

Clinical Practice Guideline

Comprehensive Geriatric Assessment in the Hospital

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Summary

Background: An increasing number of older people are being treated in German hospitals. In 2022, more than 35.7 million hospitalized patients in Germany were of age 65 or older. Comprehensive geriatric assessment (CGA) can help to structure and improve the diagnosis and treatment of these patients, many of whom suffer from multimorbidity.

Methods: The guideline group developed this guideline in accordance with the AWMF recommendations. Answers to questions were either evidence-based or consensus-based; the latter were established with a Delphi procedure followed by a consensus conference. The guideline was issued in May 2024.

Results: The guideline contains twelve evidence-based and eight consensus-based recommendations and statements. The strongest evidence for the effectiveness of CGA was found in the wards for acute geriatric medicine, oncology, and orthopedics/trauma surgery, with weaker evidence from emergency departments and general surgery wards. Core elements of the guideline are the specification of a minimum duration of CGA (15 minutes), the definition of mini-

mum requirements (six core dimensions: self-help ability, mobility, cognitive function/delirium, affect, nutrition, social situation), and setting-specific process recommendations. Specific screening instruments to identify patients who stand to benefit from CGA are recommended mainly in the oncological setting (G8 questionnaire).

Conclusion: The German clinical practice guideline on CGA can serve as a guide to personalized geriatric medicine in the hospital. Further complex interventional studies are needed to evaluate the efficacy of CGA in other settings.

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It is expected that by 2040 the proportion of older people in the total population will have increased from 19% at present to up to 26%; given the parallel increase in the burden of disease, this trend will have a major impact on the healthcare system (1). More than 35.7 million cases of in-patient treatment were recorded in the age group 65 years or older in Germany in 2022 (2). The high degree of medical, functional, psychological, and social heterogeneity observed in the older population is attributable to differences in the aging process as well as factors such as health behavior and exposure to environmental factors (3, 4). In the 1940s, Dr. Marjory Warren founded modern geriatrics by developing a resource- and function-oriented care approach, thereby enabling the discharge of numerous patients hospitalized over several months (5). This approach served as the starting point for the development of comprehensive geriatric assessment (CGA) which seeks to identify problems both in the inpatient and outpatient settings at an early stage and enable an appropriate response. CGA is a multidimensional process designed to determine and evaluate resources and deficits based on the biopsychosocial model; CGA is considered the gold standard for improving numerous relevant

endpoints for older people in acute care hospitals (6). Yet until now, no corresponding S3-level clinical practice guideline has been issued for German-speaking countries. The primary aim of the evidence- and consensus-based (= S3-level) clinical practice guideline “Comprehensive Geriatric Assessment (CGA) in the Hospital” (7) is to improve hospital care and aftercare in geriatric patients usually aged 65 years or older with multimorbidity and limited self-help ability.

Methods

The guideline group consisted of a steering committee (eTable 1) and mandate holders of various scientific medical societies as well as patient representatives (eTable 2). The Guidance Manual and Rules for Guideline Development of the Association of the Scientific Medical Societies in Germany (AWMF, Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften) (8) and the Appraisal of Guidelines

for Research and Evaluation II (AGREE II) instrument (9) served as the methodological basis. (9).

The development of the research question is described in the online version (*eFigure 1*). *Figure 1* shows the PRISMA diagram with the results of the comprehensive literature search. Of the altogether 5303 publications screened, 45 were eligible for inclusion. The AMSTAR 2 (A MeaSurement Tool to Assess systematic Reviews) tool was used to assess the methodological quality of the included systematic reviews. The guidelines included were assessed using the AGREE II instrument. The quality of evidence and strength of recommendation were rated using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach. The confidence of evidence was assessed in four levels (high, moderate, low, very low) for all relevant endpoints. In addition, the following aspects were considered for determining the strength of recommendation based on the evidence-to-decision (EtD) framework of GRADE (10): benefits and harms, patient values and preferences, resources, equity, acceptability, and feasibility. The methods used to determine the grade of recommendation as well as the evidence-to-decision table can be found in the online version (*eFigure 2* and *eTable 3*).

After a multistage Delphi process, a structured consensus conference under the neutral moderation of the AWMF, external review, and approval by the issuing medical societies/organizations, the guideline was published on 21 May 2024.

Results

When determining the strength of recommendation (for an EtD assessment overview see also *eFigure 2*), an advantage in conducting CGA compared to standard care was found across all 20 recommendations and statements of the guideline (*eTable 3*).

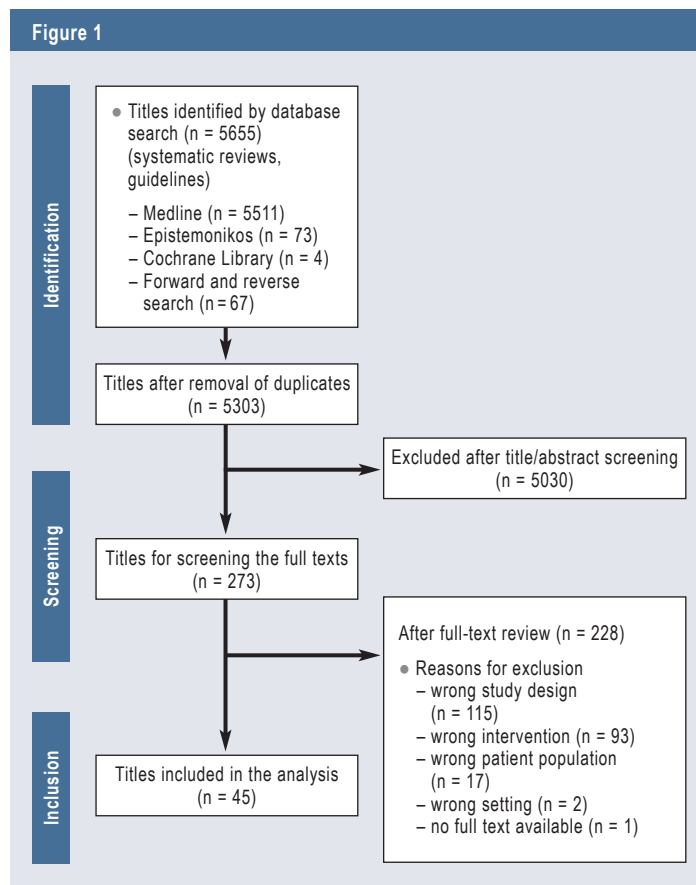
General recommendations and statements

The six general recommendations and statements are listed in *Table 1* and will be discussed below based on the clinically relevant questions.

What is CGA and what is its purpose?

Multidimensionality, interprofessionality and the need for an adequately accurate assessment based on the biopsychosocial model are considered the main features of CGA (*Table 1*) (general statement no. 1) (11). In contrast to qualitative screening approaches, CGA assesses and quantifies deficits, needs and resources in the functional and psychosocial domains of the person and goes beyond individual diseases and organ dysfunctions. The comprehensive assessment and holistic view allow individualized treatment planning and prognostication (12). Not all patients benefit to the same extent. Mainly in orthogeriatrics, a benefit of CGA is noted particularly in persons with moderately increased vulnerability and higher pre-morbid functional ability (13, 14).

The first general recommendation (*Table 1*, no. 2) advises implementing a screening tool that can identify geriatric patients with complex treatment requirements where treatment can be improved with the help of CGA (grade of recommendation A). Examples of use of these



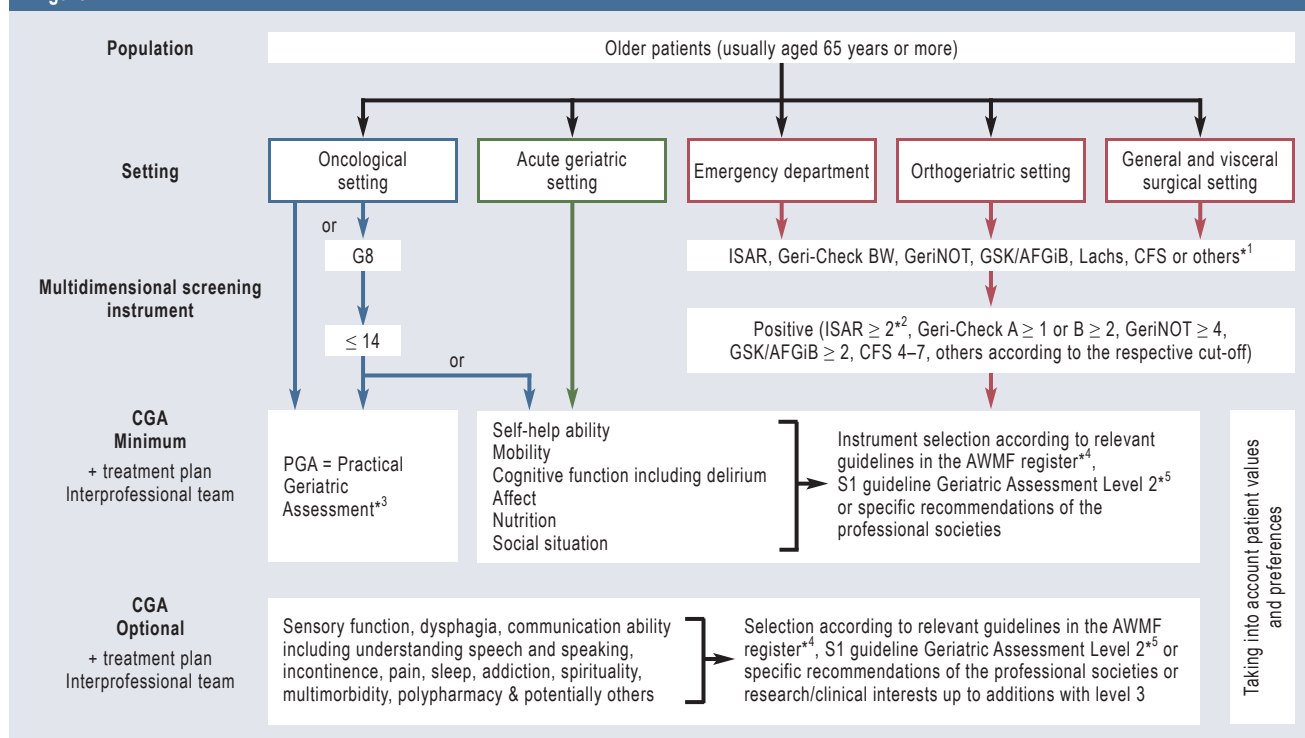
PRISMA flowchart of the literature search

tools include older persons prior to systemic cancer treatment, elective surgical procedures or, as prescribed in the structural criteria for the treatment of hip fractures, also in emergency departments. Suitable screening instruments are listed in *Figure 2*. Depending on the setting, more appropriate instruments can be used, such as the Identification of Seniors at Risk (ISAR) test in the emergency department (15) or the Geriatric-8 (G8) questionnaire in oncology (16), while patients in geriatric wards do not require any screening prior to CGA.

Which professions/persons are involved in performing CGA?

The interprofessional geriatric treatment team called for in the second general recommendation (*Table 1*, no. 3) reflects good clinical practice; interprofessionality is assumed in most of the evidence reviewed (6, 16–20). CGA performed in this manner proved effective mainly in that it led to improvements in the investigated endpoints of mortality, institutionalization rate, delirium, functionality, length of stay, and activities of daily living (ADL). Since this is to be regarded as indirect evidence, the levels of evidence were reduced by one level in each case (overall low level of evidence) and the grade of recommendation was lowered to B. In the oncology setting in particular, a key element of CGA is the involvement of patients and caregivers (including relatives) in the assessment process (16, 18). The second general statement (*Table 1*, no. 4) refers to the possibility of improving the quality of life (QoL) of older patients and their caregivers by involving the caregivers in the CGA process; this improvement is partly attributable to a reduced burden on the caregivers (21, 22).

Figure 2



Screening CGA algorithm

*¹ In the case of, for example, new evidence for the relevant setting

*² ≥ 3P regionally possible for higher specificity

*³ ASCO (American Society of Clinical Oncology) guidelines

*⁴ <https://register.awmf.org/de/start> (examples with links on pp. 5/7 of the implementation manual)

*⁵ <https://register.awmf.org/de/leitlinien/detail/084-002LG>

AFGiB, Medical Working Group for the Promotion of Geriatrics in Bavaria (Ärztliche Arbeitsgemeinschaft zur Förderung der Geriatrie in Bayern); CFS, Clinical Frailty Scale; CGA, Comprehensive Geriatric Assessment; G8, Geriatric-8 screening tool; Geri-Check BW, Geriatrics Check Baden-Württemberg; GSK, Geriatric Screening on Hospital Admission (Geriatrisches Screening bei Klinikaufnahme); ISAR, Identification Of Seniors at Risk; Lachs, geriatric screening according to Lachs

Which dimensions are relevant for CGA?

The third general statement (Table 1, no. 5) lists six essential and some optional CGA dimensions, which can be supplemented by additional dimensions, depending on the setting and question to be addressed. The essential dimensions—self-help ability, mobility, cognitive function, including delirium, affect, nutrition, and social situation—are derived from the reviewed evidence (6, 23) and the German OPS catalog 2024 (24), the Dutch CGA guideline (25), and the Integrated Care for Older People (ICOPE) recommendations of the WHO (26).

What is the optimum duration of a geriatric assessment?

The majority of studies showing beneficial effects of CGA-based interventions use assessment instruments that require a minimum total time of 15 minutes as specified in the third general recommendation (Table 1, no. 6) (examples are provided in Table 3). There are no comparative studies with different assessment durations or cut-offs. All of the studies with information or recommendations on the assessment duration are from the oncology setting. As with the interprofessional team approach, CGA carried out within the specified duration proved to be effective with regard to the endpoints treatment toxicity and secondary dose reduction (27) which is to be regarded as

indirect evidence. For this reason, the levels of evidence of the end-points were downgraded to overall low and the grade of recommendation was reduced to B.

Figure 3 provides a checklist with the essential and optional dimensions as well as the professional groups involved.

Setting-specific recommendations and statements

Setting: Emergency Department

Older people often present to the emergency departments of hospitals for acute illnesses. In Germany, the proportion of over-70-year-olds in the emergency departments is about 30% (28). According to a systematic review, the mortality within a period of three months after the visit to the emergency department is about 10% on average (29). Thus, it is crucial to detect vulnerable patients early on so that health and social problems can be identified and targeted treatment initiated (30). Yet conducting CGA in the emergency department (ED) remains a challenge, given that the lack of planning, the frequent absence of caregivers and the acute nature of illnesses seen in the emergency department setting often make it difficult to perform a structured assessment. However, if CGA is indicated, the later conduct of the assessment can already be planned in the ED. The three consensus-based recommendations (twice grade of recommendation B, once grade of recommendation 0, see Table 2) focus on carrying out at least one screening in the emergency department with the dimensions of cognition (dementia, delirium), self-help ability and mobility (risk of

Table 1

General recommendations and statements

1.	CGA is a multidimensional and interprofessional process aiming to identify and consider medical, psychosocial, and functional deficits and resources in geriatric patients. A CGA complements medical history and examination and is used for treatment and care planning, monitoring, and prognostication.	Statement, consensus-based, consensus strength 91%
2.	The indication for a CGA should be based on the definition of geriatric patients (age, geriatric-specific multimorbidity, self-help ability) or validated, multidimensional screening instruments.	↑↑ Strong recommendation, consensus-based, consensus strength 100%
3.	We suggest following an interprofessional team approach when performing a CGA and implementing the resulting treatment plan, involving regular communication among nursing professionals, therapists, social services, and physicians with geriatric qualifications, including patients and, where possible, their caregivers.	↑ Weak recommendation, evidence-based, level of evidence low, consensus strength 100%
4.	Involving caregivers (family members, persons of trust) in the performance of a CGA and in a CGA-adapted treatment can improve the quality of life for both the patient and the caregivers.	Statement, consensus-based, consensus strength 100%
5.	A CGA includes at least the following dimensions: self-help ability, mobility, cognitive function including delirium, affect, nutrition, and social situation. Additional dimensions could include, among others: sensory perception, dysphagia, communication skills including language and speaking, incontinence, pain, sleep, addiction, spirituality, multimorbidity, and polypharmacy.	Statement, consensus-based, consensus strength 100%
6.	We suggest a CGA duration of at least 15 minutes to provide therapeutically relevant statements.	↑ Weak recommendation, evidence-based, level of evidence low, consensus strength 100%

Recommendations and statements adopted from the long version of the guideline (7)
CGA, Comprehensive Geriatric Assessment

falling), as well as checking medication and asking patients about their values and preferences. Information about the premorbid functional status and, for example, the question whether preference is given to living the longest possible life or to living an independent life can have a significant impact on treatment planning from maximum care through to a palliative approach.

Setting: Oncology

With increasing age, the incidence of most cancers also increases. About half of cancer patients are 65 years or older (31). However, the fact that geriatric patients are usually considerably underrepresented in clinical trials (32) makes selecting an appropriate hemato-oncological treatment regimen and deciding on dose intensity more difficult. As a result, older people with cancer often experience over- or under-treatment which can lead to increased complication, morbidity and mortality rates (33). On the basis of the available evidence (very low quality of evidence), two recommendations (grade of recommendation B) and a statement were developed (Table 2). The guideline recommends screening of older cancer patients using the G8 questionnaire that can be completed in a few minutes and covers items such as food intake, mobility, psychosocial aspects, and polypharmacy; in patients with a G8 score of 14 or more points, the screening is followed by CGA. In all geriatric patients and all patients aged 70 years or older, CGA should always be performed before initiating systemic cancer therapy. Whilst the level of evidence is very low, partly due to a lack of meta-analyses, there is some evidence pointing to improvements in numerous endpoints (such as treatment completion, quality of life, disease burden). After CGA, a statistically significant and clinically very relevant absolute reduction in treatment toxicity by 13% is observed; CGA does not seem to cause a delay in treatment initiation (27).

Setting: Orthogeriatrics

More than 50% of all surgical procedures are performed on persons aged 65 or older (17). The most common reason for admission to an

orthogeriatric ward is fall-related hip fracture in an older person with osteoporosis (34). In Germany, the incidence of hip fractures is approximately 130 per 100 000 population per year (35), with women being more frequently affected than men. Postoperative complications occur in about one third (33.6%) of patients (36). In Germany, geriatric trauma centers (ATZ, Alterstraumatologisches Zentrum) were introduced in 2014 to enable the provision of interprofessional and interdisciplinary care for older persons after accidents or falls, taking factors specific to older patients, such as pre-existing health problems, mobility and living conditions, into account. A large epidemiological study conducted in Germany found a decrease in the adjusted 30-day mortality by 22% (absolute risk reduction of 2.48%; number needed to treat: 40) in patients admitted to hospitals with orthogeriatric co-management (37).

The four recommendations received three times the grade of recommendation B and once the grade of recommendation 0 (Table 2). The guideline recommends screening patients aged 70 and older with hip fractures in the emergency department and initiating CGA in case of abnormal screening results—because CGA can lead to improvements in the endpoints institutionalization rate, functional ability and complication rate (including delirium) (evidence level low in each case), which could explain the above-mentioned effect on mortality—as well as perioperative orthogeriatric co-management. In case of other fractures and orthopedic conditions, geriatric patients can also benefit from CGA (evidence level very low in each case).

Setting: General and visceral surgery

In general and visceral surgery, the number of geriatric cases is also increasing. In 2019, bowel surgery in patients aged 60 or older ranked first with 285 200 procedures.

Table 2

Setting-specific recommendations and statements

Setting: Emergency Department	1.	We suggest conducting a multidimensional screening in the emergency department to identify older patients with specific diagnostic and treatment needs, leading to the implementation of a CGA during further care (ambulatory/inpatient).	↑ Weak recommendation, consensus-based, consensus strength 95%
	2.	To provide optimal care for older patients in the emergency department, we suggest a screening instrument selection considering the complexity of these patients and including the dimensions cognition (dementia, delirium), self-help ability and mobility (fall risk), polypharmacy review, and asking patients for their values and preferences.	↑ Weak recommendation, consensus-based, consensus strength 100%
	3.	Based on the deficits and resources identified during the screening, interventions may be performed in the emergency department, whenever possible. A subsequent CGA can be at least planned, to be performed at a later time.	↔ Practical recommendation, consensus-based, consensus strength 95%
Setting: Oncology	1.	For older oncology patients, we suggest conducting a geriatric screening using the G8 questionnaire to identify those who may benefit from a CGA prior to initiating systemic cancer therapy.	↑ Weak recommendation, evidence-based, level of evidence very low, consensus strength 100%
	2.	In patients ≥ 65 years with a G8-score ≤ 14 points, geriatric patients, and all patients ≥ 70 years, we suggest conducting a CGA prior to initiating systemic cancer therapy to reduce the risk of CTCAE Grade 3 or higher therapy-associated toxicity.	↑ Weak recommendation, evidence-based, level of evidence very low, consensus strength 100%
	3.	A CGA in older patients in oncology is unlikely to cause a delay in starting systemic cancer therapy.	Statement, evidence-based, level of evidence very low, consensus strength 100%
Setting: Orthogeriatrics	1.	For patients ≥ 70 years old with a hip fracture, we suggest checking a geriatric treatment indication using an appropriate screening tool already in the emergency department and, if necessary, planning a subsequent CGA.	↑ Weak recommendation, evidence-based, level of evidence low, consensus strength 100%
	2.	In patients with a hip fracture identified as geriatric in the screening, we suggest conducting a CGA, as a CGA-adapted treatment can reduce institutionalization rate, maintain functional ability, and decrease overall complication rate including delirium occurrence.	↑ Weak recommendation, evidence-based, level of evidence low, consensus strength 90%
	3.	For patients with a hip fracture identified as geriatric during screening, we suggest ensuring perioperative interdisciplinary orthogeriatric co-management to implement the aforementioned recommendations.	↑ Weak recommendation, evidence-based, level of evidence very low, consensus strength 100%
	4.	The recommendations provided for patients with hip fractures may also be applied to patients with other fractures or orthopedic conditions identified as geriatric in the screening.	↔ Practical recommendation, evidence-based, level of evidence very low, consensus strength 95%
Setting: General and visceral surgery	1.	In general and visceral surgery, a CGA-adapted treatment for geriatric patients can reduce the risk of postoperative delirium and shorten the hospital stay.	Statement, evidence-based, level of evidence very low, consensus strength 100%
	2.	We suggest determining the indication for surgical intervention and the operability of geriatric patients not by chronological age, but by the individual risk of perioperative complications, which can be estimated through a screening CGA algorithm.	↑ Weak recommendation, consensus-based, consensus strength >95%
Setting: Acute geriatrics	1.	Comprehensive geriatric assessment (CGA) should be carried out in the acute geriatric setting, including all relevant therapeutic dimensions, to improve relevant health-related endpoints (living at home, risk of institutionalization, activities of daily living).	↑↑ Strong recommendation, evidence-based, evidence level moderate, consensus strength 95%
	2.	There is preliminary evidence that in the acute geriatric setting, CGA-adapted treatment can improve patients' quality of life.	Statement, evidence-based, level of evidence very low, consensus strength 89%

Recommendations and statements adopted from the long version of the guideline (7) CGA, Comprehensive Geriatric Assessment

Next was bile duct surgery with 216 100 endoscopic procedures. Total hip replacement surgery just reached third place with 204 900 procedures (38). The guideline contains one evidence-based statement (level of evidence very low) and one consensus-based recommendation

(grade of recommendation B) for this setting (Table 2). A CGA-adapted treatment strategy can reduce the risk of postoperative delirium and shorten the length of hospital stay (19). An assessment should be made based on a screening CGA algorithm in order to determine the indication for surgery as well as operability (Figure 2).

Table 3

Examples of commonly used geriatric assessment instruments*1

Dimensions	Assessment instruments	Possible/common interventions if a need is identified
Self-help ability	Barthel index (ADL) IADL assessment instrument (various)	• Nursing staff: activating care, incontinence counselling • Physiotherapy: provision of aids, strength training • Occupational therapy: assessment of home safety and treatment /counselling) • Social services: social care services, nursing services
Mobility	Timed Up and Go (TUG) Short Physical Performance Battery (SPPB) de Morton Mobility Index (DEMMI) Charité Mobility Index (CHARMI)© 4-m walking test Fall during the last 12 months?	• Physiotherapy: gait assessment, provision of aids, strength training, balance training • Additionally, in patients with history of falls: – Identifying the causes of falls (e.g., orthostatic dysregulation, FRIDs) – Information about measures to prevent falls (minimize tripping hazards, adapt footwear, anti-slip socks, etc.) – Review osteoporosis treatment!
Nutrition	Nutritional Risk Screening (NRS 2002) Mini Nutritional Assessment (MNA-SF/LF)	• Use of dietary supplements or dietary interventions (e.g., high-protein puddings by therapeutic units) • Determine etiology of reduced dietary intake and treat, if possible • Nutritional counseling/dietician, dentist, speech therapy (in case of swallowing difficulties), physiotherapy/occupational therapy (in case of motor impairments affecting food intake) • Social services: organization of Meals on Wheels • Medication review (appetite-reducing or emetogenic drugs?)
Cognition	Montreal Cognitive Assessment (MoCA) Mini Mental State Examination (MMSE) Six-Item Screener (SIS)*2 Montreal Cognitive Assessment-5 min (MoCA-5 min)*2	• Third-party medical history (obtaining information from relatives/trusted persons about the patients cognitive abilities) • Assessment of decision-making ability; if possible, involvement of caregivers/ holders of a power of attorney • Adapted language, in particular when discussing treatment and prognosis • Additional workup (e.g., neuropsychological testing, cerebral imaging) to establish the diagnosis; if necessary, initiation of pharmacotherapy • Occupational therapy: cognitive stimulation
Delirium	4 A's Test (4AT) Nursing Delirium Screening Scale (Nu-DESC) Delirium Observation Screening Scale (DOSS) Confusion Assessment Method (CAM) CAM-short*2	• Non-pharmacological measures to prevent/treat delirium (e.g., primary nursing, providing orientation measures, hearing aids, glasses, and dentures, adjusting surgical planning) • Rooming-in/consistent involvement of relatives
Affect	Geriatric Depression Scale (GDS-5/-15) Patient Health Questionnaire (PHQ-2*2/4*2 /-9) Two Whooley Questions*2	• Co-assessment/co-treatment by psychologist/psychiatrist • Assessment of risk of suicide • Pastoral care • Initiation of pharmacotherapy/psychotherapy, if necessary
Social situation	Structured social history according to OPS 8–550 specifications	• Social services: Social support at home? Emergency contact person? Further care at home questionable in the opinion of patients? • If necessary, organize: nursing service, neighborhood assistance, home help, emergency call button, stair lift, analog/digital aids for daily living • Creation of a living will, enduring power of attorney

*1 These are not recommendations from the guideline, but additional information based on the selection/assessment of the authors. The Table does not claim to be exhaustive and is intended as an exemplary list of instruments. Most of the assessment instruments can be found on the website of the Kompetenz-Centrum Geriatrie, in the German S1-level guideline "Geriatric Assessment Level 2" or online for free (www.kcgeriatrie.de; <https://register.awmf.org/de/leitlinien/detail/084-002LG>). Instruments should be selected based on expertise and individual requirements.

*2 Commonly used instruments when time resources are limited, e.g., in the emergency department or surgery settings

ADL, Activities of Daily Living; CGA, Comprehensive Geriatric Assessment; FRIDs, Fall-Risk Increasing Drugs; IADL, Instrumental Activities Of Daily Living; SF, short form; LF, long form; OPS, German Operation and procedure codes

Setting: Acute geriatrics

In-hospital care for geriatric patients is often provided in specialized geriatric units designed to prevent functional decline and associated complications in older adults admitted to hospital for an acute event (39). Overall, geriatric care in Germany is concentrated in hospitals and rehabilitation facilities, and this trend is increasing. One recommendation (grade of recommendation A) and one statement of this guideline describe the effects of CGA on various endpoints (Table 2). In acute geriatrics, a CGA, covering all treatment-relevant dimensions, should be performed, since this approach can lead to significant improvements in the endpoints living at home (relative risk [RR] 1.06; 95% confidence interval [1.01; 1.10], absolute risk calculated from the meta-

analysis 59.4% in the CGA group versus 56.1% with standard care) and risk of institutionalization (RR 0.80 [0.72; 0.89], calculated absolute risk 14.9% in the CGA group versus 18.6% with standard care) and a possible improvement in activities of daily living (level of evidence moderate) (6). The literature search found evidence indicating significant beneficial effects for further endpoints, such as risk of falls (RR 0.51 [0.29; 0.88], calculated absolute risk 5.7% in the CGA group versus 7.7% with standard care) and the risk of delirium (RR 0.73 [0.61; 0.88], calculated absolute risk 19.5% in the CGA group versus 22.7% with standard care) (level of evidence low) (39). CGA-adapted treatment can

lead to a slight improvement in the patients' quality of life (standardized mean difference 0.12; level of evidence very low) (21).

In the long version of this guideline, no specific assessment instruments are mentioned; instead reference is made to the S1-level guideline "Geriatric Assessment Level 2" (40) and clinical practice guidelines for the respective dimensions. However, examples of assessment instruments and possible interventions to address identified needs are shown in Table 3 to facilitate implementation of the recommendations in everyday clinical practice. Further instrument examples and recommendations can be found in the mentioned guidelines.

Discussion

The evidence search and discussion during the development of this guideline showed that, although it is not clearly defined whether CGA is merely a diagnostic procedure or also comprises a therapeutic intervention, studies demonstrating beneficial effects always include aspects of an interprofessional team, treatment planning, treatment itself, and aftercare. The guideline group agreed on the definition presented in the first General Statement which was largely adopted from Rubenstein (11) and includes treatment planning and follow-up.

The guideline presented here has answered many questions, but has also identified a need for further research. Examples of relevant research questions include:

- Which assessment instruments and which combination of assessment instruments are the most effective for the defined endpoints?
- Is it also possible in other settings, such as cardiology, gastroenterology or neurosurgery, to improve patient management in relation to the defined endpoints by introducing CGA-adapted treatment?
- Is CGA-adapted treatment also effective and cost-effective in view of the relevant endpoints in the outpatient setting (primary care physicians and office-based specialists)?

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Conflict of interest statement

The authors declare that no conflict of interests exists.

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Clinical practice guidelines in the *Deutsches Ärzteblatt*, as in many other journals, are not subject to a peer review process, since clinical practice (S3 level) guidelines are texts which have already been evaluated, discussed, and broadly agreed upon multiple times by experts (peers).

Translated from the original German by Ralf Thoene, M.D.

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Supplementary material

Complete list of full references, eTables, eFigures:
www.aerzteblatt-international.de/m2024.0262

Supplementary material to accompany the article

Comprehensive Geriatric Assessment in the Hospital

by Barbara Kumlehn*, Simone Brefka*, Thomas Kocar, Filippo Maria Verri, Rainer Wirth, and Michael Denking

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eTable 1

Members of the steering committee

Dr. Simone Brefka	Resident physician and research associate, Agaplesion Bethesda Hospital Ulm, Germany
Prof. Dr. Michael Denking	Guideline coordination, Medical Director Agaplesion Bethesda Hospital Ulm and Institute of Geriatric Research, University Hospital Ulm, Ulm, Germany
PD Dr. Valentin Goede	Head Oncogeriatric Unit, Dept. of Geriatric Medicine, St. Marien Hospital Cologne, Germany
PD Dr. Werner Hofmann	Institute of General Practice, University Hospital Schleswig-Holstein (UKSH), Campus Lübeck, Germany; German Geriatric Society (DGG)
Univ.-Prof. Dr. Bernhard Iglseder	Head of Department of Geriatric Medicine, University Hospital Salzburg, Austria; Austrian Society for Geriatrics and Gerontology (ÖGGG)
Dr. Thomas Kocar	Resident physician and research associate, Agaplesion Bethesda Hospital Ulm, Germany
Dr. Sonja Krupp	Scientific Management of Research Group Geriatrics Lübeck (FGL), Lübeck, Germany
Barbara Kumlehn	Resident physician and research associate, Agaplesion Bethesda Hospital Ulm, Germany
PD Dr. Thomas Münzer	Medical Director of Geriatric Clinic St. Gallen, Switzerland; Swiss Society for Geriatrics (SFGG)
Dr. Nina Neuendorff	Department of Geriatric Medicine and Early Rehabilitation, Marien Hospital Herne – University Hospital of Ruhr University Bochum, Herne, Germany
Prof. Dr. Dr. M. Cristina Polidori	Head of Clinical Aging Research, Department II of Internal Medicine (Nephrology, Rheumatology, Diabetology, and General Internal Medicine), University Hospital Cologne, Cologne, Germany, and Cologne Excellence Cluster on Cellular Stress Responses in Aging-Associated Diseases (CECAD), University of Cologne, Cologne, Germany
Prof. Dr. Ulrich Thiem	Head of Department of Geriatrics, Albertinen-Haus Hamburg, and Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany
Filippo Maria Verri	Resident physician and research associate, Agaplesion Bethesda Hospital Ulm, Germany
Prof. Dr. Rainer Wirth	Medical Director of Department of Geriatric Medicine and Early Rehabilitation, Marien Hospital Herne – University Hospital of Ruhr University Bochum, Herne, Germany German Geriatric Society (DGG)

eTable 2

Scientific medical societies and organizations in alphabetical order

Scientific medical societies/organizations	Mandate holders	Second mandate holders (deputies)
German National Association of Senior Citizens' Organisations (BAGSO)	Dr. Eugen Engels	Dr. Walter Swoboda
German Society of General and Visceral Surgery (DGAV)	Prof. Dr. Andreas Anton Schnitzbauer	
German Society of Anesthesiology and Intensive Care Medicine (DGAI)	Dr. Eva Schönenberger	Prof. Dr. Rainer Kiefmann
German Society for Occupational Therapy Science (DGEW) in cooperation with the German Occupational Therapy Association (DVE)	Julika Tiedje	
German Society of Nutritional Medicine (DGEM)	Prof. Dr. Dorothee Volkert	
German Geriatric Society (DGG)	Prof. Dr. Rainer Wirth	
German Society of Gerontology and Geriatrics (DGGG)	Prof. Dr. Helmut Frohnhofen	
German Society of Geronto-Psychiatry and -Psychotherapy (DGGPP)	PD Dr. Jens Benninghoff	
German Society of Gynecology and Obstetrics (DGGG)	Dr. Ulrich Füllers	Prof. Dr. Günter Noé
German Society of Hematology and Medical Oncology (DGHO)	Prof. Dr. Ulrich Wedding	
German Society of Internal Medicine (DGIM)	Prof. Dr. Harald Rittger	
German Society of Interdisciplinary Emergency and Acute Medicine (DGINA)	Prof. Dr. Katrin Singler	Dr. Petra Wilke
German Society of Neurology (DGN)	Univ.-Prof. Dr. Christine von Arnim	
German Society for Orthopedics and Trauma Surgery (DGOU)	Prof. Dr. Carsten Schöneberg	
German Society of Palliative Medicine (DGP)	PD Dr. Mathias H.-D. Pfisterer	
German Society for Physiotherapy Science (DGPTW)	Prof. Dr. Tobias Braun	Dr. Hanna Brodowski
German Society of Nursing Science (DGP)	Prof. Dr. Thomas Fischer	Samuel Hahn, M.A.
German Association for Psychiatry, Psychotherapy and Psychosomatics (DGPPN)	Prof. Dr. Vjera Holthoff-Detto	Dr. Stefan Kreisel, M.Sc.
German Society of Urology (DGU)	Prof. Dr. Andreas Wiedemann	
Austrian Society of Geriatrics and Gerontology (ÖGGG)	Univ.-Prof. Dr. Bernhard Iglseder	
Swiss Society of Geriatrics (SFGG)	PD Dr. Thomas Münzer	
Center for Geriatric Medicine and Gerontology Freiburg (ZGGF)	Prof. Dr. Cornelius Weiller	Prof. Dr. Christoph Maurer

e Table 3

Evidence-to-decision assessment of 20 recommendations and statements

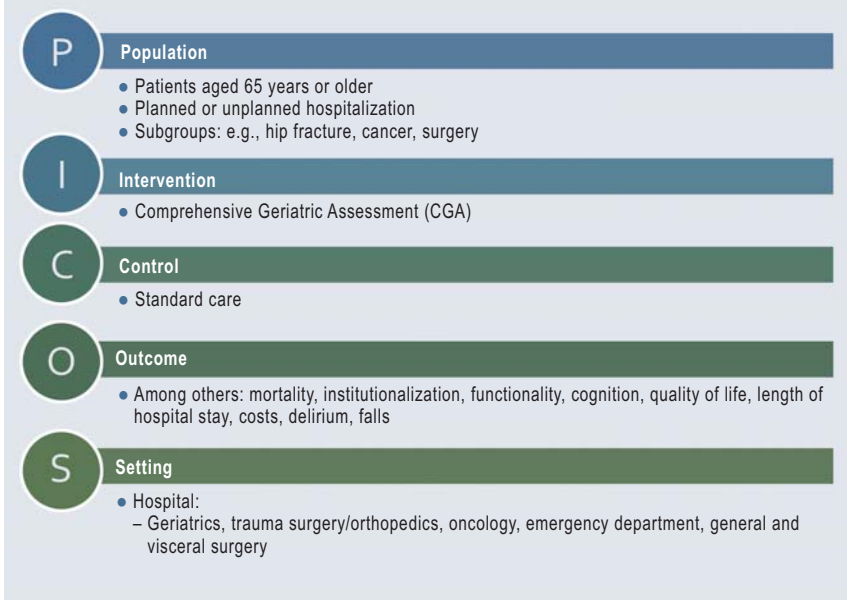
Recommendation/ Statement	Basis	Benefit/harm	Certainty of evidence	Patient values/preferences	Resources	Equity	Acceptability	Feasibility
General part								
1	c	Overall benefits outweigh the risk of potential harm: achievable by comprehensive assessment, a holistic approach, identification of deficits and resources, individual treatment planning, and prognostication	"Multidimensional"/"interprofessional" mentioned as CGA criteria; definition of Rubenstein includes identification of resources; advantages of CGA for treatment planning and prognostication (oncological setting: mortality/survival, treatment toxicity, post-operative complications, institutionalization), but no meta-analyses; mortality, institutionalization and complication rate also in other settings, but not with regard to the aspect of prognostication	Can be identified in a structured way and better taken into account; individual treatment planning and prognostication are wishes patients are likely to have	Potential initial increase in costs versus long-term cost savings	Can be increased by promoting needs-based provision of care	Positive opinion, because benefits > harms and cost savings in the long term	Can be achieved with careful planning and implementation strategy; listed in the BfArM's OPS catalog 2024 under 1-771
2	c	Benefits for identified geriatric patients (see General Statement 1); little additional time required, therefore not to be regarded as disadvantageous for non-geriatric patients	Hamaker et al. (2012): no tool with both high sensitivity and specificity available; G8 / TRST highest sensitivity; NCGN guideline: G8/VES-13 most commonly used tools	Can be identified in a structured way and better taken into account; individual treatment planning and prognostication are wishes patients are likely to have				
3	e	Specific qualities of the professional groups can be used in a coordinated manner; great benefit thanks to the involvement of patients themselves (wishes/preferences?) & involvement of relatives (possibly supplementary information); no harm expected	"Interprofessional" mentioned as a CGA criterion in numerous publications; CGA defined in this way proves to be effective; involvement of patients and caregivers are key CGA elements; indirectness included in the assessment	Can be identified in a structured way and better taken into account; comprehensive assessment and own involvement as well as additional involvement of relatives are wishes patients are likely to have				
4	c	Benefit for patient thanks to caregiver involvement (possibly additional information); benefit for caregiver through stress reduction, e.g., benefit through learning how to cope with stress; indirect benefit also for patients: no harm to be expected	Reduction in burden = an increase in quality of life for caregivers thanks to CGA; influence of the inclusion of caregivers in the assessment on patients' quality of life not significant, but can be assumed	Can be identified in a structured way and better taken into account; improving their own quality of life and the quality of life of their caregivers are wishes patients are likely to have				
5	c	Benefits from comprehensive assessment and holistic view, individual treatment planning possible; the more dimensions, the more differentiated the assessment; harm not to be expected, only increased time expenditure	Disalvo et al.: additional comorbidities and polypharmacy; Ellis et al. (2017): medical, functional, mental, social, and environment-related problems = core dimensions; 2024 OPS catalog "Standardized Geriatric Assessment" with at least 5 dimensions; Dutch guideline CGA: optional dimensions as in S1-level guideline Geriatric Assessment	Can be identified in a structured way and better taken into account; individual treatment planning and differentiated assessment are wishes patients are likely to have				

6	e	With comprehensive diagnostics, benefits from more precise/meaningful results with targeted treatment planning; harm not to be expected, only increased time expenditure	Duration of CGA not evaluated as an independent variable in the body of evidence; several cancer studies and guidelines mention mean durations, under these conditions, CGA achieves improvements in several endpoints; indirectness of evidence taken into account	Can be identified in a structured way and better taken into account; precise outcomes and targeted treatment planning are wishes patients are likely to have				
Setting: Emergency Department								
1	c	Overall benefits outweigh the risk of potential harm; when including all investigated endpoints: 4 x benefit of CGA, 13 x no difference	Very low	Can be identified in a structured way and better taken into account; identification of special examination and treatment needs are wishes patients are likely to have				
2	c	Overall benefits outweigh the risk of potential harm; when including all investigated endpoints: 4 x benefit of CGA, 13 x no difference	Very low	Can be identified in a structured way and better taken into account; optimal care in the emergency department is wish patients are likely to have				
3	c	Overall benefits outweigh the risk of potential harm; when including all investigated endpoints: 4 x advantage of CGA, 13 x no difference	Very low	Can be identified in a structured way and better taken into account; comprehensive assessment and individual treatment planning as a part of CGA are wishes patients are likely to have				
Setting: Oncology								
1	e	Overall benefits outweigh the risk of potential harm; when including all investigated endpoints: 8 x benefit of CGA, 1 x no difference	Very low (indirectness taken into account)	Can be identified in a structured way and better taken into account; comprehensive assessment and individual planning of systemic cancer treatment are wishes patients are likely to have				
2	e	Overall benefits outweigh the risk of potential harm; when including all investigated endpoints: 2 x advantage of CGA, 1 x indication of benefit, 6 x no difference	1 x very low (indirectness taken into account), 1 x moderate	Can be identified in a structured way and better taken into account; low risk of treatment-associated toxicity is a wish patients are likely to have				
3	e	Overall benefit predominates. Risk of possible harm: when including all investigated endpoints: 2 x benefit of CGA, 7 x no difference	1 x very low (indirectness taken into account), 1 x moderate	Can be identified in a structured way and better taken into account; no delay in initiation of chemotherapy is a wish patients are likely to have				
Setting: Orthogeriatrics								
1	e	Identifying patients who would benefit most from CGA leads to an increased benefit for those affected.	3 x low, 1 x moderate	Can be identified in a structured way and better taken into account; correct identification of treatment needs is a wish patients are likely to have				

2	e	Conducting CGA offers a significant benefit for those affected. The literature reviewed does not contain any evidence of harm.	2 × low, 1 × high	Can be identified in a structured way and better taken into account; discharge home while preserving functionality and reducing the risk of postoperative delirium are wishes patients are likely to have			
3	e	Interdisciplinary co-management is useful for conducting CGA and the resulting treatment. The literature reviewed does not contain any evidence of harm.	3 × very low	Can be identified in a structured way and better taken into account; interdisciplinary approach to identifying treatment needs and resulting interventions are wishes patients are likely to have			
4	e	In orthogeriatrics, conducting CGA is likely to also result in a benefit in fractures other than hip fractures. Harm is negligible or non-existent.	6 × very low, 1 × low, 1 × moderate (downgrading due to indirectness of the evidence)	Can be identified in a structured way and better taken into account; expected benefits in the absence of harm is a wish patients are likely to have			
Setting: General and visceral surgery							
1	e	Overall benefits outweigh the risk of potential harm: in both included endpoints benefit of CGA	1 × very low, 1 × moderate	Can be identified in a structured way and better taken into account; lower risk of delirium and shorter length of hospital stay are wishes patients are likely to have			
2	c	Overall benefits outweigh the risk of potential harm: when including all investigated endpoints: 2 × benefit of CGA, 2 × no difference	2 × very low, 2 × moderate	Can be identified in a structured way and better taken into account; individual risk assessment for peri-operative complications is a wish patients are likely to have			
Setting: Acute geriatrics							
1	e	Overall benefits outweigh the risk of potential harm: when including all investigated endpoints: 8 × advantage of CGA, 3 × no difference, 2 × high level of uncertainty (= no statement possible)	2 × high, 1 × moderate	Can be identified in a structured way and better taken into account; improvements in relevant health-related endpoints is a wish patients are likely to have			
2	e	Conducting CGA can lead to benefits in terms of improving quality of life: no evidence of harm in the reviewed literature	Level of evidence for quality of life very low (Chen 2021: significant difference, but serious risk of bias, serious inconsistency and publication bias; Ekdahl: no significant difference)	Can be identified in a structured way and better taken into account; improvement in quality of life is a wish patients are likely to have			

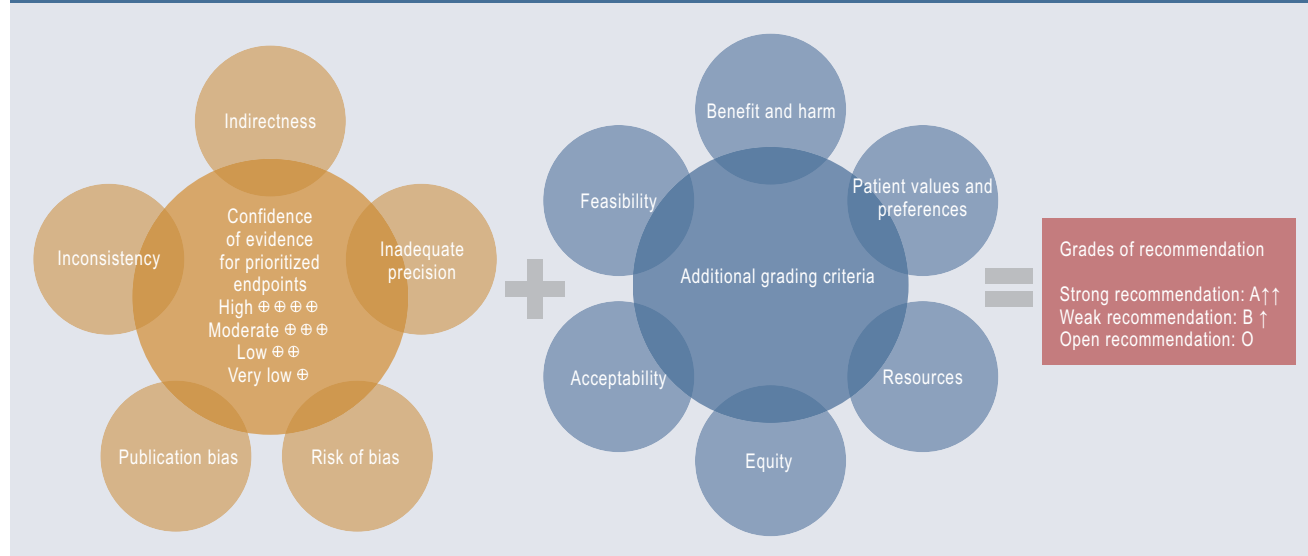
* Assessment also performed for consensus-based recommendation/statements: c, consensus-based; e, evidence-based

eFigure 1



PICOS scheme

eFigure 2



Evidence and evidence-to-decision assessment using GRADE

Essential (diagnosis and intervention)	
Dimensions	Team
Self-help ability	Specialist experienced in geriatric medicine
Mobility	Therapists (ideally: physiotherapy and occupational therapy)
Cognitive function including delirium	Nursing staff
Affect	Social services
Nutrition	
Social situation	
Optional (diagnosis and intervention)	
Dimensions	Team
Sensory function	Speech therapy
Dysphagia	Psychology
Communication ability incl. understanding speech & speaking	Hospital pastoral care
Incontinence	Setting-specific specialist
Pain	Assessment nurse to support assessment
Sleep	
Addiction	
Spirituality	
Multimorbidity	
Polypharmacy	
Other	

Checklist: Dimensions and Occupational Groups
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