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Guideline synopsis for a DMP "osteoporosis"[1]

Extract

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Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen
Im Mediapark 8
50670 Köln
Germany

Phone: +49 221 35685-0
Fax: +49 221 35685-1
E-mail: berichte@iqwig.de
Internet: www.iqwig.de

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External expert of the rapid report

- Henning Kunter, Kalk Evangelical Hospital, Cologne, Germany

The IQWiG thanks the external expert for his collaboration in the project.

IQWiG employees

- Corinna Ernsting
- Nicole Holzmann
- Wiebke Hoffmann-Eßer
- Mandy Kromp
- Ulrike Lampert
- Claudia Mischke
- Lutz Altenhofen

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Overview

Research question

The aim of the present investigation was to identify current evidence-based guidelines, summarize their recommendations as key statements and to specify those key statements that are suitable for a DMP for osteoporosis.

An answer to the following question was to be obtained:

- For which aspects of health care can suitable key statements be identified?

Key results

The guideline synopsis is based on the analysis of 23 guidelines that included a total of 643 recommendations. Table 1 provides an overview of the aspects of health care covered in the respective guidelines.

Key statements that were assessed as particularly suitable or as suitable for a new DMP could be identified for 8 aspects of health care. Table 2 also lists the number of key statements per aspect of health care for which either a further appraisal is proposed, the suitability of the key statement for a new DMP could not be assessed, or the key statement was assessed as not very suitable.

Table 1: Overview of the health care aspects for which the guidelines contain recommendations

Guideline	**Health care aspect**										
	Definition of osteoporosis	**Diagnostics**	**Treatment goals**	**Therapeutic measures (principles of therapy)**	**Therapeutic measures (non-drug and general measures)**	**Therapeutic measures (drug treatment)**	**Monitoring – duration of treatment**	**Monitoring – follow-ups**	**Cooperation between health care sectors**	**Rehabilitation[b]**	**Education of the insured**
AACE 2016	X	X	X	X	X	X	X	X	X	–	X
AAFP 2016[c]	–	X	–	–	X	–	–	–	–	–	–
AAFP 2015[c]	X	–	–	–	X	X	–	X	–	–	–
AAOS 2014	–	X	–	X	X	X	–	–	X	–	–
ACOG 2012[d]	X	–	–	X	–	X	–	X	–	–	X
ACP 2017	X	–	–	X	–	X	X	X	–	–	–
ACR 2017	–	–	–	–	X	X	–	X	–	–	–
DGI 2016	–	X	–	X	X	X	–	X	–	–	X
DKG 2017	–	X	–	-	X	X	–	X	–	–	–
DVO 2017	X	X	–	X	X	X	X	X	X	–	X
Gluszko 2014	X	X	–	–	X	X	–	X	X	–	–
ISCD 2013	–	X	–	–	–	–	–	–	–	–	–
ISCD 2013 VFA	–	X	–	–	–	–	–	–	–	–	–
ISO 2016[c]	X	X	–	–	X	X	–	X	–	–	–
NICE 2012[d, e]	X	X	–	–	–	–	–	X	–	–	–
NICE 2017 ADD	–	-	–	–	X	–	–	–	–	–	–
NOGG 2017	X	X	–	X	X	X	X	X	X	–	–

(continued)

Table 1: Overview of the health care aspects for which the guidelines contain recommendations (continued)

Guideline	Health care aspect										
	Definition of osteoporosis[a]	Diagnostics	Treatment goals	Therapeutic measures (principles of therapy)	Therapeutic measures (non-drug therapy and general measures)	Therapeutic measures (drug treatment)	Monitoring – duration of treatment	Monitoring – follow-ups	Cooperation between healthcare sectors	Rehabilitation[b]	Education of the insured
OC 2015	–	–	–	–	X	X	–	–	–	–	–
RACGP 2017	X	X	–	–	X	X	X	X	X	–	X
SIGN 2015	X	X	–	X	X	X	X	X	X	–	X
SOGC 2014	X	X	X	X	X	X	–	X	–	–	X
SRBMM 2015[c]	–	X	–	–	X	X	X	X	–	–	–
TES 2012[c, d]	X	X	–	X	X	X	–	X	–	–	–
Total of guidelines	13	17	2	10	18	18	7	17	7	0	7

a: The definitions given in the guidelines are generally not recommendations for which a GoR and/or a LoE is identified.
b: No recommendations explicitly about rehabilitation were identified, only individual recommendations about physiotherapy or orthotics were listed under “non-drug methods” or “Cooperation between health care sectors”.
c: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).
d: The guideline is more than 5 years old at the time of publication of the rapid report.
e: Updated recommendations were published in 2017.

ADD: addendum; AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAFP: American Academy of Family Physicians; AAOS: American Academy of Orthopedic Surgeons; ACOG: American College of Obstetricians and Gynecologists; ACP: American College of Physicians; ACR: American College of Rheumatology; DGI: German Society for Implantology; DKG: German Cancer Society; DVO: Confederation of German Osteology Associations; ISCD: International Society for Clinical Densitometry; ISO: Italian Society for Osteoporosis; NICE: National Institute for Health and Care Excellence; NOGG: National Osteoporosis Guideline Group; OC: Osteoporosis Canada; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; TES: The Endocrine Society; VFA: Vertebral Fracture Assessment

Table 2: Number of key statements with assessment of their suitability for a new DMP

Health care aspect	Assessment of suitability (number of key statements)				
	Particularly suitable	**Suitable**	**Proposal for further appraisal**	**No assessment possible**	**Not very suitable**
Diagnostics					
▪ History and physical examination	0	2	1	2	1
▪ Estimation of individual risk of fracture	0	6	0	1	0
▪ Imaging techniques	0	6	0	0	0
Treatment goals	1	0	0	0	0
Therapeutic measures					
▪ **Principles of therapy**	0	2	0	1	0
▪ **Non-drug treatment and general measures**					
▫ Lifestyle	0	4	0	0	0
▫ Calcium and vitamin D	0	6	0	0	2
▫ Surgical methods and treatment of fractures	0	1	0	1	2
▫ Orthotics	0	0	1	0	0
▫ Prevention of falls	0	1	0	0	0
▫ Treatment of pain and functional impairments	0	1	0	0	0
▫ Dental implants	0	1	0	0	0
▪ **Drug treatment**					
▫ Indication for drug treatment	0	3	0	0	0
▫ Specific treatment of secondary osteoporosis	0	5	0	0	4
▫ Existing fractures (spine, femur)	0	0	0	1	0
▫ Hormone (replacement) therapy	0	3	1	0	1
▫ Antiresorptive therapy	0	6	0	0	0

(continued)

Table 2: Number of key statements with assessment of their suitability for a new DMP (continued)

Health care aspect	Assessment of suitability (number of key statements)				
	Particularly suitable	**Suitable**	**Proposal for further appraisal**	**No assessment possible**	**Not very suitable**
▫ Drugs with antiresorptive and/or anabolic effect	0	2	0	0	0
▫ Combination treatment	0	0	0	0	1
▫ Flavonoids	0	1	0	0	0
Monitoring					
▪ Duration of treatment	0	3	0	1	1
▪ Follow-ups	1	4	0	2	3
Rehabilitation	–[a]	–[a]	–[a]	–[a]	–[a]
Cooperation between health care sectors	0	3	0	0	0
Education of the insured	0	2	0	0	0
Column total	2	62	3	9	15

a: No recommendations about this health care aspect were identified in the included guidelines.
DMP: Disease Management Programme; IQWiG: Institute for Quality and Efficiency in Health Care

Conclusions

23 evidence-based guidelines were included in the rapid report V17-02, from which suitable key statements could be generated about the following aspects of health care:

- Diagnostics,
- Treatment goals,
- Therapeutic measures:
  - principles of therapy
  - non-drug therapy and general measures,
  - drug treatment,
- Monitoring,
- Cooperation between health care sectors,
- Education of the insured.

The rapid report focussed on guideline recommendations concerning diagnostics, therapeutic measures and monitoring.

No recommendations were identified for the health care aspect “Rehabilitation”. Individual recommendations were extracted only for physiotherapy and for orthotics. However, these recommendations were presented in the sections of the report “Cooperation between health care sectors” or “Non-drug therapies”.

List of contents

List of tables

Page

List of abbreviations

Abbreviation	Meaning
ACR	American College of Radiology
AGREE	Appraisal of Guidelines for Research & Evaluation
BMD	bone mineral density
CKD	chronic kidney disease
CT	computed tomography
DMP	disease management programme
DMP-A-RL	Disease Management Programme Requirements Directive
DVO	Confederation of German Osteology Associations
DXA	dual energy X-ray absorptiometry
EVOS	European Vertebral Osteoporosis Study
FLS	Fracture Liaison Service
FRAX	Fracture Risk Assessment Tool
G-BA	Federal Joint Committee
GC	glucocorticoids
GKV	German statutory health insurance scheme
GoR	Grade of Recommendation
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HCQI	Health Care Quality Indicator Project
HRT	hormone replacement therapy
IOM	former Institute of Medicine (US), now called National Academy of Medicine
IQWiG	Institute for Quality and Efficiency in Health Care
ISO	Italian Society of Osteoporosis
LoE	Level of Evidence
MRI	magnetic resonance imaging
NOGG	UK National Osteoporosis Guideline Group
NVL	German National Health Care Guideline
RCT	randomized controlled trial
SD	standard deviation
SERM	selective estrogen receptor modulators
tTG-IgA-Ab	tissue transglutaminase-IgA antibody
T-score	bone density measurement score (given in standard deviations below the statistical average compared to healthy patients)
OECD	Organisation for Economic Cooperation and Development

Abbreviation	Meaning
PTH	parathormone
QUS	quantitative ultrasound

1 Background

Disease management programmes

Disease management programmes (DMPs) are structured treatment programmes for chronically ill people that are based on the findings of evidence-based medicine. Within these programmes, treatment methods are primarily used that correspond to the current state of scientific knowledge [1]. Patients thus receive health care that aims to prevent as far as possible the risk of late complications and acute deterioration of the disease and increase their quality of life. The goals of DMPs are, among other things, to optimize treatment, promote collaboration with service providers and thus better link diagnostic and therapeutic procedures [2].

Relevant disorder

Osteoporosis is a systemic skeletal disorder characterized by low bone mass and a microarchitectural deterioration of bone tissue, with a consecutive increase in bone fragility and susceptibility to fractures [3]. The clinical importance of osteoporosis lies in the occurrence of bone fractures and their consequences [4]. Population-related studies such as the European Vertebral Osteoporosis Study (EVOS) showed that in Germany, 7.6 % of women and 4.9 % of men between the ages of 50 and 79 years had suffered at least one osteoporosis-related vertebral fracture [5].

The following risk factors are regarded as predictors of primary osteoporosis or osteoporotic fractures: advanced age, female sex, ethnicity (Caucasian race), early menopause (in women), positive family history, low body weight, smoking, excessive alcohol consumption, lack of physical activity, as well as a diet deficient in calcium and vitamin D [6]. Furthermore, secondary osteoporosis is seen in connection with several chronic diseases and as an adverse effect of drugs [7]. The most common causes of secondary osteoporosis include: chronic inflammatory bowel diseases, chronic liver and kidney diseases, rheumatoid arthritis, anorexia nervosa, coeliac disease, hyperparathyroidism, vitamin D deficiency, hypogonadism and long-term use of corticosteroids [8,9].

Guidelines

For the present report, the term “guidelines” is used according to the definition of the Institute of Medicine (IOM): guidelines are systematically developed decision-making aids for service providers and patients about appropriate health care for specific health care problems. Their aim is to improve patient health care. Their recommendations are based on a systematic appraisal of the evidence and assessment of the benefits and harms of the alternative treatment options [10,11].

Guideline authors are expected to issue a Grade of Recommendation (GoR) and Level of Evidence (LoE). The GoR reflects the strength of a recommendation and is usually based on a weighing of the benefits and harms of a (medical) intervention in each specific health care contact, as well as on the strength of the underlying evidence of the LoE. The LoE represents an assessment of the certainty of results of the studies underlying the recommendations; in this

context, systematic reviews of randomized controlled trials (RCT) are generally awarded the highest LoE. Guideline groups often use different systems to determine GoR and LoE.

2 Research question

The aim of the present investigation was to identify current evidence-based guidelines, summarize their recommendations as key statements and to specify those key statements that are suitable for a DMP Osteoporosis.

An answer to the following question was to be obtained:

- For which aspects of health care can suitable key statements be identified?

3 Methods

Guidelines developed for osteoporosis were included in the investigation. The target population of the guideline synopsis were male and female patients with osteoporosis.

The present report is an update to final report V14-03 for which a systematic internet search in guideline databases as well as in interdisciplinary and discipline-specific guidelines was carried out. In addition, information from enquiries to authors was included.

The update search took place for the period from October 2015 (the time of the last search for Report V14-03) to July 2017. The still valid guidelines from the final report V14-03 were also included in the pool of potentially relevant guidelines. Only evidence-based guidelines applicable to the German health care system and published from April 2012 onwards that were marked as valid and/or had not exceeded the stated revision date were included. The recommendations had to be clearly designated as such.

The guideline recommendations relevant to the research question were extracted into tables, together with the related Grade of Recommendation (GoR) and Level of Evidence (LoE). In order to achieve a comparability of the largely different systems of recommendation and evidence grading in the guidelines, the GoR and LoE used in the guidelines were allocated to the categories of high, not high and unclear.

For the synthesis, the extracted recommendations were summarized as key statements.

The key statements were assessed for their suitability for a new DMP. In each case, the assessment was conducted on the basis of the GoR of the recommendations underlying the key statements. The LoE was used in addition only in cases where only recommendations with unclear GoR were available for a key statement.

The respective key statement was either assessed as particularly suitable for a DMP, suitable, not very suitable or a further appraisal of the suitability proposed or an assessment of the suitability of the respective key statement was not possible.

4 Results

4.1 Results of the information retrieval

The systematic search according to screening of the title and abstract produced 106 potentially relevant documents, the full text of which was then inspected. Six of the guidelines had already been included in final report V14-03 [12]. A further guideline was also included in final report V14-03, but updated after the end of the search and subsequently included [13]. After checking the criteria for guideline inclusion, 23 relevant guidelines could be included. The last search took place on 03.07.2017.

4.2 Synthesis of recommendations

The key statements summarized from the individual recommendations, classified according to health care aspects, are presented in the following tables (Table 3 to Table 26), together with their assessment regarding suitability for a DMP.

The first column contains the designation of the corresponding key statement, which also represents the name of the corresponding extraction table in Section A3.4 of the full rapid report, where the underlying recommendations can be found.

The second column shows the key statements synthesized from the extracted recommendations.

The third column shows the abbreviations of the guidelines that contain recommendations underlying the corresponding key statement.

The fourth column presents the ratio of the number of recommendations with high GoR underlying the corresponding key statement to the total number of recommendations regarding this key statement.

The fifth column contains an assessment as to whether the key statement is particularly suitable, suitable or not very suitable for an osteoporosis DMP or whether a further appraisal of the DMP suitability is proposed or whether no statement about suitability is possible.

Further notes on individual key statements can be found in the sixth column.

In the case of a few key statements assessed as particularly suitable and/or suitable for a DMP, discrepancies were identified between their statements about drugs or non-drug interventions, the approval status in Germany and the prescribability/reimbursability by German statutory health insurance (GKV). The discrepancies concerned the drugs parathormone (PTH), tibolone and bisphosphonates (in particular ibandronate iv, zoledronate iv) and denosumab (dose-dependent) and to the following non-drug interventions: dual energy X-ray absorptiometry (DXA) monitoring, measurement of tissue transglutaminase-IgA antibodies (tTG-IgA Ab) and bone turnover parameters, supplementation of calcium and vitamin D, as well as the prescribing of hip protectors and electromagnetic field therapy. The affected places are marked in the

relevant tables with a corresponding note. In the case of classes of drugs, these were randomly checked for German approval status and prescribability for the specific indication.

No contradicting IQWiG assessments were identified.

Since no guideline recommendations could be identified for the health care aspect “Rehabilitation”, this aspect was not listed in the synthesis of recommendations to key statements.

In the headings of the following sections, a numbering based on the Disease Management Programme Requirements Directive (DMP-A-RL) for already existing DMPs is stated after the respective designation of the health care aspect in brackets.

4.2.1 Definition of osteoporosis

All the guidelines that contain statements on this topic define osteoporosis as a chronic progressive disease characterised by a loss of bone density, rarefaction of trabecular bone and an associated increased risk of bone fractures. Five of the guidelines provide a more detailed definition of the disease in that they give precise information about T-scores (that describe the degree of bone mineral density [BMD]), which enable the stages of osteoporosis to be differentiated. Thus osteoporosis is defined as a deviation in the BMD compared to a population without osteoporosis of at least −2.5 standard deviations (SD). Osteopenia (low BMD) is present when the T-score is between −1 and −2.5 SD. Manifest osteoporosis is defined by a T-score ≤ −2.5 SD. If the T-score is ≤ −2.5 SD and there are signs in the imaging technique of at least one fragility fracture, this finding is described as severe osteoporosis.

The definitions in the guidelines are shown in Tabelle 32 of the full rapid report. Since definitions are not recommendations, no key statements were compiled from them.

4.2.2 Diagnostics (V1)

4.2.2.1 History and physical examination (T1)

Table 3: Summarizing assessment of the health care aspect “Diagnostics – history and physical examination”

Designation of the extraction table in Section A3.4.2.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T1 – K1 (General)	Diagnosis should be made on the basis of the medical history, a clinical examination and the measurement of bone density by DXA. If possible, the diagnostics should be extended by laboratory values and X-rays of the thoracic and lumbar spine. Important parameters are information about previous medications, chronic diseases, alcohol consumption and smoking and a personal or family history of fractures. The clinical examination should include information about any height loss, current spinal curvatures, balance tests, mobility, fragility and possible causes for secondary osteoporosis. The examination should include an investigation of possible testicular atrophy in men, hyperthyroidism and COPD in patients of both sexes.	RACGP 2017, TES 2012[a, b]	0 / 2	Not very suitable	
V1/T1 – K2 (Risk factors)	Risk factors for primary and secondary osteoporosis are described. If no bone density measurement is available, drug treatment should not be initiated on the basis of risk factors alone.	DKG 2017, SIGN 2015	0 / 2	Not assessable	

(continued)

Table 3: Summarizing assessment of the health care aspect “Diagnostics – history and physical examination (continued)

Designation of the extraction table in Section A3.4.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T1 – K3 (Basic diagnostics)	The focus of osteoporosis diagnostics is the differentiation between primary and secondary causes of a fracture after minor trauma or an unusually low bone marrow density, especially in patients over 50 years of age. Secondary causes are more commonly found in men and should be specially investigated in this group of patients. Diagnosis is primarily based on a comprehensive history-taking, imaging techniques to identify prevalent fragility fractures, bone density measurement (by DXA), prevalent fragility fractures, basic laboratory tests and fracture risk assessment with exclusion of other metabolic bone diseases or a T-score of −2.5 or less in the lumbar spine (anteroposterior), femoral neck, in the hip and in the radius even in the absence of a fracture. Basic diagnostics for osteoporosis should also be undertaken in patients under cancer treatment (especially antihormonal treatment, long-term steroids and induced early menopause).	AACE 2016, DKG 2017, DVO 2017, Gluszko 2014, NOGG 2017, RACGP 2017	5 / 11	Suitable	Long-term corticosteroid treatment should be mentioned as possible risk factor for osteoporosis, also in patients not receiving cancer therapy.

(continued)

Table 3: Summarizing assessment of the health care aspect “Diagnostics – history and physical examination (continued)

Designation of the extraction table in Section A3.4.2.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T1 – K4 (Basic laboratory tests)	Parameters to be measured in basic laboratory tests should always include calcium, phosphate and alkaline phosphatase, gamma-GT, creatinine clearance, ESR, CRP, blood count, TSH and PTH. Serum sodium and serum protein electrophoresis (possibly with immunofixation) are optional. Additionally, measurement of tissue transglutaminase-IgA antibody is recommended in justified cases and in individual cases, measurement of testosterone (in men), optionally hydroxy-vitamin D3 or bone resorption parameters, on suspicion also calcium excretion in 24-hour urine or measurement of cadmium. Genetic tests should not be routinely used.	AACE 2016, DKG 2017, DVO 2017, TES 2012[a, b]	2 / 10	Suitable	Measurement of tTG-IgA antibody in ambulatory care is only reimbursable by the GKV if coeliac disease is suspected (as a possible cause of the osteoporosis).

(continued)

Table 3: Summarizing assessment of the health care aspect “Diagnostics – history and physical examination (continued)

Designation of the extraction table in Section A3.4.2.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T1 – K5 (Bone turnover parameters)	Bone turnover markers (BTM), for example CTX, or biochemical markers should not be measured unless this is to assess bone resorption and monitor the pharmacological efficacy of the antiresorptive treatment. However, if these parameters are available, they can be included in the case-by-case decision in the fracture risk calculation.	DGI 2016, DVO 2017, SIGN 2015, SRBMM 2015[b]	3 / 5	Further appraisal is proposed	Measurement of specific bone resorption parameters (U-CTX, S-CTX, UDPD, TRAP 5b) in ambulatory care is not reimbursable. The guidelines sometimes give no precise explanations about bone turnover markers, biochemical markers or bone markers. This makes it difficult to compare the results.
	Inconsistency of content: One guideline recommends BTM to be considered for the initial workup and follow-up of patients, because high levels can predict bone loss and a higher risk of fracture.	AACE 2016	0 / 1		

(continued)

Table 3: Summarizing assessment of the health care aspect “Diagnostics – history and physical examination (continued)

Designation of the extraction table in Section A3.4.2.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T1 – K6 (Compression fracture/symptoms)	Patients with a vertebral compression fracture should be investigated for osteoporosis and preventative treatment initiated if necessary. An investigation is especially required if there is no (significant) trauma or other risk factors. Particular attention is needed in the diagnosis and treatment of patients under 60 years of age, who show only a minimal deformation.	AAFP 2016[b] RACGP 2017	0 / 2	Not assessable	

a: The guideline is more than 5 years old at the time of publication of the rapid report.
b: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAFP: American Academy of Family Physicians; BMD: bone mineral density; BTM: bone turnover markers; COPD: chronic obstructive pulmonary disease; CRP: C-reactive protein; CTX: C-terminal telopeptide of collagen; DGI: German Society for Implantology; DKG: German Cancer Society; DMP: disease management programme; DVO: Confederation of German Osteology Associations; DXA: dual energy X-ray absorptiometry; ESR: erythrocyte sedimentation rate; Gamma-GT: gamma-glutamyltransferase; G-BA: Federal Joint Committee; GKV: German statutory health insurance; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; PTH: parathormone; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; TES: The Endocrine Society; T-scores: number of standard deviations (SD) of the BMD measurement above or below that of young healthy adults of the same sex; TSH: thyroid stimulating hormone; V: health care aspect

4.2.2.2 Estimation of the individual fracture risk (T2)

Table 4: Summarizing assessment of the health care aspect “Diagnostics – individual fracture risk assessment”

Designation of the extraction table in Section A3.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T2 – K1 (General)	The fracture risk should be assessed for patients who report a (family) history of osteoporosis or other risk factors (for example, use of glucocorticoids). In addition, an existing fragility fracture increases the risk of future fractures and confirms the diagnosis of osteoporosis, irrespective of the bone density measurement. Routine investigation of the fracture risk for patients younger than 50 years of age is not recommended.	DVO 2017, NICE 2012[a, c] NOGG 2017, RACGP 2017, SIGN 2015, SOGC 2014	4 / 9	Suitable	
V1/T2 – K2 (Risk prediction model)	Various risk prediction models are named for measuring the individual fracture risk such as FRAX, QFracture or Garvan fracture risk calculator. These should be used to calculate the risk, bearing in mind other individual risk factors (age, BMI, fractures in the [family] history, alcohol consumption and smoking, secondary causes of osteoporosis), prior to measurement of bone density by DXA. Depending on the tool, other factors (e.g. living in a care home) that can also influence the fracture risk should be considered.	AACE 2016, DVO 2017, NICE 2012[a, c], NOGG 2017, RACGP 2017, SIGN 2015, SOGC 2014, TES 2012[a, b]	6 / 16	Suitable	

(continued)

Table 4: Summarizing assessment of the health care aspect “Diagnostics – individual fracture risk (continued)

Designation of the extraction table in Section A3.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T2 – K2 (continued)	Determination of fracture risk should facilitate the selection of patients who are eligible for osteoporosis therapy. If the result of a trabecular bone score is available, this should be included in the measurement of fracture risk.				
V1/T2 – K3 (10-year risk)	The 10-year fracture risk should be determined as the absolute risk. The BMI, clinical risk factors and (if available) measurement of bone density in central regions should be included in the determination, and the risk is dependent on age, life expectancy and the current fracture risk. Caution is advised when interpreting the estimated absolute risk in patients aged over 80 years, because it may underestimate their short-term fracture risk. Threshold values for a high, medium and low risk are given.	Gluszko 2014, NICE 2012[a, c], NOGG 2017	1 / 4	Suitable	
V1/T2 – K4 (DVO score)	The DVO score should be used to estimate the fracture risk. If the 10-year risk of a femoral neck or vertebral fracture is > 20%, basic diagnostics are recommended.	DVO 2017	4 / 4	Suitable	An international consensus regarding this statement could not be identified.

(continued)

Table 4: Summarizing assessment of the health care aspect “Diagnostics – individual fracture risk (continued)

Designation of the extraction table in Section A3.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T2 – K5 (Concomitant diseases)	Assessment of fracture risk should be considered in patients over 50 years of age with the following concomitant diseases or symptoms, especially if other risk factors are present: ▪ Early menopause ▪ Low BMI (< 20 kg/m^2) ▪ Alcohol consumption and smoking ▪ Diabetes ▪ Rheumatoid arthritis ▪ Lupus erythematosus ▪ Inflammatory bowel diseases or absorption disorders ▪ Hyperparathyroidism or other endocrine disorders ▪ Chronic liver disease ▪ Chronic kidney disease (eGFR < 60 ml/min/1.73 m^2) ▪ Neurological disorders (incl. Alzheimer’s disease, Parkinson’s disease, multiple sclerosis, stroke, epilepsy) ▪ Asthma ▪ Organ transplantation	NICE 2012[a, c], SIGN 2015	0 / 13	Not assessable	

(continued)

Table 4: Summarizing assessment of the health care aspect “Diagnostics – individual fracture risk (continued)

Designation of the extraction table in Section A3.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T2 – K5 (continued)	Bone density should be measured by DXA in patients before the use of drugs that could alter bone density (e.g. ADT, treatment of breast or prostate cancer).				
V1/T2 – K6 (CKD)	It should be noted that if patients with chronic kidney disease or under dialysis are at Stage 1–3 (GFR ≥ 30 ml/min), the densitometric values measured by DXA are similar to those of patients with normal renal function. Kidney patients should always undergo a DXA measurement and an assessment of fracture risk. No precise assessment can be made in patients at Stage 4–5 and 5D (≤ 29 ml/min), because no clear distinction is possible between the various components of renal osteodystrophy. DXA measurement should always be carried out in organ transplant recipients.	ISO 2016[b], SIGN 2015	1 / 3	Suitable	

(continued)

Table 4: Summarizing assessment of the health care aspect “Diagnostics – individual fracture risk (continued)

Designation of the extraction table in Section A3.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T2 – K7 (Concurrent medications)	Fracture risk assessment should be considered in patients over the age of 50 with the following concurrent medications, especially if other risk factors are present: ▪ Antidepressants, particularly SSRI (long-term therapy) ▪ Antiepileptics, especially enzyme-inducers ▪ Before starting treatment with aromatase inhibitors (breast cancer) ▪ GnRH-agonists ▪ Proton pump inhibitors (PPI) ▪ Glucocorticoids ▪ Thiazolidinediones (glitazone or TZD) ▪ Prior to starting androgen deprivation therapy (ADT) in men, e.g. in men with prostate cancer	RACGP 2017, SIGN 2015	2 / 9	Suitable	

a: The guideline is more than 5 years old at the time of publication of the rapid report.

b: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

c: Updated recommendations were published in 2017.

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; ADT: androgen deprivation therapy; BMI: body mass index; CA: carcinoma; CKD: chronic kidney disease; DMP: disease management programme; DVO: Confederation of German Osteology Associations; DXA: dual energy X-ray absorptiometry; eGFR: estimated glomerular filtration rate; FRAX: Fracture Risk Assessment Tool; GFR: glomerular filtration rate; GnRH: gonadotropin-releasing hormone; GoR: Grade of Recommendation; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NICE: National Institute for Health and Care Excellence; NOGG: National Osteoporosis Guideline Group; PPI: proton pump inhibitors; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; SSRI: selective serotonin-reuptake inhibitor; T: topic aspect; TES: The Endocrine Society; T-scores: number of standard deviations (SD) of the BMD measurement above or below that of young healthy adults of the same sex; TZD: thiazolidinedione; V: health care aspect

4.2.2.3 Imaging techniques (T3)

Table 5: Summarizing assessment of the health care aspect "Diagnostics – imaging techniques"

Designation of the extraction table in Section A3.4.2.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T3– K1 (BMD)	After assessment of the fracture risk with risk prediction models, the bone density (BMD) should be determined. DXA measurement is named as the preferred technique and can be helpful for decision-making regarding osteoporosis therapy, especially in patients with risk factors or a history of fragility fractures. Sole use of the bone density measurement for making a diagnosis is not recommended. Various age groups are mentioned for whom measurement of bone density is worthwhile. A further assessment of fracture risk should be undertaken in patients who show a low bone density in the DXA scan. Indications for bone density measurement: ▪ Patients under the age of 40 with multiple fractures or a history of glucocorticoid use (> 3 months) ▪ Patients over the age of 50 with fragility fractures ▪ Men aged 70 and above, women aged 65 and above ▪ Men younger than 70 and women younger than 65 years only in the presence of risk factors for low bone density (e.g. low body weight, previous fractures, use of high-risk medications and concomitant diseases correlated with low bone density)	AACE 2016, ISCD 2013[a], ISO 2016[b] NICE 2012[a, c], NOGG 2017, RACGP 2017, SIGN 2015, SRBMM 2015[b]	5 / 10	Suitable	

(continued)

Table 5: Summarizing assessment of the health care aspect “Diagnostics – imaging techniques” (continued)

Designation of the extraction table in Section A3.4.2.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T3 – K2 (Site of BMD measurement)	Bone density should be measured by DXA scan at the spine or hip. The WHO recommends the femoral neck as the preferred region of the body. In exceptional cases, or if measurement at the hip or spine is not possible (or in younger postmenopausal women), other guidelines also mention the forearm (distal radius) or heel as a suitable site. The forearm is especially recommended in men with hyperparathyroidism or androgen deprivation therapy. 2 guidelines recommend scanning of at least 2 sites to measure bone density. However, it is pointed out that the T-scores can be different depending on the region of the body and investigation method.	AACE 2016, ISO 2016[b], NOGG 2017, RACGP 2017, SIGN 2015, SRBMM 2015[b], TES 2012[a, b]	10 / 21	Suitable	
V1/T3 – K3 (T-score / threshold value)	The densitometric threshold for the diagnosis of osteoporosis is a T-score of > −2.5 (SD). The same threshold is used for men and women. If one or more risk factors are present, a higher fracture risk is to be assumed. Thus, for example, in patients with type 1 diabetes, or another concomitant disease that requires the use of glucocorticoids (> 3 months), the treatment limit is increased by +1.0 T-score to −2.0 (SD). The trabecular bone score can be optionally included in the assessment.	DVO 2017, ISO 2016[b], NOGG 2017, TES 2012[a, b]	5 / 11	Suitable	

(continued)

Table 5: Summarizing assessment of the health care aspect “Diagnostics – imaging techniques” (continued)

Designation of the extraction table in Section A3.4.2.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T3 – K4 (Diagnosis of fractures)	A vertebral fracture assessment (VFA) using DXA is recommended to diagnose fractures in patients with low bone density or diagnosed osteoporosis. Drug therapy can also be given without measuring bone density if vertebral fractures are present. If a DXA is not possible, then an X-ray of the spine at 2 levels should be carried out. One guideline makes firm statements about the indication for VFA or X-rays: ▪ T-score < –1 ▪ Women over 70 and men over 80 years of age ▪ Height loss of more than 4 cm ▪ Self-reported fractures ▪ Glucocorticoid therapy (> 5 mg/day for more than 3 months) MRI is the method of choice when suspected hip fractures cannot be confirmed radiologically.	AAOS 2014, Gluszko 2014, ISCD 2013 VFA, SIGN 2015, SRBMM 2015[b], TES 2012[a, b]	3 / 6	Suitable	
V1/T3 – K5 (CT-based techniques)	Quantitative computed tomography (QCT) and CTXA (computed tomography X-ray absorptiometry) should not be routinely used to predict vertebral or hip fractures, fractures of the proximal femur, radius or tibia in the case of increased risk of osteoporosis and fracture. If a QCT result is available, then a greatly reduced absolute value (trabecular L1-3 < 80 mg / ml) and the CTXA T-score should be included in the fracture risk assessment, by analogy to a DXA T-score.	DVO 2017	4 / 4	Suitable	

(continued)

Table 5: Summarizing assessment of the health care aspect “Diagnostics – imaging techniques” (continued)

Designation of the extraction table in Section A3.4.2.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V1/T3 – K6 (QUS)	Fracture risk can be assessed by measurement of QUS at the heel. However in routine practice, a DXA measurement should primarily be used. If a result of the QUS measurement is available, this should be included in the fracture risk calculation.	DVO 2017	1 / 1	Suitable	

a: The guideline is more than 5 years old at the time of publication of the rapid report.
b: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).
c: Updated recommendations were published in 2017.

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; BMD: bone mineral density; CT: computed tomography; CTXA: computed tomography X-ray absorptiometry; DMP: disease management programme; DVO: Confederation of German Osteology Associations; DXA: dual energy X-ray absorptiometry; ISCD: International Society for Clinical Densitometry; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NICE: National Institute for Health and Care Excellence; NOGG: National Osteoporosis Guideline Group; QCT: qualitative computed tomography; QUS: quantitative ultrasound; RACGP: Royal Australian College of General Practitioners; SD: standard deviation; SIGN: Scottish Intercollegiate Guidelines Network; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; TES: The Endocrine Society; T-scores: number of standard deviations (SD) of the BMD measurement above or below that of young healthy adults of the same sex; V: health care aspect; VFA: vertebral fracture assessment; WHO: World Health Organization

4.2.3 Treatment goals (V2)

Table 6: Summarizing assessment of the health care aspect “Treatment goals”

Designation of the extraction table in Section A3.4.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V2 – K1 (General)	The assessment of fracture risk and fracture prevention are named as the goals of osteoporosis treatment. Successful treatment is considered as stable or increasing bone density without further fractures. Other conditions apply for patients taking antiresorptive drugs. In this case, treatment is successful if the BTM (bone turnover marker) is below the respective reference value for premenopausal women.	AACE 2016, SOGC 2014	3 / 3	Particularly suitable	
AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; BTM: bone turnover marker; DMP: disease management programme; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; SOGC: Society of Obstetricians and Gynaecologists of Canada; T: topic aspect; V: health care aspect					

4.2.4 Therapeutic measures

4.2.4.1 Principles of therapy (V3)

Table 7: Summarizing assessment of the health care aspect “Therapeutic measures – principles of therapy”

Designation of the extraction table in Section A3.4.4.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V3 – K1 (General)	Clinical and radiological findings that indicate a compromising of soft tissue healing, bone turnover or rate of new bone formation, should be recorded and included in the decision-making in the case of planned dental replacement. Female patients (especially younger postmenopausal women) with a history of fragility fractures should be considered for osteoporosis therapy. Otherwise, osteoporosis treatment is initiated on the basis of the estimated 10-year fracture risk; patients with a 10-year fracture risk above the upper threshold (or with a T-score of −2.5 or lower) should receive drug therapy. Those with probabilities between the highest and lowest threshold value should be referred for bone density measurement. Patients below the lowest threshold do not require any treatment.	ACOG 2012[a], DGI 2016, NOGG 2017, SIGN 2015, SOGC 2014	4 / 5	Suitable	

(continued)

Table 7: Summarizing assessment of the health care aspect “Therapeutic measures – principles of therapy (continued)

Designation of the extraction table in Section A3.4.4.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V3 – K2 (Treatment planning)	Patients who show significant bone loss or further fractures under osteoporosis therapy should be investigated for secondary osteoporosis, or other suitable therapeutic approaches should be considered. Patients with hip fracture should be investigated for osteoporosis and treated. Interventions (with or without biomarker results) should be used to specifically improve compliance during treatment with osteoporosis drugs. Modifiable risk factors should be minimised and general fracture prevention measures taken in all risk groups. In the case of women over 65 years of age with osteopenia who have a high risk of fractures, the treating physician should decide whether osteoporosis treatment should be initiated. The decision should be supported by determining the patient preferences, the fracture risk profile and a consideration of the harm and benefit ratio.	AACE 2016, AAOS 2014, ACP 2017, DVO 2017	3 / 5	Suitable	
V3 – K3 (Dental examination)	A dental examination with any necessary preventative dental treatment should take place prior to starting treatment with bisphosphonates or denosumab.	DVO 2017, SIGN 2015, TES 2012[a, b]	0 / 4	Not assessable	

a: The guideline is more than 5 years old at the time of publication of the rapid report.
b: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAOS: American Academy of Orthopedic Surgeons; ACOG: American College of Obstetricians and Gynaecologists; ACP: American College of Physicians; DGI: German Society for Implantology; DVO: Confederation of German Osteology Associations; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; TES: The Endocrine Society; V: health care aspect

4.2.4.2 Non-drug therapy and general measures (V4)

4.2.4.2.1 Lifestyle (T1)

Table 8: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug therapy and general measures – lifestyle”

Designation of the extraction table in Section A3.4.4.2.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T1 – K1 (General)	General principles of osteoporosis prevention apply equally to all patients. A healthy lifestyle should be observed. Efforts should be made to avoid falls through muscle strengthening and physiotherapy. Other principles are the maintenance or achievement of a healthy BMI (20–25 kg/m^2), a healthy diet, avoidance of excessive alcohol consumption and smoking, regular sporting or physical activity and adequate intake of vitamin D and calcium.	DKG 2017, Gluszko 2014, ISO 2016[a], RACGP 2017, SIGN 2015	2 / 8	Suitable	
V4/T1 – K2 (Alcohol/tobacco)	The consumption of tobacco smoke and alcohol should be reduced or completely stopped.	AACE 2016, SIGN 2015, TES 2012[a, b]	3 / 6	Suitable	
V4/T1 – K3 (Physical activity)	A combination of regular physical activity and strengthening exercises to prevent fractures or falls is recommended. Endurance, balance and flexibility training or stretching are named. Static weight-bearing exercises to avoid continuous loss of bone density in the hips are mentioned.	DVO 2017, NOGG 2017, OC 2015, RACGP 2017, SIGN 2015, TES 2012[a, b]	3 / 17	Suitable	

(continued)

Table 8: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug therapy and general measures – lifestyle” (continued)

Designation of the extraction table in Section A3.4.4.2.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T1 – K3 (continued)	Strength training, also combined with endurance training (jogging, aerobics, walking, Tai-Chi etc.), is recommended for stabilising bone density in the region of the femoral neck or lumbar spine. 30-40-min sessions of weight-bearing training 3 to 4 times a week are specifically recommended.				
V4/T1 – K4 (Diet/food supplements)	A balanced, low-salt diet is recommended for bone health and the dietary status of patients should therefore be recorded. Care should be taken to ensure adequate provision of vitamin B, vitamin K, potassium, magnesium and antioxidants. Excessive ingestion of retinol is to be avoided. Underweight is correlated with an increase in the risk of falls and fractures. Overweight, excessive ingestion of caffeine and the intake of phytoestrogens are to be avoided. Folic acid deficiency is a risk factor for primary osteoporosis.	AAOS 2014, DKG 2017, DVO 2017, Gluszko 2014, SIGN 2015	5 / 14	Suitable	

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

b: The guideline is more than 5 years old at the time of publication of the rapid report.

AAOS: American Academy of Orthopedic Surgeons; BMI: body mass index; DKG: German Cancer Society; DMP: disease management programme; DVO: Confederation of German Osteology Associations; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; OC: Osteoporosis Canada; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; T: topic aspect; TES: The Endocrine Society; V: health care aspect

4.2.4.2.2 Calcium and vitamin D (T2)

Table 9: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug therapy and general measures – calcium and vitamin D”

Designation of the extraction table in Section A3.4.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T2 – K1 (General)	The intake of adequate amounts of calcium and vitamin D should be ensured. Calcium supplementation is recommended only if dietary intake is inadequate (less than 700 mg per day). The recommended daily intake of calcium is between 700 and 1200 mg. Persons who are only exposed to small amounts of sunlight are at risk of vitamin D deficiency. Supplementation with 400 IU/day is recommended for these patients.	DVO 2017, ISO 2016[a], NOGG 2017, SIGN 2015, SRBMM 2015[a]	3 / 11	Suitable	
V4/T2 – K2 (Institutionalized elderly persons)	Supplementation of vitamin D and calcium is recommended for fracture prevention in fragile and elderly residents of care homes. Patients at high risk of fracture should receive vitamin D3 supplementation of 800 to 2000 IU per day. Calcium up to 500 mg daily should be given with both a high and a low fracture risk, depending on the individual intake via the usual diet and especially if the daily dietary intake is below 1300 mg.	OC 2015, RACGP 2017	4 / 8	Suitable	Most calcium and vitamin D3 preparations are available only in pharmacies and - according to Annex I of the German Medicinal Products Prescribing Directive - can be prescribed for adults in exceptional cases. Combined calcium and vitamin D3 supplementation

(continued)

Table 9: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug therapy and general measures – calcium and vitamin D (continued)

Designation of the extraction table in Section A3.4.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T2 – K2 (Institutionalized elderly persons) (continued)					is reimbursable by the GKV only if prescribed “for the treatment of manifest osteoporosis” or in the case of treatment with steroids or bisphosphonates. It cannot be prescribed for general use in elderly care home residents [14].
V4/T2 – K3 (Postmenopausal women/elderly men)	General supplementation of calcium and vitamin D in elderly non-institutionalized persons is not recommended because the absolute benefit of calcium and vitamin D supplementation for fracture prevention is limited. A daily intake of 1000–1200 mg calcium and 800–2000 IU vitamin D is recommended for men and postmenopausal women at risk of osteoporosis.	AACE 2016, DVO 2017, ISO 2016[a], NOGG 2017, RACGP 2017, SOGC 2014, TES 2012[a, b]	5 / 12	Suitable	

(continued)

Table 9: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug therapy and general measures – calcium and vitamin D (continued)

Designation of the extraction table in Section A3.4.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T2 – K3 (Postmenopausal women/elderly men) (continued)	Vitamin D given in combination with calcium is supposed to reduce the risk of vertebral or hip fractures. High doses can be needed in patients with additional risk factors such as overweight, absorption disorders, transplants or for certain ethnicities. The optimum serum 25-hydroxyvitamin D (25[OH] D) level is stated as 30–50 ng/ml.				
V4/T2 – K4 (Cancer patients)	Daily vitamin D3 supplementation of 800 to 1000 IU and 1000 to 1500 mg calcium is recommended for prophylaxis against osteoporosis caused by cancer treatment. If possible, adequate calcium should be ingested via the diet. Supplementation is only recommended if adequate dietary intake cannot be ensured.	DKG 2017	0 / 2	Not very suitable	
V4/T2 – K5 (Comorbidities)	Vitamin D deficiency is especially common in patients with chronic kidney disease or in organ transplant recipients. Laboratory tests for 25 [OH] D are recommended and supplementation with calcitriol or other vitamin D analogues is advised. Vitamin D supplementation can reduce PTH levels and improve bone turnover rate in these patients. Vitamin D and calcium supplementation is also recommended in patients after a hip fracture.	AAOS 2014, ISO 2016[a]	1 / 4	Suitable	Prescription of vitamin D3 supplementation in the named groups of patients is not reimbursable by the GKV [14].

(continued)

Table 9: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug therapy and general measures – calcium and vitamin D (continued)

Designation of the extraction table in Section A3.4.4.2.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T2 – K6 (Chronic use of GC)	Patients given ≥ 2.5 mg/day prednisone for ≥ 3 months should receive 800–1000 mg or 1000–2000 mg/day calcium and 500–800 IU/day vitamin D and observe a healthy lifestyle.	ACR 2017, ISO 2016[a]	1 / 2	Suitable	Different (twice as high) doses are given in the guideline recommendations in respect of the calcium administration
V4/T2 – K7 (Chronic ingestion of GC - children)	The intake of calcium (1000 mg/day) and vitamin D (600 IU/day) should be ensured for children between 4 and 17 years who take glucocorticoids for longer than 3 months.	ACR 2017	0 / 1	Not very suitable	
V4/T2 – K8 (Concurrent medication)	Calcium and vitamin D supplementation are an important addition in the case of antiresorptive or anabolic treatments. This applies particularly with the administration of bisphosphonates. It should be noted that calcium should be given at least 2 hours after administration of the bisphosphonate.	DVO 2017, SIGN 2015, SOGC 2014	3 / 4	Suitable	

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).
b: The guideline is more than 5 years old at the time of publication of the rapid report.

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAOS: American Academy of Orthopedic Surgeons; ACR: American College of Rheumatology; DMP: disease management programme; DVO: Confederation of German Osteology Associations; GKV: German statutory health insurance; ISO: Italian Society for Osteoporosis; IU: international units; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; OC: Osteoporosis Canada; PTH: parathormone; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; TES: The Endocrine Society; V: health care aspect

4.2.4.2.3 Surgical interventions and treatment of fractures (T3)

Table 10: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug treatment and general measures –surgical interventions and treatment of fractures”

Designation of the extraction table in Section A3.4.4.2.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T3 – K1 (Compression fractures	Patients with vertebral compression fractures should first be offered conservative treatment.	AAFP 2016[a]	0 / 1	Not very suitable	
V4/T3 – K2 (Fractures in the hip area)	Hip fracture surgery should not be delayed in patients who regularly take aspirin and/or clopidogrel. Operative fixation should be performed in non-displaced femoral neck fractures.	AAOS 2014	0 / 3	Not assessable	
V4/T3 – K3 (Vertebroplasty/ kyphoplasty)	From cost-benefit considerations, vertebroplasty is generally preferred to kyphoplasty. Neither procedure is recommended as first-line treatment. They should only be used for fractures that have occurred less than 6 weeks earlier or 6 weeks to maximally 1 year earlier and which continue to cause intense pain despite drug treatment, or if trial conservative treatment has failed. They are also indicated if the MRI has shown oedema or analgesics are contraindicated.	AACE 2016, AAFP 2016[a], SRBMM 2015[a]	0 / 3	Not very suitable	

(continued)

Table 10: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug treatment and general measures –surgical interventions and treatment of fractures (continued)

Designation of the extraction table in Section A3.4.4.2.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T3 – K4 (Endoprosthesis)	A hip endoprosthesis (total hip replacement or hemiarthroplasty) should be offered to patients with displaced intracapsular hip fracture. It should be noted that the posterior surgical approach shows a higher dislocation rate than direct lateral access. An endoprosthesis is indicated in patients aged over 65 years with displaced intracapsular fracture. The following requirements must be met: ▪ Patients show adequate cognitive function and ▪ are independently mobile. ▪ Also medically fit for anaesthesia. Intertrochanteric fractures are treated either with sliding screw extramedullary implants or intramedullary nails. The latter tend to be recommended for patients with subtrochanteric and unstable intertrochanteric fractures.	AAOS 2014, NICE 2017 ADD	4 / 10	Suitable	

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).
AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAFP: American Academy of Family Physicians; AAOS: American Academy of Orthopedic Surgeons; ADD: Addendum; DMP: disease management programme; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NICE: National Institute for Health and Care Excellence; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; V: health care aspect

4.2.4.2.4 Orthotics (T4)

Table 11: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug treatment and general measures – orthotics”

Designation of the extraction table in Section A3.4.4.2.4 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T4 – K1 (General)	Provision of a spinal orthotic should be considered in order to enable less painful mobilization. This should be supported by physiotherapy exercises and posture training.	DVO 2017	2[a] / 2	Further appraisal is proposed	Orthotics are reimbursable by the GKV (but co-payment required by the insured) [15].

a: Recommendations are based on a GoR categorized as unclear and a high LoE.

DMP: disease management programme; DVO: Confederation of German Osteology Associations; GKV: German statutory health insurance; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; T: topic aspect; V: health care aspect

4.2.4.2.5 Falls prevention (T5)

Table 12: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug treatment and general measures – falls prevention”

Designation of the extraction table in Section A3.4.4.2.5 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T5 – K1 (Falls prevention)	Multifactorial interventions such as mobility training and safety precautions for falls protection in the home are envisaged especially for institutionalized persons aged over 75. A falls risk assessment should be regularly undertaken in the over-65 year-olds (e.g. during a “geriatric assessment”) or in patients with a history of vertebral fractures. The wearing of hip protectors in persons at high risk of falls is generally recommended; this particularly applies to institutionalized patients who are still mobile. It is pointed out that psychopharmacological agents or drugs that favour the development of osteoporosis should be used with caution and/or regularly reviewed, since they can increase the risk of falls.	AACE 2016, AAFP 2015[a], DVO 2017, ISO 2016[a], OC 2015, RACGP 2017	5 / 13	Suitable	Hip protectors as medical aids are not generally prescribable. They are not listed in the German Medical Aids Register [16].

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

AACE: American Association of Clinical Endocrinology; AAFP: American Academy of Family Physicians; DMP: disease management programme; DVO: Confederation of German Osteology Associations; GoR: Grade of Recommendation; ISO: Italian Society for Osteology; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; OC: Osteoporosis Canada; T: topic aspect; V: health care aspect

4.2.4.2.6 Treatment of pain and functional impairments (T6)

Table 13: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug treatment and general measures – treatment of pain and functional impairments”

Designation of the extraction table in Section A3.4.4.2.6 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T6 – K1 (Treatment)	Physiotherapy or electromagnetic field therapy (alone) or in combination with load-bearing exercises, is recommended to relieve pain and improve functionality and quality of life in patients with vertebral fractures. Rapid mobilization to avoid complications such as pneumonia, thromboembolism or functional losses is also recommended. The analgesic effect of calcitonin can be utilized for short-term symptomatic pain management of vertebral or other osteoporotic fractures. Long-term treatment with calcitonin for osteoporosis is not recommended. Locally acting analgesics are recommended for pre-operative pain management.	AAOS 2014, DVO 2017, Gluszko 2014, SIGN 2015	2 / 5	Suitable	Electromagnetic field therapy is not prescribable or reimbursable by the GKV in the ambulatory sector across all indications [17].

AAOS: American Academy of Orthopaedic Surgeons; DMP: disease management programme; DVO: Confederation of German Osteology Associations; GKV: German statutory health insurance; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; SIGN: Scottish Intercollegiate Guidelines Network; T: topic aspect; V: health care aspect

4.2.4.2.7 Dental implants (T7)

Table 14: Summarizing assessment of the health care aspect “Therapeutic measures – non-drug treatment and general measures – dental implants”

Designation of the extraction table in A3.4.4.2.7 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V4/T7 – K1 (Indication)	Particular care is needed when selecting patients for dental implants, especially patients receiving antiresorptive treatment (jaw augmentation should be avoided). Bone turnover and regeneration rate are reduced under antiresorptive treatment, so the healing time until load-bearing is likely to be prolonged. The indication for an implant should also be reviewed as to whether prosthesis pressure points can be avoided and hence the risk of osteonecrosis reduced.	DGI 2016	1 / 5	Suitable	
DGI: German Society for Implantology; DMP: disease management programme; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; T: topic aspect; V: health care aspect					

4.2.4.3 Drug treatment (V5)

4.2.4.3.1 Indication for drug treatment (T1)

Table 15: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – indication for drug treatment”

Designation of the extraction table in Section A3.4.4.3.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T1 – K1 (Indication)	Drug treatment is indicated in the case of minimal trauma single (Grade 2 or 3 according to Genant) or multiple (Grade 1 to 3 according to Genant) vertebral fractures and a T-score < −2.0 at the lumbar spine, femoral neck or entire proximal femur. Drug treatment can also be given on an individual basis in the case of a T-score of > −2.0. It is also indicated with a 10-year fracture risk > 30% for the femoral neck and vertebrae. Drug treatment is additionally recommended especially in men without a history of fracture but with a T-score of − 2.5 or lower and postmenopausal women with osteopenia or low bone density and a previous fragility fracture. No drug treatment should be started in women over 75 years old with fragility fractures outside of the hip or vertebral region except if they have osteoporosis confirmed by DXA bone density measurement.	AACE 2016, DVO 2017, SIGN 2015, TES 2012[a, b]	7 / 9	Suitable	

(continued)

Table 15: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – indication for drug treatment (continued)

Designation of the extraction table in Section A3.4.4.3.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T1 – K2 (General)	It is recommended that only approved drugs such as raloxifene, bisphosphonates, PTH, denosumab, strontium ranelate and calcitonin are used for fracture prophylaxis. Another drug should only be resorted to if these cannot be given. The choice of drug should be made on an individual basis, depending on the fracture history, T-score, fracture risk, comorbidities, contraindications, bone density as well as side effects and additional actions.	ACOG 2012[a] DVO 2017, TES 2012[a, b]	24 / 31	Suitable	▪ Zoledronic acid, approved [18] or not approved [19], depending on trade name. ▪ PTH: manufacturer relinquished marketing authorization [20]. ▪ Denosumab: only 60-mg dose approved [21]. ▪ The manufacturer of strontium ranelate stopped production [22].

(continued)

Table 15: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – indication for drug treatment (continued)

Designation of the extraction table in Section A3.4.4.3.1	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T1 – K3 (Choice of drug)	Due to their positive effects on fracture prevention, aledronate and risedronate- mostly in combination with vitamin D and calcium – are recommended as first-line therapy. Zoledronate, denosumab or teriparatide are recommended for patients at high risk of fracture who show contraindications or intolerances to intravenous or oral bisphosphonates. Alternatively, strontium ranelate can be used. Alendronate, risedronate, denosumab and teriparatide can be used in patients with chronic kidney disease (Stage 1-3).	AACE 2016, ACP 2017, Gluszko 2014, ISO 2016[b], NOGG 2017, SRBMM 2015[b]	29 / 36	Suitable	▪ Zoledronic acid, approved [18] or not approved [19], depending on trade name. ▪ Denosumab: only 60-mg dose approved [21]. ▪ Strontium ranelate [23] is only approved for the treatment of severe osteoporosis, the manufacturer has since stopped production.

a: The guideline is more than 5 years old at the time of publication of the rapid report.
b: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; ACOG: American College of Obstetricians and Gynecologists; ACP: American College of Physicians; DMP: disease management programme; DVO: Confederation of German Osteology Associations; DXA: dual energy X-ray absorptiometry; GoR: Grade of Recommendation; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guidelines Group; PTH: parathormone; SD: standard deviation; SIGN: Scottish Intercollegiate Guidelines Network; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; TES: The Endocrine Society; T: topic aspect; TES: The Endocrine Society; T-score: number of standard deviations (SD) of the BMD measurement above or below that of young healthy adults of the same sex; V: health care aspect

4.2.4.3.2 Specific therapy of secondary osteoporosis (T2)

Table 16: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – specific treatment of secondary osteoporosis”

Designation of the extraction table in Section A3.4.4.3.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T2 – K1 (General)	A precise diagnosis and detailed history-taking should be undertaken before starting drug treatment for secondary osteoporosis. The causes of fractures not suggestive of primary osteoporosis should be clarified by a specialist.	Gluszko 2014	1 / 1	Suitable	
V5/T2 – K2 (Hypogonadism)	The administration of calcium and vitamin D is recommended for men with osteoporosis. If hypogonadism is present, then these should be administered in combination with androgens. If hypercalciuria is present, thiazides should be given.	SRBMM 2015[a]	0 / 1	Not very suitable	
V5/T2 – K3 (Androgen deprivation therapy)	The fracture risk should be determined before beginning androgen deprivation therapy in men. Men who show additional traumatic fractures in the recent past should be started on antiresorptive treatment, provided this is not contraindicated.	NOGG 2017, RACGP 2017	1 / 2	Suitable	
V5/T2 – K4 (GC – moderate to high risk of fractures)	Long-term administration of glucocorticoids (> 3 months) can induce osteoporosis and therefore the fracture risk should be determined. Glucocorticoids should be dosed as low as possible and used topically if possible. In the case of planned or implemented longer or high-dose glucocorticoid therapy (especially if there is already a history of fractures caused by minimal trauma), then bone protection	ACR 2017, DVO 2017, Gluszko 2014, ISO 2016[a], NOGG 2017, SIGN 2015, TES 2012[a, b]	5 / 16	Suitable	The guidelines differ in their definition of high-dose GC medication.

(continued)

Table 16: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – specific treatment of secondary osteoporosis (continued)

Designation of the extraction table in Section A3.4.4.3.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T2 – K4 (continued)	should be started as soon as possible in the form of oral bisphosphonates instead of sole treatment with calcium and vitamin D. Aledronate, risedronate and zoledronate are mentioned and these should be preferred to the intravenous administration of bisphosphonates, teriparatide or denosumab, with consideration of the risks. Raloxifene has also been mentioned as an alternative for patients under 40 years of age. After 3 months of high-dose GC, the glucocorticoid therapy needs to be re-evaluated.				▪ The approval of bisphosphonates varies depending on the dosage form and trade name and the reimbursability by the GKV differs. ▪ Denosumab not approved [21,24].
V5/T2 – K5 (GC – low fracture risk)	Aledronate and risedronate, alternatively zoledronate or teriparatide should be considered as first-line therapy for fracture prophylaxis during glucocorticoid therapy. Care should be taken to ensure adequate intake of calcium and vitamin D through the diet or dietary supplements. Discontinuation of the bone protective medication can also be considered after the glucocorticoids have been stopped.	ACR 2017, ISO 2016[a], NOGG 2017	15 / 25	Suitable	Zoledronate: depending on the trade name either approved [18] or not [19], therefore differences in the reimbursability by the GKV [24].

(continued)

Table 16: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – specific treatment of secondary osteoporosis (continued)

Designation of the extraction table in Section A3.4.4.3.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T2 – K5 (continued)	Optimization of calcium and vitamin D intake and lifestyle adjustment are preferentially recommended for patients with low fracture risk (≥ 40 years) rather than the administration of bisphosphonates, teriparatide, denosumab or raloxifene. Optimization of calcium and vitamin D intake as well as lifestyle adjustment are also recommended over drug therapy with bisphosphonates, teriparatide or denosumab for patients under 40 years of age with low fracture risk.				
V5/T2 – K6 (GC – women)	Oral administration of bisphosphonates is preferred over sole treatment with calcium and vitamin D, teriparatide or intravenous bisphosphonates or denosumab for patients of child-bearing age with a moderate to high fracture risk. Caution is required in the administration of bone-protective drugs that pose a risk for fetal development.	ACR 2017, NOGG 2017	0 / 2	Not very suitable	
V5/T2 – K7 (GC – children)	Administration of oral bisphosphonates in combination with calcium and vitamin D is recommended for children (4–17 years) under glucocorticoid therapy with an osteoporotic fracture.	ACR 2017	0 / 1	Not very suitable	

(continued)

Table 16: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – specific treatment of secondary osteoporosis (continued)

Designation of the extraction table in Section A3.4.4.3.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T2 – K8 (GC – Organ-transplantation)	Patients who have received an organ transplant and patients with a glomerular filtration rate of ≥ 30 ml/min without proven osteoporosis should be treated according to their age. It is recommended that renal transplant recipients are referred to a specialist. Denosumab is only to be used with caution in immunosuppressed patients.	ACR 2017	0 / 1	Not very suitable	
V5/T2 – K9 (Cancer therapy)	Bisphosphonates and denosumab are available for treating osteoporosis caused by cancer treatment. Pharmacological treatment for osteoporosis can be considered for men with prostate cancer. All patients under oestrogen treatment or androgen-suppressive therapy whose BMD is < 1.5 should receive antiresorptive therapy.	DKG 2017, RACGP 2017, TES 2012[a, b]	3 / 4	Suitable	Ibandronate (i. v.) and zoledronate (i. v.) [18,25] are approved, prescribable and reimbursable by the GKV. Non-approved agents [19,26] are not prescribable [24].

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).
b: The guideline is more than 5 years old at the time of publication of the rapid report.

ACR: American College of Rheumatology; BMD: bone mineral density; DKG: German Cancer Society; DMP: disease management programme; DVO: Confederation of German Osteology Associations; GC: glucocorticoids; GKV: German statutory health insurance; GoR: Grade of Recommendation; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; TES: The Endocrine Society; V: health care aspect

4.2.4.3.3 Existing fractures (spine, femur) (T3)

Table 17: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – existing fractures (spine, femur)”

Designation of the extraction table in Section A3.4.4.3.3 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR (n / N)	Methodological assessment	Notes
V5/T3-K1 (General)	Depending on the overall clinical situation, bone density does not need to be measured in the case of a fracture of the proximal femur. Thrombosis prophylaxis should be considered in the case of hip fractures.	DVO 2017, AAOS 2014	0 / 2	Not assessable	

AAOS: American Academy of Orthopedic Surgeons; DVO: Confederation of German Osteology Associations; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; T: topic aspect; V: health care aspect

4.2.4.3.4 Hormone therapy/hormone replacement therapy (T4)

Table 18: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – hormone therapy/hormone replacement therapy”

Designation of the extraction table in Section A3.4.4.3.4 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T4 – K1 (Testosterone)	Testosterone therapy is basically recommended for men with a testosterone level below 200 ng/dl, a high risk of fracture and if contraindications against bone-protective medication are present. Additional administration of bone protection/antifracture medication such as bisphosphonates or teriparatide is recommended for men under testosterone therapy with high fracture risk. If symptoms do not improve after 3 to 6 months of testosterone therapy, it should be discontinued and alternative therapeutic measures considered.	TES 2012[a, b]	0 / 3	Not very suitable	

(continued)

Table 18: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – hormone therapy/hormone replacement therapy (continued)

Designation of the extraction table in Section A3.4.4.3.4 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T4 – K2 (Hormone [replacement] therapy)	Hormone replacement therapy should be given in as low a dose as possible and only for a short time and/or only in the case of intolerance or contraindications to the other osteoporosis drugs, and with an individual benefit-risk assessment. Tibolone reduces the fracture risk, but is explicitly not recommended for elderly postmenopausal women due to the increased risk of stroke. **Inconsistency of content:** Oestrogen therapy or a combination of progestins and the administration of raloxifene is not recommended for the treatment of osteoporosis.	DVO 2017, SIGN 2015, SRBMM 2015[b] ACP 2017	2 / 3 1 / 1	Further appraisal is proposed	▪ Tibolone: Not approved for the treatment of osteoporosis, only as HRT in postmenopausal women in whom the menopause occurred more than 1 year ago [27]. ▪ Raloxifene: Not approved and therefore not prescribable or reimbursable by the GKV as HRT [24,28].

(continued)

Table 18: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – hormone therapy/hormone replacement therapy (continued)

Designation of the extraction table in Section A3.4.4.3.4 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T4 – K3 (HRT – gluco-corticoid therapy)	Glucocorticoids reduce the production of sex hormones. Hormone replacement therapy to prevent osteoporosis should be initiated in women under GC therapy who show amenorrhoea or ovarian failure and in men with hypogonadism.	ISO 2016[b]	1 / 1	Suitable	Approval of testosterone as testosterone replacement therapy in male hypogonadism; but no reference to osteoporosis prevention [29].
V5/T4 – K4 (HRT – older postmenopausal women)	The state of health (especially in women over 60 years with risk factors) should be recorded before the administration of HRT. Osteoporosis therapy in postmenopausal women is not the primary indication for hormone replacement therapy; a benefit-risk assessment should be undertaken. Long-term administration is not recommended.	Gluszko 2014, RACGP 2017, SIGN 2015, SRBMM 2015[b]	2 / 4	Suitable	▪ Approval applies to oestrogens in general as HRT. ▪ The age groups for those described as older and younger postmenopausal women need to be more closely defined.

(continued)

Table 18: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – hormone therapy/hormone replacement therapy (continued)

Designation of the extraction table in Section A3.4.4.3.4 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T4 – K5 (HRT – younger postmenopausal women)	Hormone (replacement) therapy with tibolone or low-dose oestrogen is recommended for fracture prevention in younger postmenopausal women and for the treatment of menopausal symptoms.	DVO 2017, SIGN 2015, SOGC 2014	4 / 7	Suitable	Approval of tibolone [27] only for postmeno-pausal women, in whom the menopause occurred more than 1 year ago. The age groups for those described as older and younger postmenopausal women need to be more closely defined.

a: The guideline is more than 5 years old at the time of publication of the rapid report.
b: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

ACP: American College of Physicians; DMP: disease management programme; DVO: Confederation of German Osteology Associations; GC: glucocorticoid; GoR: Grade of Recommendation; HRT: hormone replacement therapy; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; TES: The Endocrine Society; V: health care aspect

4.2.4.3.5 Antiresorptive therapy (T5)

Table 19: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – antiresorptive therapy”

Designation of the extraction table in Section A3.4.4.3.5 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T5 – K1 (General)	Antiresorptive therapy is recommended in patients over 75 years with confirmed osteoporosis (e.g. by DXA). Raloxifene and ibandronate are named as treatment options for patients who require specific spinal efficacy. There are no solid data in favour of a treatment pause with antiresorptive agents.	AACE 2016, DGI 2016, Gluszko 2014, RACGP 2017	2 / 4	Suitable	
V5/T5 – K2 (Risk of osteonecrosis)	The risk of osteonecrosis, general disorders and systemic factors that may be associated with an elevated wound healing disorder should first be recorded in patients in whom dental implants are indicated during or after antiresorptive therapy. This is because these parameters can be the result of an inflammatory complication of an implant. Important influencing factors are: ▪ Underlying disease ▪ Antiresorptive medication and the method, frequency and duration of administration ▪ Concurrent diseases and co-medications (e.g. antiangiogenetic, immunotherapy or antibody therapy and oncological underlying diseases)	DGI 2016	1 / 3	Suitable	

(continued)

Table 19: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – antiresorptive therapy (continued)

Designation of the extraction table in Section A3.4.4.3.5 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T5 – K2 (Osteonecrosis risk) (continued)	▪ Previous osteonecrosis of the jaw ▪ Other medication/treatment: hormone therapy, immunotherapy or antibody therapy, chemotherapy, antiangiogenetic therapy, radiotherapy of the head-neck				
V5/T5 – K3 (Bisphosphonates)	Treatment with bisphosphonates (alendronate, risedronate) is first-choice therapy for osteoporosis and is recommended to reduce the risk of spinal and hip fractures as well as non-spinal fractures. Intravenous bisphosphonates (ibandronate, zoledronate) are recommended if oral administration of drugs is not possible. Zoledronate should not be started for 2 weeks after an operation on a proximal femur fracture. Bisphosphonates can be used for primary prevention of spinal fractures in women who are already at least 10 years postmenopausal and have osteopenia.	AAFP 2015[a], ACP 2017, DVO 2017, Gluszko 2014, ISO 2016[a], NOGG 2017, OC 2015, RACGP 2017, SIGN 2015, SOGC 2014, SRBMM 2015[a]	18 / 24	Suitable	Ibandronate (i. v.) and zoledronate (i. v.) [18,25] are approved, prescribable and reimbursable by the GKV. Non-approved agents [19,26] cannot be prescribed and are not reimbursed by the GKV [24].
V5/T5 – K4 (Bisphosphonates – etidronate)	Etidronate is not the drug of first choice for the treatment of osteoporosis or for fracture prevention. Etidronate can be used if other drugs are not tolerated or are contraindicated. Etidronate should not be used for patients at high risk of fracture who are cared for in in-patient facilities.	OC 2015, SIGN 2015, SOGC 2014, SRBMM 2015[a]	1 / 4	Suitable	

(continued)

Table 19: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – antiresorptive therapy (continued)

Designation of the extraction table in Section A3.4.4.3.5 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T5 – K5 (Denosumab)	Denosumab is recommended to reduce the risk of spinal, non-spinal and hip fractures ▪ in women with increased risk of fracture (including minimal trauma fracture) and/or DXA-confirmed osteoporosis, for whom oral bisphosphonates are contraindicated, ▪ and in men under antiandrogen therapy or with an increasing risk of minimal trauma fractures. Denosumab is recommended as first-line therapy for elderly patients at high risk of fracture, in whom oral medication cannot be used. It is contraindicated in patients with hypocalcaemia. Caution should be exercised in renal impairment. Calcium and vitamin D should be given in addition to denosumab. Rapid bone loss can occur after the drug is discontinued.	Gluszko 2014, NOGG 2017, OC 2015, RACGP 2017, SIGN 2015, SOGC 2014, SRBMM 2015[a]	7 / 11	Suitable	Denosumab: only 60-mg dose approved [21].

(continued)

Table 19: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – antiresorptive therapy (continued)

Designation of the extraction table in Section A3.4.4.3.5 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T5 – K6 (SERM)	SERM may be considered as an option for the prevention of spinal fractures in postmenopausal women. Raloxifene may also be considered in postmenopausal women with hyperlipidaemia, especially at high risk of breast cancer or with a family history thereof, or in the case of intolerance to other pharmacological approaches. Raloxifene is not recommended for elderly patients in care homes with a high risk of fracture.	Gluszko 2014, OC 2015, RACGP 2017, SIGN 2015, SOGC 2014, SRBMM 2015[a]	3 / 6	Suitable	

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAFP: American Academy of Family Physicians; ACP: American College of Physicians; DGI: German Society for Implantology; DMP: disease management programme; DVO: Confederation of German Osteology Associations; DXA: dual energy X-ray absorptiometry; GKV: German statutory health insurance; GoR: Grade of Recommendation; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; OC: Osteoporosis Canada; RACGP: Royal Australian College of General Practitioners; SERM: selective estrogen receptor modulators; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; V: health care aspect

4.2.4.3.6 Drugs with antiresorptive and/or anabolic effects (T6)

Table 20: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – drugs with antiresorptive and/or anabolic effects”

Designation of the extraction table in Section A3.4.4.3.6 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T6 – K1 (Strontium ranelate)	Strontium ranelate should be used as a second-line option in patients at high risk of fracture, who show no increased risk of cardiovascular diseases or hypertension, or if other drugs are contraindicated.	Gluszko 2014, RACGP 2017, SIGN 2015, SRBMM 2015[a]	3 / 6	Suitable	The drug is no longer produced by the manufacturer [22]. Approved only for the treatment of severe osteoporosis [23].
V5/T6 – K2 (Teriparatide)	Teriparatide is recommended for the prevention of spinal and other fractures in postmenopausal women with severe osteoporosis, for glucocorticoid-induced osteoporosis and in men above the age of 50 years, who have had a fracture under antiresorptive treatment. Teriparatide plays a particular role in care home residents at high risk of fracture and can be generally considered as a bone-stimulating therapy for patients above the age of 75 years. Treatment should not exceed 24 months. Treatment with teriparatide should be followed by antiresorptive therapy to prevent a reduction in bone density and an increase in the fracture risk.	AACE 2016, AAFP 2015[a], Gluszko 2014, ISO 2016[a], OC 2015, RACGP 2017, SIGN 2015, SOGC 2014, SRBMM 2015[a]	8 / 12	Suitable	

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAFP: American Academy of Family Physicians; DMP: disease management programme; GoR: Grade of Recommendation; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; OC: Osteoporosis Canada; RACPR: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; V: health care aspect

4.2.4.3.7 Combination treatments (T7)

Table 21: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – combination treatments”

Designation of the extraction table in Section A3.4.4.3.7	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T7 – K1 (General)	Combination treatment can be considered in individual cases. The combination of denosumab and teriparatide shows an improved bone density compared to a respective monotherapy, but no data on fracture prophylaxis are available. As long as the effect of the combination treatment on fracture risk is not proven, a combination is not recommended. Women at high risk of fracture who are taking hormones against menopausal symptoms or raloxifene for breast cancer prophylaxis, may be given bisphosphonates, denosumab or teriparatide in addition.	AACE 2016, DVO 2017	0 / 4	Not very suitable	
AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; DMP: disease management programme; DVO: Confederation of German Osteology Associations; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; T: topic aspect; V: health care aspect					

4.2.4.3.8 Other substances (T8)

Table 22: Summarizing assessment of the health care aspect “Therapeutic measures – drug treatment – other substances”

Designation of the extraction table in Section A3.4.4.3.8 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V5/T8 – K1 (Flavonoids)	Isoflavones can have a positive effect on bone density, but are not recommended for osteoporosis treatment.	SRBMM 2015[a]	1 / 1	Suitable	As OTC preparations, not prescribable or reimbursable by the GKV[14].

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

DMP: disease management programme; GKV: German statutory health insurance; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; OTC: over the counter; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; V: health care aspect

4.2.5 Monitoring (V6)

4.2.5.1 Duration of treatment (T1)

Table 23: Summarizing assessment of the health care aspect “Monitoring – duration of treatment”

Designation of the extraction table in Section A3.4.5.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V6/T1 – K1 (General)	The benefits and risks of the substance used, the level of fracture risk and the course of treatment should be included in the decision about long-term treatment. Women with osteoporosis should receive drug treatment for a period of 5 years and then the treatment re-evaluated. However, as a general rule the drug treatment should be continued for as long as possible in order to reduce the fracture risk. BMD values > –2.5 T (in patients without fractures) or > –2T (with a fracture in the past 5 years) are named as acceptable values for the fracture risk. Bone density should be measured every 3 to 5 years. If the treatment goal has been reached, then consideration can be given to ending the treatment. The duration of antiresorptive treatment in patients who have taken aromatase inhibitors or are still taking them, should be established on an individual basis and based on the absolute fracture risk.	AACE 2016, ACP 2017, DVO 2017, RACGP 2017, SRBMM 2015[a]	1 / 6	Suitable	

(continued)

Table 23: Summarizing assessment of the health care aspect “Monitoring – duration of treatment (continued)

Designation of the extraction table in Section A3.4.5.1 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V6/T1 – K2 (Denosumab)	A pause in treatment with denosumab is not recommended.	AACE 2016	1 / 1	Suitable	
V6/T1 – K3 (Strontium ranelate)	Strontium ranelate can be given for up to 10 years in postmenopausal women with severe osteoporosis, if other treatments are unsuitable.	SIGN 2015	0 / 1	Not very suitable	
V6/T1 – K4 (Teriparatide)	Administration of teriparatide should be limited to 2 years.	AACE 2016	1 / 1	Suitable	
V6/T1 – K5 (Bisphosphonates)	The success of bisphosphonate treatment should be reviewed every 3 to 5 years. If successful, a treatment pause can be considered. The duration of treatment until a pause or discontinuation differs and depends on the particular drug. It ranges from 3 years (zoledronate) to up to a maximum of 10 years (alendronate). After a treatment pause, a possible continuation of the drug should be determined on an individual patient basis. If the bone density is still low (T-score ≤ −2.5) or fractures occur, the treatment should be continued, especially in postmenopausal women and in men above 50 years of age. A switch to a drug with a different mode of action (teriparatide or strontium ranelate) can also be considered.	AACE 2016, NOGG 2017, RACGP 2017, SIGN 2015, SRBMM 2015[a]	0 / 14	Not assessable	

(continued)

Table 23: Summarizing assessment of the health care aspect “Monitoring – duration of treatment (continued)

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; ACP: American College of Physicians; BMD: bone mineral density; DMP: disease management programme; DVO: Confederation of German Osteology Associations; GoR: Grade of Recommendation; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; T-score: number of standard deviations (SD) of the BMD measurement above or below that of young healthy adults of the same sex; V: health care aspect

4.2.5.2 Follow-ups (T2)

Table 24: Summarizing assessment of the health care aspect “Monitoring – follow-ups”

Designation of the extraction table in Section A3.4.5.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V6/T2 – K1 (General)	Clinical follow-ups for tolerability and recorded events (e.g. fractures) should take place every 3 to 6 months after initiation of a drug treatment. The frequency of repeat bone density measurement should be determined by the baseline value. Stable or increased bone density represents successful treatment; if it falls or fractures occur, then treatment needs to be adjusted. This could, for example, mean the exchange of an antiresorptive agent for a bone-increasing drug. The follow-up should be carried out by a specialist and always in the same institution and with the same apparatus.	AACE 2016, DVO 2017, Gluszko 2014, RACGP 2017, SOGC 2014, SRBMM 2015[a]	1 / 11	Suitable	
V6/T2 – K2 (Postmenopausal women)	If possible, monitoring of bone density changes in postmenopausal women should take place in the spine, hips and femoral neck; otherwise the distal third of the radius can also be used as the measuring site.	AACE 2016	1 / 1	Suitable	

(continued)

Table 24: Summarizing assessment of the health care aspect “Monitoring – follow-ups (continued)

Designation of the extraction table in Section A3.4.5.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V6/T2 – K3 (Secondary osteo-porosis – ADT)	The state of bone density should be checked every 1 to 2 years in men under ADT.	RACGP 2017	0 / 1	Not very suitable	
V6/T2 – K4 (Secondary osteo-porosis – GC)	Adult patients above the age of 40 under glucocorticoid therapy who, despite oral bisphosphonate therapy (≥ 18 months), have suffered a fracture or significant loss of bone density (≥ 10% per year) should receive alternative drugs such as denosumab or teriparatide. If the cause of treatment failure is poor absorption or low compliance, a treatment trial with intravenous bisphosphonates combined with calcium and vitamin D can also take place. The same applies to patients who have been prescribed oral bisphosphonates combined with glucocorticoids for longer than 5 years and who show a moderate to high risk of fracture.	ACR 2017	0 / 2	Not very suitable	
V6/T2 – K5 (Secondary osteo-porosis – discontinuation of GC)	After discontinuation of glucocorticoid therapy in patients above the age of 40 years, who are taking an osteoporosis drug in combination with calcium and vitamin D: ▪ With low fracture risk ▫ the osteoporosis drug should also be stopped. Calcium and vitamin D should be continued.	ACR 2017	1 / 3	Suitable	

(continued)

Table 24: Summarizing assessment of the health care aspect “Monitoring – follow-ups (continued)

Designation of the extraction table in Section A3.4.5.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V6/T2 – K5 (continued)	▪ With a moderate to high fracture risk ▫ the osteoporosis drug in combination with calcium and vitamin D should be continued.				
V6/T2 – K6 (Organ transplantation)	A DXA measurement should be carried out immediately after transplantation in organ transplant recipients and then every 18 months in the first 3 years. An annual spinal X-ray should be taken in the first 2 to 3 years after transplantation to identify spinal fractures.	ISO 2016[a]	0 / 2	Not very suitable	
V6/T2 – K7 (Fracture risk calculation)	The fracture risk should be recalculated after every new fracture, irrespective of the point in time ▪ If no new fracture occurs after 18 months to 3 years ▪ After a minimum of 2 years, if the calculated risk lies within the threshold value for a planned treatment or if the individual risk factors of the patient have changed ▪ In patients receiving no osteoporosis therapy, but who show a high fracture risk	DVO 2017, NICE 2012[b,c], NOGG 2017, RACGP 2017	1 / 5	Suitable	

(continued)

Table 24: Summarizing assessment of the health care aspect “Monitoring – follow-ups (continued)

Designation of the extraction table in Section A3.4.5.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V6/T2 – K7 (continued)	▪ If treatment is changed through alleged side effects or discontinuation of therapy The fracture risk can be recalculated using FRAX and the bone density of the femoral neck. The decision whether or not to continue treatment can then be made on the basis of a threshold value. If the hip T-score is ≤ −2.5, then treatment should be continued regardless of the calculated fracture risk.				
V6/T2 – K8 (Antiresorptive therapy)	Regular checks on calcium levels are recommended to avoid hypocalcaemia. Patients who have received a dental implant under antiresorptive treatment should be given risk-adapted follow-up care.	DGI 2015, DKG 2017	2 / 2	Particularly suitable	
V6/T2 – K9 (BTM)	BTM should be measured after 3 to 6 months of selected osteoporosis treatments, in order to check the response to treatment. CTX or NTX (in serum) are recommended. If biochemical markers of bone turnover indicate that the rate of bone turnover and the bone density have decreased, then continuation of treatment is recommended. The measurement of biochemical markers should not be routinely used to diagnose osteoporosis. However, these can be helpful	AACE 2016, NOGG 2017, RACGP 2017, SIGN 2015, TES 2012[a, b]	0 / 5	Not assessable	

(continued)

Table 24: Summarizing assessment of the health care aspect “Monitoring – follow-ups (continued)

Designation of the extraction table in Section A3.4.5.2 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V6/T2 – K9 (continued)	in assessing the efficacy of a treatment and for evaluating secondary causes for a loss of bone density.				
V6/T2 – K10 (DXA)	If no additional risk factors develop, then a DXA measurement should not be undertaken more often than every 1 to 3 years. A shorter interval for the densitometric check-up can be considered for patients receiving glucocorticoids or showing other risk factors. **Inconsistency of content**: No further densitometric measurement should be undertaken in women under antiresorptive therapy during the 5 years of osteoporosis treatment. Another guideline recommends no further checks at all if the patient’s BMD has improved or remains stable.	AACE 2016, AAFP 2015[a], ACOG 2012[b], SRBMM 2015[a], TES 2012[a, b], SIGN 2015 ACOG 2012[b], ACP 2017	0 / 6 0 / 2	Not assessable	Osteodensitometry (DXA) should not be repeated earlier than 5 years. Exception: the presence of particular treatment-relevant historical and clinical findings [30].

a: In its overall assessment according to AGREE II, the guideline shows a low methodological quality (≤ 3 points).
b: The guideline is more than 5 years old at the time of publication of the rapid report.
c: Updated recommendations were published in 2017.

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; ACP: American College of Physicians; ACR: American College of Rheumatology; ADT: androgen deprivation therapy; BTM: bone turnover marker; CTX: C-telopeptide of type I collagen; DMP: disease management programme; DGI: German Society for Implantology; DKG: German Cancer Society; DVO: Confederation of German Osteology Associations; DXA: dual energy X-ray absorptiometry; FRAX: Fracture Risk Assessment Tool; GC: glucocorticoids; GoR: Grade of Recommendation; ISO: Italian Society for Osteoporosis; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NICE: National Institute for Health and Care Excellence; NOGG: National Osteoporosis Guideline Group; NTX: N-telopeptide of type I collagen; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; SRBMM: Spanish Society for Research on Bone and Mineral Metabolism; T: topic aspect; TES: The Endocrine Society; V: health care aspect

4.2.6 Cooperation between health care sectors (V7)

Table 25: Summarizing assessment of the health care aspect “Cooperation between health care sectors”

Designation of the extraction table in Section A3.4.6 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V7 – K1 (General)	General practitioners should identify to what extent patients require fracture prophylaxis or osteoporosis treatment to be undertaken by specialists/specialist centres. In favour of a referral to a specialist are: ▪ Individual need ▪ Need for fracture prevention and initiation of a treatment, as well as other diagnostic measures ▪ Abnormal blood results in the basic laboratory workup ▪ Secondary causes of osteoporosis ▪ (Younger) patients with marked osteoporosis or fractures without trauma ▪ T-score <−3.5 (SD) in younger patients ▪ Presence of concomitant diseases (e.g. monoclonal gammopathy, chronic kidney disease [GFR < 30 ml/min/1.73 m^2], hyperthyroidism, dietary deficiency)	AACE 2016, DVO 2017, Gluszko 2014, NOGG 2017, RACGP 2017, SIGN 2015	2 / 16	Suitable	

(continued)

Table 25: Summarizing assessment of the health care aspect “Cooperation between health care sectors (continued)

Designation of the extraction table in Section A3.4.6 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V7 – K2 (Fracture Liaison Service)	Interdisciplinary care (similar to the Fracture Liaison Service) can be recommended in the context of osteoporosis therapy, especially for patients with fragility fractures, postmenopausal women and men aged over 50 years. An interdisciplinary care programme for persons with hip fracture and dementia can also contribute to an improvement in functional status.	AACE 2016, AAOS 2014, DVO 2017, SIGN 2015	2 / 4	Suitable	The FLS is currently only operating in Germany in the context of pilot projects.
V7 – K3 (Physiotherapy)	Physiotherapy, throughout the entire health care chain, is an important measure to prevent falls, to improve functional status and the quality of life.	AACE 2016, AAOS 2014, NOGG 2017	2 / 4	Suitable	

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; AAOS: American Academy of Orthopedic Surgeons; DVO: Confederation of German Osteology Associations; FLS: Fracture Liaison Service; GFR: glomerular filtration rate; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; NOGG: National Osteoporosis Guideline Group; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; T: topic aspect; V: health care aspect

4.2.7 Education of the insured (V8)

Table 26: Summarizing assessment of the health care aspect “Education of the insured”

Designation of the extraction table in Section A3.4.7 of the full rapid report	Key statement	Underlying recommendations of the following guideline(s)	High GoR n / N	Methodological assessment	Notes
V8 – K1 (Education of the insured)	It is recommended that primary prevention in the form of structured education programmes is promoted and patients are encouraged to make use of the exercise programmes, range of information (e.g. in the form of self-help groups) and psychological support. Girls and women of any age should be told about the effect of lifestyle on their bone health.	ACOG 2012[a], DVO 2017, RACGP 2017, SIGN 2015	1 / 6	Suitable	
V8 – K2 (Patient information/ education)	Female patients should be advised about lifestyle factors that affect BMD and fracture risk (smoking, diet, excessive weight loss, weight-oriented and muscle-building exercises and falls prevention) as well as the importance of calcium and vitamin D intake and about the side effects of medroxyprogest-erone with respect to bone density. In addition, they should be informed of the positive effects of hormone replacement therapy on the fracture risk and the taking of statins that have no effect on fracture risk, and of the individual risk of osteonecrosis and follow-up care if a dental implant is inserted.	AACE 2016, ACOG 2012[a], DGI 2016, SIGN 2015, SOGC 2014	4 / 7	Suitable	Medroxyprogeste-rone monotherapy is approved as a contraceptive. In combination (+estradiol valerate) also approved for the prevention of osteoporosis [31].

a: The guideline is more than 5 years old at the time of publication of the rapid report.

AACE: American Association of Clinical Endocrinologists and American College of Endocrinology; ACOG: American College of Obstetricians and Gynaecologists; BMD: bone mineral density; DGI: German Society for Implantology; DVO: Confederation of German Osteology Associations; K: key statement; n: number of recommendations with high GoR; N: total number of recommendations concerning this key statement; RACGP: Royal Australian College of General Practitioners; SIGN: Scottish Intercollegiate Guidelines Network; SOGC: Society of Obstetricians and Gynaecologists of Canada; T: topic aspect; V: health care aspect

5 Classification of the work results

The rapid report V17-02 is an update of the final report V14-03 [12]. The great majority of the 23 evidence-based guidelines included in the rapid report were published in the last 3 years; only 7 guidelines were already contained in the final report V14-03. The rapid report should be considered as a basis for a possible DMP Osteoporosis.

In terms of the assessment of suitability of the key statements (see Table 2), one particularly suitable key statement could be identified in each of the health care aspects “Treatment goals” and “Monitoring – follow-ups”. 62 key statements could be classified as suitable. 3 key statements were recommended for further appraisal and 15 key statements were identified as not very suitable. No assessments were possible for 9 key statements.

Bone turnover parameters

No precise definitions regarding bone turnover parameters were included in some of the guidelines. In others, various terms such as “bone turnover marker”, “biochemical marker”, “bone marker” or “biochemical bone turnover parameter” were used in the individual guidelines. The corresponding recommendations are arranged and summarized in this report as “Bone turnover parameters” under the topic aspect “History and physical examination”. In this key statement, there was inconsistency of content in respect of the determination of bone markers, which may be due to the differing terminology in the guidelines.

Calcium intake

The statements in the guidelines about the daily calcium dose or supplementation differ. In order to enable adequate representation of the different dosages, recommendations in this report about calcium and vitamin D intake were therefore subdivided according to subpopulations. However, the differences in the statements on daily calcium dosage persist in the guideline recommendations (ACR 2017 and ISO 2016) concerning the group of patients with concurrent medication of glucocorticoids, where the recommended daily intake of calcium in these two guidelines differs two-fold.

Secondary osteoporosis – glucocorticoids

The guideline recommendations also differ in their definitions of a high dose of glucocorticoids. Whereas the American guideline states ≥ 30 mg per day (ACR 2017), the UK NOGG 2017 guideline describes ≥ 15 mg per day as a high dose and a German guideline (DVO 2017) considers even ≥ 7.5 mg per day as high-dose therapy with glucocorticoids for postmenopausal women and men.

Age designations in the hormone replacement therapy of postmenopausal women (HRT)

The precise differentiation between younger and older postmenopausal women is left open in some guidelines. Since the treatment is different in the two subpopulations, the assignment of recommendations to the respective key statements was based on the symptoms described in the respective guidelines.

Inconsistency in the DXA follow-ups

The timing of follow-ups in the form of a DXA measurement specified in the various guidelines differs. Inconsistent statements are made regarding the time interval for measurement and whether – if BMD is constant - any further DXA measurements should be undertaken at all. This is possibly due to the overall clinical situation of the person to be investigated. The deviations in the time intervals of DXA measurements might also be caused by the different, state-specific health care situations and possibilities of payment by the GKV.

Fracture Liaison Services

Under the health care aspect “Cooperation between healthcare sectors”, 4 guidelines contained recommendations about an interdisciplinary care programme similar to the Fracture Liaison Service that exists in some countries (for example New Zealand or Canada) [32,33]. Through the collaboration of osteology centres with peripheral hospitals or community-based physicians, there is the possibility of improving the local care of patients with osteoporosis [34]. Comparable approaches are being tested for the first time in the Rechts der Isar hospital in Munich und in Freising [35].

6 Conclusions

23 evidence-based guidelines were included in the rapid report V17-02, from which suitable key statements could be generated about the following aspects of health care:

- Diagnostics,
- Treatment goals,
- Therapeutic measures,
  - principles of therapy
  - non-drug therapy and general measures,
  - drug treatment,
- Monitoring,
- Cooperation between health care sectors,
- Education of the insured.

The rapid report focussed on guideline recommendations concerning diagnostics, therapeutic measures and monitoring.

No recommendations were identified for the health care aspect “Rehabilitation”. Individual recommendations were extracted only for “Physiotherapy” and for “Orthotics”. However these recommendations were presented in the sections of the report covering “Cooperation between health care sectors” or “Non-drug therapies”.

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Please see full rapid report for full reference list.

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