

Country report Germany – November 2020

(update of the 2013 report by Prof. Helmut Gohlke and Prof. Ulrich Keil)



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I. Structure of health care in Germany

Stephan Gielen

Briefly, the German healthcare system is built on two foundations:

1. Health Insurance System

Initiated in 1883 by Bismarck the German state health insurance is probably one of the oldest national health systems in the world. It is compulsory in Germany to have health insurance with full coverage of diagnosis and treatment of diseases, rehabilitation, maternity, and medical/surgical treatment of accidents. In case the person is unable to pay (i.e. lack of income, immigration etc.) the state covers the health insurance premiums.

Everyone below a certain income level (4,687.50 € per month) is member of a legally accredited public health insurance company – currently 73.01 million people. At the moment, the premium is 14.6% of the gross income up to a specified income limit. Both the employer and the employee pay 7.3% of this insurance premium. If a person is above a certain income level he/she can remain member in the public insurance company with a maximum premium of 684.38 € per month or join a private insurance company, which determines the premiums based on individual health risk assessment and age (8.74 million people). At younger age private insurance companies often offer cheaper premiums than public insurance companies, because their members are generally less sick, better educated, and more aware of risk prevention. Because hospitals and physicians receive significantly better reimbursement in private patients, they sometimes have a more rapid access to specialized medical services and can opt to be treated by the chair of the department in person.

2. Sectoral Structure of the Healthcare System

The German healthcare system is split into three sectors: (1) The **hospital sector**, which provides the highest density of hospital beds per capita in Europe (6.0 hospital beds per 1,000, data from 2018), (2) the **ambulatory sector** as provided by general practitioners and specialists in private practice and hospital outpatient units, and (3) the **rehabilitation sector**, which still largely relies on in-hospital rehabilitation programmes. However, over the last decade outpatient rehabilitation centres have increased significantly. Especially, in urban settings ambulatory rehabilitation is becoming more important for patients with adequate mobility and/or family support.

The total number of hospital beds has significantly declined over the last three decades: In 1991 666,000 hospital beds were available in 2,411 hospitals. By 2018 25% of beds have been cut, so that 498,000 beds were open in 1,925 hospitals.

Hospitals are usually run by cities/regions (i.e. public hospitals) and by churches or charities (i.e. non-profit hospitals). In the last two decades, however, the number of private for-profit hospitals has increased significantly: While 46% of all hospitals were public in 1991 this figure has declined to 29% in 2018. The proportion of church or charity run hospitals remained largely unchanged at 34% (versus 39% in 1991), while private hospitals increased more than twofold from 15% to 37%. The two largest stock-owned companies in the hospital business are Helios-Fresenius and Asklepios.

One of the downsides of the sectoral structure of the German medical system is the loss of information and change of medication when a patient goes from one sector into another.

3. Finances

Germany spends 391 billion € per year on its healthcare system, which represents 11.7% of the gross domestic product or 4,712 € per capita (data from 2018). Only Norway, Switzerland, and the USA spend more money per capita on their healthcare according to 2019 data.

The direct costs of all cardiovascular diseases amount to appr. 46.4 billion € annually. Of this sum 8 billion € are directly related to stroke or myocardial infarction.

4. Life Expectancy

Life expectancy in Germany remains at an average of 81.0 years, which is equivalent with the average EU28 life expectancy. Lifespan is highest in Switzerland (83.7 years) and lowest in Lithuania (74.9 years) among OECD countries.

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Deutsches Ärzteblatt 2020, 117 (42), p. 1666: Weniger Betten auf Normalstationen. (*German*)

II. Risk factor statistics

Stephan Gielen, Helmut Gohlke

Risk factor prevalence in men and women in Germany

Risk Factor	Overall	Male	Female	Trend	Data from
Smoking	22.4%	26.4%	18.6%	↘	2018
Overweight (BMI 25 to ≤30)	44.3%	52.9%	35.6%	↗	2003
Obesity (BMI >30)	22.9%	22.5%	23.3%	↗	2003
Sports/physical activity ≥2 h per week	43.3%	46.5%	40.6%	→	2012
Childhood overweight/ obesity	8.7% 6.3%	8.8% 6.3%	8.5% 6.4%	↗ ↗	2007
Risky alcohol consumption	26.3%	32.3%	20.6%	→	2012
Hypertension	31.8%	32.8%	30.9%	→	2015
Diabetes	7.7%	8.6%	7.0%	↗	2015
Salt intake	9.2 g/day	10.0 g/day	8.4 g/day		2011

Source: Gesundheitsberichterstattung des Bundes (Health reporting of the Federal Republic of Germany), www.gbe-bund.de, accessed 21.08.2020. Years in the last column indicate the publication year of the data used.

Comments on Risk Factor Changes:

The major significant improvement in risk factor profile in Germany during the last decade is the reduction of smoking prevalence, particularly among adolescents and young adults. This achievement is particularly notable because Germany is among the last European countries which still permit public advertisement for tobacco.

However, the reduction in smoking prevalence is more than counterbalanced by the steady increase in overweight and obesity in the population. Today, less than 1/3 of all adults have normal weight. This development is reflected by the rise in diabetes prevalence.

Cardiovascular Disease Mortality

Stephan Gielen

	Overall	Male	Female	Trend	Data from
Total Mortality	1,151.8	1,149.1	1,154.4	→	2018
Total CVD Mortality	216.2	224.8	208,0	↘	2018
Ischemic Heart Disease related Mortality	149.5	166.7	132.9	↘	2018
Cerebrovascular Disease Mortality	66.7	58.1	75.1	↘	2018

Source: Gesundheitsberichterstattung des Bundes (Health reporting of the Federal Republic of Germany), www.gbe-bund.de, accessed 21.08.2020. Years in the last column indicate the publication year of the data used.

III. Main actors in the Healthcare Sector

Stephan Gielen, Harm Wienbergen, Bernhard Schwaab, Bernhard Rauch

1. Health Care Sector Employees & Cardiologists

In 2016 (last available data) 420 physicians per 100,000 inhabitants (EU average: 360) worked in the German health care system, about half of these in private practice (2, 3). In total, 3,293 cardiologists (2019) are currently working in Germany, equivalent to 3.97 cardiologists per 100,000 inhabitants.

In 2018 5,679 million persons (including non-physician, nurses, laboratory staff, allied health personnel and managing positions) were employed in the health care system - about 10% of the overall workforce. Of all employees 1,175 million people worked in hospitals and 122,000 people worked in prevention and rehabilitation institutions.

2. Hospitals with Departments of Cardiology

38 University hospitals with a department of cardiology and cardiovascular surgery and about 220 hospitals outside a university with a major department of cardiology and with additional 32 CV-surgery sites provide in-hospital cardiovascular care.

The number of cardiac catheterization laboratories in 2017 was 1,005 (equivalent to 1 per 82,380 inhabitants), the number of PCIs in 2017 was 378,152 (457/100,000).

The number of total procedures and procedure related mortality/morbidity data are collected on a compulsory basis by the *Institute for Quality Assurance and Transparency in the Healthcare System* (IQTIG). In case of hospitals/departments exceeding average mortality in interventional procedures a structured dialogue is started between IQTIG and the institution and causes for the increased complication rates are analyzed. If this does not lead to improvement IQTIG ultimately has the power to close interventional programmes.

3. Rehabilitation Centers

More than 160 rehabilitation hospitals offer residential CR; the *German Society for Cardiovascular Prevention and Rehabilitation (DGPR)* organizes an annual symposium and continuing education on prevention and rehabilitation.

Research Activities

Among the many studies to improve the long-term effect of cardiac rehabilitation interventions the German randomized Intensive Prevention Program (IPP) Trial is particularly notable. The IPP included intensive group education sessions, telephone visits and clinical as well as telemetric control of risk factors by non-physician “prevention assistants”.(1, 2) After 12 months patients in the IPP study arm showed significantly better results in terms of LDL-cholesterol and blood pressure levels, lifestyle modification as well as medical adherence compared to patients that were randomly assigned to “Usual Care”. The study proved the effectiveness of prevention programs based on repetitive contacts between non-physician coworkers and patients over one year after myocardial infarction. Further studies of the same working group currently investigate the effects of IPP after 24 months and if short reinterventions (“prevention boosts”) during long-term course are effective. Currently, the integration of new technologies (e-learning, video sessions) and disclosure of genetic risk (“personalized medicine”) into prevention programs (New Technologies in Intensive Prevention Programs, NET-IPP Trial) is being investigated.(3) It is the purpose of these studies to improve evidence on the effects of long-term prevention programs after coronary events and to implement optimized strategies for secondary prevention into clinical practice.

A second aspect which receives growing attention in clinical studies is the increasing prevalence of geriatric patients >80 years in rehabilitation programmes. In a prospective multicentric cohort study Eichler and colleagues enrolled 344 patients after TAVI and measured frailty as a predictor of participation in either cardiac or geriatric rehabilitation. (5) The authors found that higher values in instrumental activities of daily living (ADL) reduced the probability for referral to geriatric rehabilitation (GR, OR:0.49, $p < 0.001$), while an impaired mobility was positively associated with referral to GR (OR: 3.97, $p = 0.046$). Clinical parameters like stroke (OR:0.19 of GR, $p = 0.038$) and the EuroSCORE (OR:1.04 of GR, $p = 0.026$) were also predictive of being referred to geriatric rehabilitation.

Mechanical circulatory support is an increasingly used therapeutic option in terminal heart failure. In 2016 Willemsen and colleagues published a position paper on “Rehabilitation standards for follow-up treatment and rehabilitation of patients with ventricular assist device (VAD)”. (6) The paper is unique in Europe, focusses on device management, INR self-management, drive-line care, and medication and represents a milestone to overcome the heterogeneity of VAD patient rehabilitation.

Rehabilitation sciences are increasingly represented as academic departments of German universities and medical schools. Prof. H. Völler is one of the first experts who received a chair of rehabilitation sciences at the University of Potsdam in 2012.

German rehabilitation experts are part of the EAPC European network of experts and are actively involved in EAPC position papers: From the position paper on EAPC accreditation (7) to a recent call for action for cardiac telerehabilitation in times of the COVID-19 pandemic. (8)

To improve the knowledge on preventive cardiology among German cardiologists the German Cardiac Society (DGK) implemented a new qualification “special cardiovascular prevention” in 2019 that will be granted to physicians successfully completing courses on cardiovascular prevention now offered twice a year in Germany.(4) The courses are chaired by prevention experts and convey theoretical knowledge, case examples and practical tips that clarify the implementation of knowledge into practice. The aim of the new qualification is to improve awareness and skills of physicians on cardiovascular prevention.

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IV. Prevention activities

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1. Prevention of smoking

Different societies and groups (cardiac, pulmonary, cancer, addiction, general prevention) are committed to reduce the rate of active and second-hand smoking in Germany and oppose against the interests of tobacco industry. In the „Task Force Non-Smoking“ („Aktionsbündnis Nichtraucher e.V.“) 15 German societies together try to improve non-smoker rights by lobbying for a better legislation.

Unfortunately, in Germany prevention of smoking by state institutions or representatives of the state is worse than in other European countries. This has recently been documented by the European Tobacco Control Scale that evaluates parameters such as budget, price of cigarettes, public place bans and health warnings regarding tobacco smoking.(5) In this ranking of 36 European countries Germany was on the last position.

Several unresolved issues make smoking prevention difficult:

- Germany is the only EU country where tobacco products can be advertised in public spaces via billboards.
- Taxes on tobacco products are too low.
- In many federal states of Germany, a range of exemptions for public place smoking bans exist.

The effectiveness of public place smoking bans has been demonstrated by several German studies.

In the Bremen STEMI registry a significant decline of hospital admissions due to STEMIs in non-smokers was observed after the smoking ban came into force, probably due to the protection of non-smokers from second-hand smoking.(6) Furthermore, an analysis of health insurance data (Deutsche Angestellten-Krankenkasse, DAK) showed that law implementation was associated with reductions of hospitalisations for angina pectoris and acute myocardial infarctions resulting in cost savings.(7)

Electronic cigarettes (e-cigarettes)

The increasing use of e-cigarettes is criticized by prevention experts. The German Task Force on Prevention published numerous statements on this topic, pointing out that e-cigarette use facilitates conventional cigarette smoking of adolescents and e-cigarette vapour is suspected to have toxic effects that require more research.(8, 9)

Recently, a German working group has published that e-cigarette vapour exposure increases vascular, cerebral, and pulmonary oxidative stress via a NOX-2-dependent mechanism.(10) Further data indicated that e-cigarette smoking is associated with impaired endothelial function and increased arterial stiffness.(11) These studies suggest that immediate and decisive public action is warranted to reduce e-cigarette smoking, particularly amongst youth, in order to limit health risks.

2. Promotion of Physical Activity

An effective way to increase the public level of physical activity is to provide large-scale outreach-programs. They may have a high potential to motivate even sedentary people to be physically active. The “Walk 10!” programme is one example to demonstrate how these programs could be successfully performed:

“Walk 10!”, which is in its 13th year in Bavaria by now, is the largest physical activity health campaign accompanied by the Bavarian television. Every year 30,000-40,000 people take part from all over Bavaria. “Walk 10!” is addressed to overweight, physically inactive people with a cardiovascular risk profile such as diabetes, hypertension, lipid metabolism disorders or sleep apnoea syndrome. The project aims to reduce the cardiovascular risk factors and to get people more physically active within 10 weeks. Thus, the participants are supported to increase their physical activity level starting with 10 minutes of walking or slow jogging in week one, up to accomplishing a 10 km walk or run at the end of week 10. The Bavarian Television accompanies four protagonists during the 10 weeks. They are examined in the Centre of Prevention and Sports cardiology in Munich, in order to document the improvements from baseline to the end of the program and to spread their success through the media. Once a week, there are interviews with nutritionists, practical cooking lessons with the celebrity chef Christian Henze as well as exercise training sessions with Professor Halle of the University Hospital Klinikum rechts der Isar of the Technical University Munich. The participants also receive recommendations for physical training in consideration of specific risk factors or obesity. The health campaign concludes with a 10 km running event. This year, it was held only with protagonists and their companions due to the COVID-pandemic. Next year, “Walk10!” will be continued from April onwards with the final run on July 09, 2021. Spin-offs of Walk-10 have been established in other German cities (e.g. Bremen) to spread the idea of physical activity among the public.

3. Promotion of Guideline-oriented Dyslipidemia Management

Established coronary artery disease:

With the publication of the new [ESC/EAS Clinical Practice Guideline on the Management of Dyslipidemias](#) the LDL-C target for very high-risk patients was lowered to <55 mg/dl. In Germany, like in many other European countries, this more aggressive target range continues to be a matter of controversy. While

hospital-based cardiologists are now prescribing high-potency statins (e.g. atorvastatin and rosuvastatin) as first choice to achieve maximal LDL-reduction most of the associations representing general practitioners and non-hospital cardiologists (such as Kassenärztliche Vereinigungen) recommend the use of simvastatin and pravastatin in the majority of patients – mainly due to lower costs. In negligence of the vast evidence-base for increased clinical benefit of aggressive lipid lowering financial aspects continue to dominate much of the debate in the ambulatory sector.

Additionally, real-life data from Saxony-Anhalt document a 12-month drop in adherence to statin prescription of 15.7% (from 85.4% at hospital discharge to 72.9% after 12 months) in patients with angiographically documented coronary heart disease.⁸

The German Cardiac Society (DGK) is actively promoting guideline-oriented therapy of dyslipidemias through the German translation of the ESC/EAS guideline, which has been published in 2020.

Familial hypercholesterolemia:

Since 2014 newly diagnosed patients with familial hypercholesterolemia are registered in the *Cascade Screening and Registry for High Cholesterol (CAREHIGH registry)*. The aim of the prospective registry is to improve the identification of patients with familial hypercholesterolemia and to collect data about treatment status and disease course. Additionally, the registry encourages the cascade screening of families in case of newly diagnosed cases to identify asymptomatic FH patients at young age.

In Bavaria the large-scale VRONI study led by Prof. Schunkert (Munich) has started in 2020. In this trial over 60,000 children between the age of 5 and 14 years will be systematically tested for FH as part of the regular prevention/vaccination examinations (U9 – J1). Above an LDL-C value of 135 mg/dl a genetic testing for FH will be initiated.

4. Nutrition

After years of lobbying efforts - both at national and EU level – Germany has recently introduced a 5-class colour-coded classification system for the labelling of preproduced food called Nutri-Score. The new legislation was finally approved on October 9th 2020 and introduced in November 2020.

Currently, printing the Nutri-Score on the package is voluntary. Energy content, healthy and unhealthy ingredients are all evaluated and a scale from A to E (from green to red) indicates whether products are healthy (i.e. A-B) or unhealthy (i.e. D-E) within their category.

Unhealthy eating habits and lack of physical activity are the major contributors to the increasing rate of obese people in Germany, particularly among adolescents.

Critics of the Nutri-Score argue that the score should be made compulsory in order to achieve a major impact on eating habits.



5. Academy Courses on Special Cardiovascular Prevention

Courses on cardiac prevention and rehabilitation are becoming more common in Germany: A few years after the *German Society of Cardiac Prevention and Rehabilitation* (DGPR) started to offer a course to become a “Cardiovascular Prevention Specialist (DGPR)” the *German Society of Cardiology* (DGK) is now also offering special courses:

Last year the DGK Project Group on Prevention headed by Prof. R. Hambrecht (Bremen) successfully launched the first DGK-organized Academy Courses of Special Cardiovascular Prevention during its autumn meeting in Berlin.(4) The courses are chaired by prevention experts and convey theoretical knowledge, case examples and practical tips that clarify the implementation of knowledge into practice. The aim of the new qualification is to improve awareness and skills of physicians on cardiovascular prevention and to propose a framework for potential future board certification of cardiovascular prevention as a cardiology subspeciality.

While the DGPR traditionally reaches out to rehabilitation and prevention institutions the DGK has great influence on hospital-based and outpatient cardiological centres. I can therefore be hoped that the visibility of cardiovascular prevention in cardiology will be increased through both course programmes.

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V. Cardiac Rehabilitation in Germany

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Phase II cardiac rehabilitation (CR) in Germany is established for more than 50 years. Traditionally, a 3-week-course of comprehensive CR takes place, predominantly as inpatient CR, with emphasis on exercise training, dietary counselling, patient education on life-style risk factors, and psychosocial support as core components. In the last 20 years, however, outpatient CR is a well-established alternative being performed in up to 10 % in patients younger than 65 years and in less than 5 % in older ones (1). The current indications from a survey from the German Society of Prevention and Rehabilitation of Cardiovascular Diseases (DGPR, www.dgpr.de) in 2018 are as follows:

Indication

Acute coronary syndrome	29.2%
Coronary artery bypass surgery (CABG)	16.6%
Transfemoral aortic valve implantation (TAVI)	11.7%
Valvular surgery	10.3%
Atrial flutter/fibrillation	7.3%
Aortic surgery	5.8%
Device implantation (pacemaker, ICD, CRT)	5.8%
Peripheral vascular disease	5.6%
Combined cardiac surgery	4.6%
Heart failure	3.6%
Pulmonary embolism	3.5%
Cardiomyopathies	3.4%
Ventricular assist implantation (VAD)	0.4%
Heart transplantation	0.15%

In summary, the majority of patients sent to cardiac rehabilitation is still recovering from cardiac surgery or interventional therapy. Heart failure – although a class I indication for cardiac rehabilitation – ranks in the lower third of indications. The influence of cardiologists to change this distribution is, however, limited, because indications for rehabilitation are set by the major public health insurance companies.

In Germany, CR is financed by pension funds in patients being still employed and by health insurances in retired patients. The legal retirement age in Germany will be 67 years by the year 2031. In the working age group, return to work (RTW) represents a major topic of CR. Besides cardiac related parameters, psychosocial and work-related factors are predictors of successful RTW. In a recent published study out of 1262 patients (54 ± 7 years, 77% men) 864 patients (69 %) returned to work, within 6 months after CR discharge. Predictors of failed RTW were primarily the desire to receive pension (OR = 0.33, 95 % CI:0.22-0.50) and negative self-assessment occupational prognosis (OR = 0.34, 95 % CI:0.24-0.48) at CR discharge, acute coronary syndrome (OR = 0.64, 95 % CI:0.47-0.88) and comorbid heart failure (OR = 0.51, 95 % CI:0.30-0.87). High educational level, stress at work and physical as well as mental health related quality of life (HRQL) were associated with successful RTW (2). To achieve optimal reintegration, expanded CR including aftercare prevention programs enables the sustainability of medical success of CR and serves as a bridge between temporarily limited CR and the everyday lives of the patients. In Germany, several follow-up programs (IRENA: intensive rehabilitation aftercare; BERONA: occupationally orientated rehabilitation aftercare; IMBURINA: intensified medically and professionally orientated rehabilitation care) have been implemented since 2001 (3).

Another important component of long-term prevention are ambulatory cardiac sports groups which are co-financed by the health insurance companies and offer weekly medically supervised physical exercise training to patients after cardiac events. In older patients, the task of CR is also to prevent or delay dependency and to enable patients to stay at their homes instead of moving into a nursing home. In 2001 self-determined and independent participation in social life has been recognized as a goal of CR by law. Most geriatric patients are referred to CR after transcatheter valve implantations (TAVI) (1). Because nutrition and mobility predict all-cause mortality in these frail patients a tailored CR program should be applied (3).

As the German pension fund (DRV) pays for the majority of rehabilitation programs sophisticated quality assurance reporting systems are in place to document the benefit of the intervention and guarantee common standards of care.

CR in Germany has changed dramatically during the COVID-19 pandemic. Data from a recent survey (August 2020) in 45 centers of the DGPR reveal that more than 40 % of the institutions had to close partly or complete. 31,1 % of CR centers treated patients with cardiac complications/manifestations after COVID-19 disease mostly after acute coronary syndrome (29,6 %) and pulmonary artery embolism (25,9 %) (5). Isolated outbreaks of COVID-19 in rehabilitation institutions have changed patient attitude to CR. Now many patients decline to participate in CR because of fears of being exposed to COVID-19 patients. Extensive hygiene measures have been introduced to guarantee patient safety in times of the COVID-19 pandemic. Nonetheless, it is expected that the pandemic will negatively affect CR participation with consecutive negative impact on patient recovery after cardiovascular events. The complex problems of providing CR in the future are described in a recently published recommendation paper based on a large-scale Delphi questionnaire (6).

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Evidence-Based Clinical S3 Guideline for Cardiovascular Rehabilitation in the German Speaking Countries of Europe – Germany, Austria, Switzerland

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General information on guideline initiation and development

Initiated and supported by the *German Society of Prevention and Rehabilitation of Cardiovascular Diseases* (DGPR, www.dgpr.de) a structured and evidence-based guideline for initiation and delivery of cardiovascular rehabilitation in Germany, Austria and Switzerland has been developed and published in German language in 2019 (www.awmf.org). (1) Apart from the DGPR six additional medical societies and associations of Germany, as well as the “Österreichische Kardiologische Gesellschaft” (ÖKG), the “Swiss Working Group for Cardiovascular Prevention, Rehabilitation and Sports Cardiology” (SCPRS), and the German pension funds participated in developing and consenting the guideline. The structured and predefined consensus process was guided and controlled by the “Association of the Scientific Medical Societies in Germany” (AWMF). Moreover, the German Heart Foundation participated by representing patient’s view to promote shared decision making.

Within this guideline four major topics were evaluated and graded on the basis of newly implemented structured scientific reviews and meta-analyses (guideline level “S3” according to the AWMF grading rules). (1-5) These topics include the clinical and prognostic effect of CR participation in patients after acute coronary syndrome (ACS) and after coronary artery bypass grafting (CABG), as well as in patients with severe chronic systolic heart failure (HFrEF, LVEF ≤ 40%). (2-4) Moreover, the additional clinical effects of predefined psychological interventions during CR participation were also evaluated by a newly realized structured review and meta-analysis serving as a basis for specific guideline recommendations. (5)

The recommendations of all other CR specific topics within the guideline were based on predefined semi-structured literature searches and consented by the involved medical societies (“S2k”-level according to the AWMF regulations). (1) A total of 92 experts participated in generating the actual scientific evidence including experts from the Cochrane Institute of the University of Düsseldorf and the Institute of Medical Biometry and Informatics of the University of Heidelberg. On the basis of this actualized scientific evidence clinical recommendations were discussed and finalized by the scientific committee representing expert delegates from the participating medical societies. The discussion and decision process was moderated and controlled by official representatives of the AWMF.

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V. Cardiac Rehabilitation

Contents of the guideline

The guideline starts by outlining legal requirements and baseline CR structures of the three participating countries, thereafter describing aims and tasks of cardiac rehabilitation. Following these introductory chapters a large number of indications for CR initiation and delivery were evaluated with regard to the particular clinical, prognostic and psychosocial effects of CR participation (Table 1).

Following CR indications the specific therapeutic interventions delivered during cardiac rehabilitation with emphasis on exercise training, psychosocial interventions, lifestyle changes as well as motivation and education are outlined, and potential specific issues regarding age, gender and migration were considered and graded. The guideline then continues with the evaluation of phase III rehabilitation, long-term prevention programs and new concepts like “tele”-rehabilitation and/or “home-based” rehabilitation and closes up with issues on CR quality management.

In conclusion, the evidence-based scientific guideline on indication and delivery of cardiovascular rehabilitation in German speaking countries provides an extensive presentation of the actual state of the art to strengthen CR quality and facilitate further progress and improvements in CR delivery. This guideline is also supposed to be a first step in harmonizing rehabilitation contents and delivery within the participating three countries, and thereby setting minimal requirements/standards needed for successful cardiovascular rehabilitation.

Table 1: Topics of the LLKardReha evaluated on the basis of predefined methodological procedures (1)
Indications for CR delivery
Acute coronary syndrome (ACS)
Coronary artery bypass grafting (CABG)
Stable coronary artery disease (CAD)
Patients with increased CV risk
Chronic heart failure
Heart valve repair
Patients with Implanted Cardioverter Defibrillator (ICD) and/or Cardiac Resynchronization Therapy (CRT)
Ventricular assist device (VAD)
Patients after heart transplantations (HTX)
Surgical or interventional repair of the aorta
Atherosclerosis of the peripheral arteries
Pulmonary embolism
Severe pulmonary hypertension
Patients after myocarditis
Adults with congenital heart disease
Therapeutic interventions during CR delivery
Nurses and physician`s role in CR
Physical exercise training specifically adapted to the individual`s disease
Psychosocial interventions
Interventions to stop smoking
Nutrition
Ergotherapy
Vocational support and social participation
Motivation, information, education as specified by risk factors/diseases
Special aspects of age, gender, migration
Phase III rehabilitation and long-term prevention programmes
New concepts in cardiovascular prevention and rehabilitation

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VI. The Future

Stephan Gielen

A COVID-19 Foreword:

Future is a difficult topic when the medical problems of the presents are as pressing as they are right now. In a world gripped by the COVID-19 pandemic any other medical topics are currently a second priority. This is particularly sad since cardiovascular diseases still by far outnumber COVID-19 or any other disease entity as major cause of death. Nonetheless, the functioning of health care systems in general and intensive care units in particular depends on the rigidity of social distancing, quarantine for infected patients and contacts, and hygienic preventive measures including COVID-19 testing of elective patients. Many rehabilitation hospitals currently struggle for survival because hygienic restrictions result in great reluctance of patients to participate in such programmes. It is unclear when restrictions may be lifted and how the pandemic may affect the financing, the structure, and the priorities in the German health care system in the years to come. Health politics – formerly a minor part of the political discussion – has come to centre stage. Despite the current dominance of COVID-19 this change and the money which is now flowing into better national and European coordination of health policies is certainly bringing a new level of priority to all health policy issues. In the medium- to long-term period other health topics with great impact on longevity and public health may ultimately benefit from the changes we are about to witness.

Nutrition: Among the positive developments regarding cardiovascular prevention is the introduction of the **NutriScore system** to give consumers a better idea of how healthy or unhealthy certain food products are. It remains to be seen whether a voluntary system of labelling works or if it needs to be made compulsory to have an impact on nutrition habits. Because of large COVID-19 outbreaks in the meat industry and the negative climate impact of meat production better standards and higher prices for meat production are currently being discussed. If changes are implemented, higher meat prices may potentially reduce the amount of **meat consumption** in Germany – which would have a positive impact on cardiovascular disease incidence. Fruit and vegetable consumption should be increased; trans fatty acids (TFAs) should be labeled as such and consumption reduced. In Austria and Denmark e.g. TFAs are banned from industrial products, which should also be implemented in Germany. Resistance from the food industry in the trans fatty acid issue will be high.

Dyslipidemia: According to a recent survey, less than a quarter of all very high-risk patients in Germany achieve a target LDL-C <55 mg/dl. A major obstacle to reaching this goal are recommendations for cheap

low-potency statins by GP associations. The DGK and other allied societies press hard to make high-potency statins the first choice of therapy. Additionally, insurance companies are still very reluctant to pay for PCSK9 inhibitors – even when clearly indicated. A one-year futile treatment effort with statins needs to be documented before payment may be granted.

Finally, an FH screening programme similar to the Netherlands is much needed. The VRONI study in Bavaria is a first big step towards this goal.

Smoking bans in other federal states need to be adjusted according to the highest standards recently achieved in North-Rhine-Westphalia. Fortunately enough, after decades of discussion, the German parliament has finally voted in favour of a general ban of tobacco product advertisement. Cinema advertisements are prohibited starting in 2021, a more general ban on outside advertisement of tobacco products will come into place in 2022. A major challenge for the future is to implement the same level of bans on innovative electronic smoking devices (vaporizers etc.).

Obesity and **decreased physical activity** are a huge problem, which has been aggravated by the COVID-19 pandemic. Lockdowns, closures of schools and sport facilities make physical activity more difficult than before. The situation calls for a coordinated effort of politicians and medical societies to improve consumer options for a healthy choice regarding nutrition (through health scores such as NutriScore and taxation of particularly unhealthy food products) and initiation of digital training programmes adapted to individual age and risk. This field should not be left to for-profit companies in the smartphone business. Finally, the increasing awareness of climate change as an immediate danger has changed the concepts of urban planning and has led to a more physical activity friendly environment in many cities with separate lanes for bicycles. This megatrend will continue as societies strive to become CO₂ neutral.

On a general note, primary prevention has not yet become a priority of German health policy. We are still lacking a life-long concept for primary prevention, starting during school, continuing during work, and going on after retirement. First studies on workplace prevention interventions (i.e. PreFord study) document the health benefits derived from such efforts, but a larger vision is clearly needed.