



Zorginstituut Nederland

Room for Improvement Report

Osteoporosis

Zinnige Zorg | ICD-10- Chapter XIII, M80-85

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Zorginstituut Nederland and Zinnige Zorg (Appropriate Care)

Zorginstituut Nederland's motto is "Taking care of good health care: no more and no less than necessary". Each citizen must be able to count on receiving good health care.

Accordingly, the Zorginstituut carries out systematic assessments of health care. We assess whether diagnostics and (therapeutic) interventions are being deployed in a patient-oriented, effective and cost-effective manner. The core feature of this is that we compare opinions on good care in guidelines and science with the implementation of health care in practice in the Netherlands.

We discuss our findings with healthcare providers, patients, care institutions, health insurers and fellow government agencies. Together with them, we examine what is needed to improve patient care and avoid unnecessary costs.

The parties in health care are responsible for improving that care. The Zorginstituut provides an overview of any points for improvement, promotes cooperation and monitors the results. This is how we contribute to good and affordable health care for everyone.

More information about the activities of Zorginstituut Nederland and Zinnige Zorg can be found at www.zorginstituutnederland.nl.

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Summary

This room for improvement report describes the study and the resulting possibilities for improving health care for patients with osteoporosis. Osteoporosis is a chronic condition in which the strength of bones decreases. As a result, patients have an increased risk of a fracture. As part of the Zinnige Zorg programme of the Zorginstituut Nederland we have examined the care pathway for osteoporosis together with relevant organisations of patients, healthcare professionals, healthcare providers and health insurers. This led to the conclusion that improvement is desirable. The improvement actions we have agreed with the parties concerned and the corresponding care pathway for fracture prevention develop this further.

Actions agreed with parties on improvements

Care for patients with osteoporosis is made more appropriate by improvements in three areas:

- **Diagnosis:** osteoporosis is frequently not diagnosed (promptly) in current practice. That happens because too few patients who are eligible for one get a bone density measurement. In addition, not enough examinations for vertebral fractures are carried out. Underdiagnosis of osteoporosis can be reduced by improving the healthcare organisation and providing better information for patients. This will enable treatment to be started for more people in order to reduce the risk of new fractures.
- **Treatment:** improvements are possible in the treatment of patients with bone-sparing medication. Too few over-50s who have suffered a fracture and too few patients who use glucocorticoids are treated with medication to prevent (new) fractures. Patients who do use bone-sparing medication frequently stop prematurely or without the necessary follow-up treatment. By improving the treatment of patients with osteoporosis, fewer people will suffer a new fracture.
- **Patient information:** improving patient information on osteoporosis ensures a better knowledge and understanding of their condition among patients. As a result, they will be able to make reasoned decisions concerning their care pathway and the lifestyle adjustments which are most appropriate for them. Improving patient information, more references to the website of the patients' association and making decision aids easier to find are important steps in this process.

For all three of these areas, the Zorginstituut has agreed specific improvement actions with the parties concerned. We also put forward a Fracture Prevention care pathway which seems appropriate for implementing these improvement actions.

Impact analysis

The improvement actions have a considerable impact on the health of people with osteoporosis. More than 22,000 additional people receive medication, thereby almost halving their chance of a new fracture. Each year almost one and a half thousand new fractures can be prevented, resulting in fewer disabilities, a better quality of life and an annual saving of about 13.5 million euros in healthcare costs. On the other hand there is a rise in healthcare costs of almost 20 million euros per annum: More diagnoses and more consultations in hospital cost 10.4 million euros annually. Increased use of medication and more checks with general practitioners together cost 9.4 million euros per annum.

Implementation, monitoring and evaluation

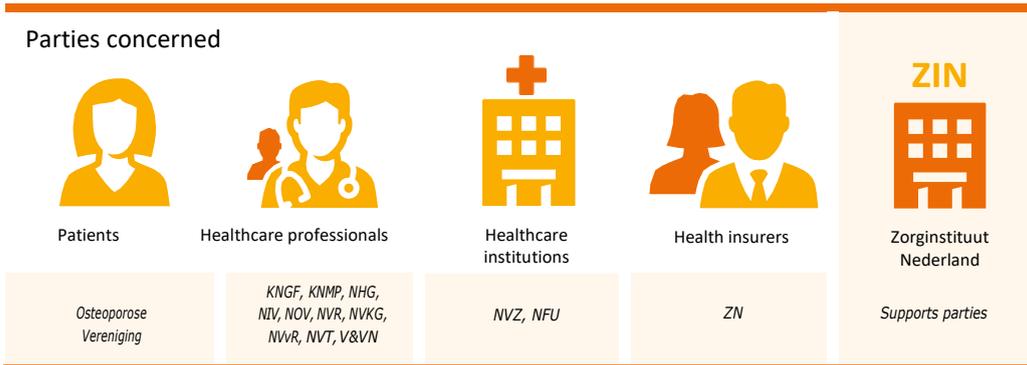
Performance and implementation of the improvement actions are the joint responsibility of the relevant parties in health care. They have promised to do this. The Zorginstituut will provide support for implementation where necessary and at the request of the parties; for example, by organising meetings to bring parties together and by presenting data which provide an insight into progress.

The Zorginstituut will monitor the improvement actions by discussing the progress with parties annually and reporting on this to the Minister for Medical Care and Sport. About five years after publication of this room for improvement report, the Zorginstituut will produce an evaluation report on the improvements achieved for the minister.

Appropriate care for people with osteoporosis (loss of bone density)

- In 1 in 3 people aged 50 and over with a fracture, that fracture is the result of osteoporosis. In general practice, half a million people are known to have osteoporosis. Osteoporosis occurs more frequently in women than in men.
- Only 1 in 4 people over the age of 50 with a fracture get a bone density measurement to identify osteoporosis.
- As a result, fewer than half of people with an indication for treatment are given bone-sparing medicines. These medicines can reduce the chance of a second fracture.

Parties concerned



Prevent underdiagnosis



Improve the treatment of osteoporosis



Improve patient information on osteoporosis



Ensure full and accurate patient information



Refer patients to the website of the Osteoporose Vereniging



Link the 'PATIENT+ keuzehulp' [decision aid] to the new Fracture Prevention guideline and make the decision aid more accessible

The impact



Fewer fractures and disabilities, better quality of life



Less use of health care and fewer complications



Lower social costs

Introduction

With the Zinnige Zorg [Appropriate Care] programme, Zorginstituut Nederland [National Health Care Institute] wants to improve the quality of care for patients, reduce ineffective or unnecessary care and avoid unnecessary costs. The programme covers various projects. In each project we systematically assess a specific disease area. We take as our basis for this the classification of diseases according to the World Health Organization International Classification of Diseases, version 10 (ICD-10) from 2016.^[1] A systematic assessment consists of four consecutive phases: screening, in-depth analysis, implementation and evaluation. Annex A gives more information on the Zinnige Zorg working method.

Screening for endocrine, nutritional and metabolic diseases

This Zinnige Zorg report on Osteoporosis is the result of the systematic assessment of the healthcare field 'Endocrine, nutritional and metabolic diseases (ICD-10: IV (E00-E90). Endocrine diseases (ICD-10-codes E00-E35) are diseases of glands which produce hormones and secrete these into the blood. Although osteoporosis is regarded as an endocrine disease, this is included in a different chapter of ICD-10 (ICD-10 chapter XIII, codes M80-85, diseases of the locomotor apparatus). Because the endocrine system plays an important role in the development of osteoporosis, we have nevertheless included osteoporosis in this systematic assessment.

Together with parties involved in the implementation of health care, the Zorginstituut has selected osteoporosis as a care pathway for more detailed study in the in-depth analysis phase. The choice is explained in detail in the screening report, which was published in September 2018.^[2]

In-depth study of osteoporosis

This room for improvement report gives an account of the study undertaken at the Zorginstituut of the care provided for people with osteoporosis. In this we cooperated closely with representatives of the parties involved in that care pathway. These are organisations of patients, healthcare professionals, healthcare providers and health insurers. A list of these parties is given in Annex B.

The starting point for the study was potential bottlenecks in the Osteoporosis care pathway. These potential bottlenecks emerged from an analysis of guidelines, indications from interested parties and preliminary data analyses. The potential bottlenecks and research possibilities were discussed with and added to by the relevant parties. Studies were then carried out. The sources and methods used for these are set out in Annex C. This room for improvement report concerns the outcomes of these studies.

The study in the in-depth analysis phase focussed on a comparison of osteoporosis care as described in guidelines with the implementation of that care in practice.

Study



In consultation with the parties concerned, the Zorginstituut drew up research questions for osteoporosis care regarding:

- diagnosis: bone density measurements (DEXA scans), spinal column diagnosis, laboratory study, fall risk estimation and, where necessary, fall risk assessment;
- non-pharmacological treatment: fall prevention, lifestyle advice, calcium and vitamin D intake;
- pharmacological treatment: starting treatment, switch to another medicine and adherence; discontinuing treatment;
- follow-up and after-care: check-up consultations with the doctor and check-up DEXAs;
- patient information: accuracy and completeness of public patient information;
- organisation of health care: shaping of the care pathway in and out of hospital.

The Zorginstituut conducted part of the study itself, namely:

- an analysis of national and international guidelines;
- analyses of the implementation of health care in practice on the basis of claims data (hospital care and medicines) and quality indicators;
- an analysis of public sources with patient information;
- a description of the organisation of health care in different regions on the basis of document analysis and interviews.

We contracted out two studies to the PHARMO Institute. These were: a study of GP case records concerning the diagnostic pathway of patients with an increased fracture risk and a study of the fall risk estimation by the GP for patients after a fracture or the diagnosis of osteoporosis.^[3, 4]

Supplementary to the aforementioned studies, we conducted a literature review and held interviews with osteoporosis experts: healthcare professionals who are members of the relevant scientific associations and representatives of the patients' association. The aim here was to gain an understanding of explanations for the results obtained, to be able to put the results into a broader context and to get a picture of possibilities for improvement.

It emerged from some of the studies that implementation of care in the care pathway studied was already good. There were also studies where it was not possible to draw any clear conclusions or where the parties disagreed about the possibilities for improvement. Finally, there were research results which showed clearly that improvement is possible. In this report we describe only the research results which have led to concrete agreed actions for improvement of care for patients with osteoporosis. We have done an impact analysis on the basis of the improvement actions; the method used is described in Annex D. The follow-up steps after this in-depth analysis phase are reported briefly in Annex E. Prior to publication of the room for improvement report we invited the parties to take part in a written administrative consultation. The responses are given in Annex F.

Reader's guide

This room for improvement report describes, for a number of elements in the osteoporosis care pathway, the improvements which are possible on the basis of the results of the study. Chapter 1 contains a description of the care pathway for people with osteoporosis. In Chapter 2 we show that underdiagnosis can be reduced by improving the organisation of care. Chapter 3 sets out clearly how the treatment of patients with bone-sparing medication can be improved. Chapter 4 describes what improvements are necessary in patient information on various websites. Chapter 5 contains the improvement actions which the Zorginstituut has agreed with relevant parties. We also set out a Fracture Prevention care pathway which seems appropriate for implementing the improvement actions. Finally, we describe the impact which the improvement actions may have on the health of patients and on the costs and savings for health care.

1 Osteoporosis care pathway

Osteoporosis is a chronic disease by which the strength of bones decreases. As a result, patients have an increased risk of a fracture. In this chapter we describe the care pathway of patients with osteoporosis. This description is based on two guidelines: the 2011 *Multidisciplinary Guideline on Osteoporosis and Fracture Prevention* and the 2012 *NHG [Dutch College of General Practitioners] Standard for Fracture Prevention*.^[5, 6]

The diagnosis and treatment of osteoporosis focus mainly on the suppression of further bone loss and the prevention of fractures. We describe below the care pathway according to the guidelines. This care pathway was the starting point for drawing up this room for improvement report.

1.1 Description of the disease

Osteoporosis is bone loss: bones become brittle and lose their strength. Particularly in old age, more bone is broken down than is created, and the result may be osteoporosis. Possible causes of osteoporosis are insufficient physical activity, too little calcium in the diet, insufficient sunlight (resulting in insufficient vitamin D) and hormonal changes in women in the menopause. Osteoporosis may also be the result of (other) diseases or the use of medicines. In that case, it is referred to as secondary osteoporosis. Osteoporosis occurs more frequently in women than in men, and the chance of this increases with age.

Osteoporosis does not itself cause any symptoms but it does increase the chance of broken bones (fractures). For this reason experts no longer talk of osteoporosis but of an increased fracture risk. As a result of a broken bone, patients may be restricted in their day-to-day functions, for example standing up, walking, bending, carrying and lifting. Particularly in the initial period after a fracture, patients have a greatly increased risk of a new fracture. Of the people aged 55 and over who break their hip, almost a quarter die within a year.^[7] Osteoporosis can also lead to collapsed vertebrae (vertebral fractures), as a result of which patients get more stooped or shorter. Changes in the shape of the spinal column may cause pressure on the internal organs. Osteoporotic vertebral fractures can cause a great deal of pain and invalidity.

1.2 Diagnosis, treatment and monitoring

Because patients aged fifty and over with a broken bone form the main risk group, we describe here the care pathway which they would have to be given under the guidelines. The care pathway consists broadly of three parts: diagnosis of the disease, possible treatment and monitoring.

Diagnosis

Diagnosis consists of a bone density measurement, examination for vertebral fractures, laboratory analysis and a fall risk estimation and, where necessary, a fall risk assessment. Diagnosis starts with a bone density measurement to identify osteoporosis, by means of a DEXA scan (*Dual-energy X-ray absorptiometry*). The second part of the diagnosis is an examination for vertebral fractures, based on a VFA (*Vertebral Fracture Assessment*). Then the patient undergoes a laboratory analysis. This is necessary to identify additional ('secondary') causes of bone loss and to adjust the treatment to this. In addition, other diseases are examined, and the use of medicines which may increase the risk of a reduction in bone density. Finally, a fall risk estimation and, where necessary, a fall risk assessment of the patient is done. Among other things, this examines whether the patient has had two or more falls in the last year, whether he/she has impaired vision, whether he/she has problems with walking or balance, and whether he/she uses medicines which increase the risk of falls.

Treatment

All patients who have gone through this diagnosis qualify for treatment by means of lifestyle advice. This consists of encouraging sufficient physical activity, a healthy diet (specifically, sufficient calcium) and sufficient vitamin D. In addition, they are given advice on stopping smoking and avoiding excessive alcohol consumption. Above all, patients at increased risk of falling must be given tailored interventions, for example strength and balance training with a physiotherapist or adjustment of medication.^[8, 9] In addition, patients with osteoporosis and patients with osteopenia (reduced bone quality but not yet osteoporosis) and a vertebral fracture qualify for bone-sparing medication and, if necessary, calcium and vitamin D supplements (in line with the recommendations of the Gezondheidsraad [Health Council of the Netherlands]).^[10]

Monitoring

Patients who are treated with bone-sparing medication continue to be monitored by a doctor. This treatment lasts for five years in each case, but may be even longer. During the check-ups particular attention must be paid to fall risk, lifestyle, adherence and the effect of the treatment. At the end of or a few years after stopping the treatment, the patient qualifies for a new DEXA scan, and the risk of a fracture is assessed again. A decision is also made then on whether further treatment is necessary. Patients who nevertheless suffer a new fracture during treatment go through the whole process of diagnosis and treatment once again from that point in time.

Figure 1.1 | Patient care pathway according to current guidelines



2 Prevent underdiagnosis

One of the most important findings from our study is that osteoporosis is not diagnosed (promptly). That happens because too few patients who qualify for a bone density measurement are given one. In addition, there is insufficient investigation of vertebral fractures. This underdiagnosis leads to undertreatment and thus to new fractures, some of which could have been prevented if patients had received treatment. There are various reasons why many patients are not diagnosed. These can be found among healthcare providers, on the one hand, and among patients, on the other hand. By improving the organisation of health care and providing better information for patients, it is possible to reduce underdiagnosis of osteoporosis and prevent a large part of the new fractures.

2.1 Give more patients a bone density measurement

Our study shows that not enough patients are given a bone density measurement to identify osteoporosis. Bone density is measured by means of a DEXA scan. The DEXA scanner is an apparatus which uses a low dose of radiation to measure bone density. To diagnose osteoporosis, the bone density of the hip and vertebrae is measured. Bone density is expressed as a T-score: if this is -2.5 or lower, the diagnosis of osteoporosis is confirmed.¹ If a patient is not given a bone density measurement, a doctor cannot establish whether that person has osteoporosis and cannot offer treatment to prevent fractures as a result of that osteoporosis. Bone density measurement is not offered often enough because of shortcomings in the organisation of health care. As a result, too few people aged fifty and over with a fracture are given a bone density measurement. Furthermore, however, too few people with an increased risk of fractures as a result of using glucocorticoids are offered a bone density measurement.

2.1.1 Improve the organisation of health care for over-50s with a fracture

Various results from our study show that the organisation of health care for over-50s with a fracture requires improvement.

Too few over-50s with a fracture are given a bone density measurement

Only 26% of people aged fifty and over with a fracture are given a DEXA scan, as can be seen in table 2.1. This is apparent from our analysis of claims data from about 120,000 over-50s who suffered a fracture 2016.^[11] According to the guidelines, all patients over the age of fifty who have suffered a fracture should have a bone density measurement by means of a DEXA scan^[6, 5], since these patients have an increased risk of a new fracture. It is well known from research that, after a first fracture, patients have an approximately 16% chance of suffering a second fracture within 5 years.^[12, 13] In practice there appears to be insufficient investigation of bone density: three-quarters of over-50s with a fracture are not given a DEXA scan.

Table 2.1 | Percentage of patients aged ≥ 50 with a fracture in 2016, who had or did not have a DEXA scan in the year before or the year after that fracture (excluding people with head or facial fractures)

Source: Claims data^[11]

Had/did not have a DEXA scan in 2016	Number of patients	Percentage
Had a DEXA scan, in year before or year after fracture	31,750	26.3 %
Did not have DEXA scan, in year before or year after fracture	88,759	73.7 %
Total number of patients aged ≥ 50 with a fracture	120,509	100%

¹ The T-score is the deviation in the measurement compared to the reference value for young adults expressed in standard deviations (SD).

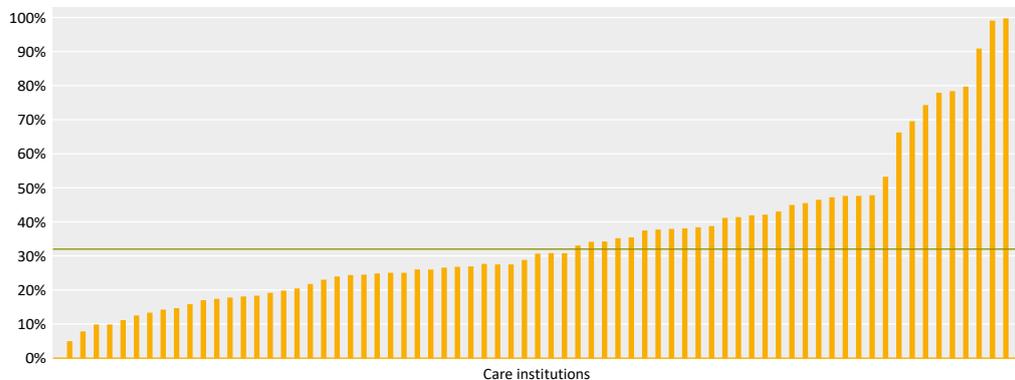
² Only where people have already had a bone density measurement in the year prior to a fracture, they do not have to have another one if they suffer a fracture.

Research shows that reduced bone quality is identified in about 40% of over-50s with a fracture: they have osteoporosis or osteopenia combined with a vertebral fracture.^[14-17] Laboratory analysis must be carried out for these patients in order to identify additional (secondary) causes of bone loss and to adjust treatment to these.^[5] Claims data show that, in fact, four out of ten (39%) patients with a fracture who were given a DEXA scan had the full set of laboratory tests recommended in the multidisciplinary guideline.^[11] In addition, it seems that, when over-50s are given a DEXA scan after a fracture, they then receive medication to prevent new fractures, as we demonstrate in chapter 3.

The quality indicators which have been agreed by medical specialists, hospitals and patients' organisations provide a comparable picture regarding bone density measurements. According to this information from hospitals, in 2018 on average 30% of the approximately 113,000 patients aged 50 and over with a recent fracture were given a DEXA scan.^{3[18, 19]} There are, however, big differences in the data provided by hospitals (practice variation): the percentage who get a DEXA scan varies, as is shown in figure 2.1. Some of the differences between hospitals can be explained by differences in patients who are included in the calculation of this quality indicator. Two hospitals report that a DEXA scan is carried out for 100% of older patients with a fracture. Osteoporosis experts suggest that this percentage is not credible, because 80% would be the maximum achievable for a hospital. For example, some of the patients do not live in the region where the fracture is diagnosed and they get a DEXA scan in their own region, or for other reasons cannot or do not want to return to the hospital to undergo a DEXA scan.

Figure 2.1 | Percentage of patients aged ≥50 with a fracture, who had a DEXA scan in 2018, by care institution (71 institutions).

Source: Openbaar Databestand Kwaliteitsindicatoren [Public Database Quality Indicators]^[19]



In addition, the number of over-50s with a fracture who get a DEXA scan appears to decrease over time. According to claims data, each year about one quarter of these patients had a bone density measurement in the 2013-2017 period.^[20] A number of regional studies indicate that in previous years this figure was higher, namely 40% in 2012 and 51% 2007-2008.^[21, 22] Thus, the problem of underdiagnosis of osteoporosis appears to be getting bigger.

³ Relates to patients who were given a DEXA scan in the year before the fracture until six months after.

The fact that so few patients get a bone density measurement is related to the organisation of health care, among other things. Healthcare providers do not always offer a bone density measurement to patients with an increased fracture risk. We estimate that about half of the patients over the age of fifty with a fracture are not offered a bone density measurement.⁴ Of the patients who are invited, about half do not respond to the notice.^[22, 21, 23]

Prevention of administrative errors

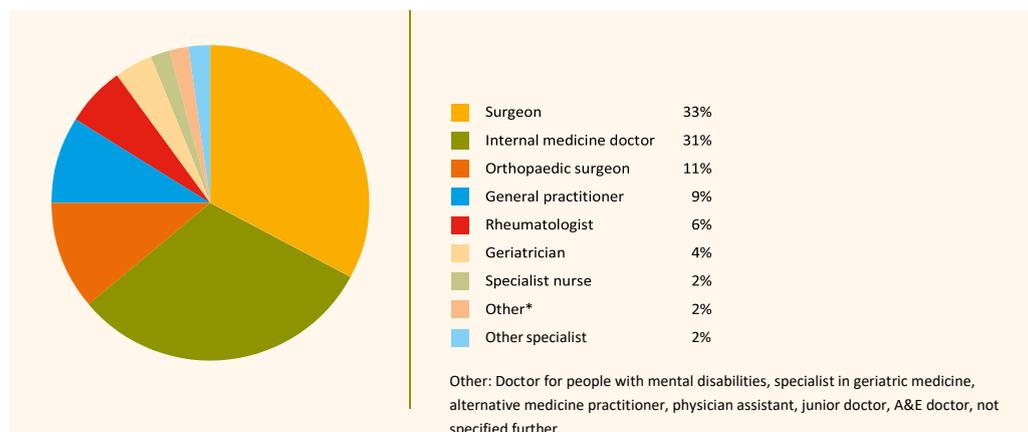
Administrative errors are a leading reason for failure to carry out a bone density measurement. Because it is primarily in the first year that patients with a fracture have a greatly increased risk of suffering a second fracture, the multidisciplinary guideline recommends identifying patients who qualify for a bone density measurement in the Accident & Emergency Department (A&E) immediately after the fracture.^[5] However, in the Netherlands investigation of osteoporosis is not usually initiated in the A&E, but rather in an osteoporosis outpatient clinic. This usually falls under the responsibility of a diagnostic medical specialism (for example, rheumatology or internal medicine) which is not involved in the admission and treatment of patients with a fracture. According to this organisational model the osteoporosis outpatient clinic must identify patients who have had a fracture and qualify for further investigation via the A&E registration system. The osteoporosis outpatient clinic then sends an invitation to the patient for a DEXA scan. However, a recent survey shows that 14% of patients with a fracture are not properly registered at the A&E and, therefore, are not called by the osteoporosis outpatient clinic.^[23] Administrative errors in hospitals can, therefore, mean that some patients with a fracture are not offered a bone density measurement. Osteoporosis experts say that automated requests for a DEXA scan from the A&E registration system (for example, via a *pop-up*) may lead to improvement.

Assign responsibilities

A second reason for failure to carry out a bone density measurement is the fact that different healthcare providers are involved in osteoporosis care. However, none of them is primarily responsible for carrying out bone density measurements. Figure 2.2 (based on claims data) shows that DEXA scans for over-50s with a fracture are requested by more than seven different specialists. Most bone density measurements are requested by surgeons and internal medicine doctors, but other health care providers also request bone density measurements.^[11] The multidisciplinary guideline does not, however, state explicitly which healthcare provider is primarily responsible for the diagnosis.^[5]

Figure 2.2 | Parties requesting the DEXA scan for patients aged ≥50 with a fracture in 2016, who got a DEXA scan in the year before or the year after that fracture

Source: Claims data^[11]



⁴ Two studies have shown that half of patients invited for a bone density measurement do not respond.^[22, 21] According to claims data, 26% had a bone density measurement. This implies that 52% of patients were offered a bone density measurement and that 48% of patients over the age of 50 with a fracture were not offered a bone density measurement.

Improve knowledge among healthcare professionals

Thirdly, it appears that some of these healthcare providers do not have sufficient knowledge or awareness of osteoporosis and the risk factors for the occurrence of fractures. This may explain why they do not request bone density measurements for patients who, according to the guidelines, should have a DEXA scan. National and international studies show that, among various groups of healthcare providers, there is a lack of knowledge, awareness and urgency regarding osteoporosis care and that this plays a role in underdiagnosis.^[24-30] In addition, Dutch research shows that healthcare providers have inadequate knowledge regarding the diagnosis and treatment of osteoporosis caused by glucocorticoids.^[31] Many patients with a fracture say that they have not been advised by their treating doctor to have a bone density measurement.^[23]

Raise awareness among hospital administrations

Osteoporosis experts maintain that insufficient awareness is an issue not only among healthcare providers but also for the management of hospitals. This leads to the fourth reason why DEXA scans are not carried out in sufficient numbers. Some hospitals attach less importance to osteoporosis care and fracture prevention than others and therefore make fewer resources available, for example in terms of capacity for DEXA scans or hours for an osteoporosis nurse. The quality indicators show that 36 out of 86 hospitals (42%) employ only one osteoporosis nurse for 20 hours a week or less for the entire implementation and coordination of osteoporosis care, including calling patients for a DEXA scan.^[19] Experts say that the costs of scaling up fracture prevention care may be a limiting factor for hospitals. They propose setting up a short-term multidisciplinary fracture prevention DTC (Diagnosis Treatment Combination) with just the essential procedures and focus on reallocation of tasks, which will replace the current DTCs.

Clarify which patients qualify or do not qualify for a DEXA scan

Finally, hospitals appear to exclude certain groups of patients from bone density measurements. Hospitals say that, for example, they do not call for a DEXA scan patients with hip, hand, foot and facial fracture, people with (many) comorbidities, patients with limited life expectancy, patients who (are going to) live in a residential home, patients who are not able to get to the osteoporosis clinic because of somatic or psychological problems and patients who are already being treated by an internal medicine doctor or rheumatologist.^[19, 32] The patient groups who are not invited differ from hospital to hospital, and this shows that implementation practice is not the same. Osteoporosis experts acknowledge that, as a result, some over-50s with a fracture are – wrongly – not offered a bone density measurement. The problem here is that this exclusion of patient groups is not stated in the guidelines and can lead to underdiagnosis and undesirable variation in practice.

Improve the information given to patients

Where healthcare providers do invite patients for a bone density measurement, it appears that some patients do not respond to this. About half of the patients ignore an invitation for a bone density measurement.^[22, 23, 21] Research indicates that there are various factors underlying this: older age, male sex, less educated, living alone, reduced mobility and practical factors such as the compulsory excess and the distance to the hospital.^[22, 21, 23] In addition, among patients there appears to be a lack of interest and knowledge concerning the relationship between fractures, osteoporosis and the chance of another fracture. In a Dutch study, for example, 17% of the participants answered yes to the statement “In spite of the fact that I have had a fracture, I do not think that my fracture risk has increased.”^[23] The time at which patients are called for a DEXA scan and the method used can also play a role: osteoporosis experts say that patients do not always establish the link between their fracture and the invitation for a bone density measurement.

Discussion of bone density measurement in A&E or the plaster room may increase understanding of the link between fracture and bone density measurement. Peer-to-peer contact may also help to increase knowledge about (the importance of) diagnosis and treatment of osteoporosis. In a Canadian study elderly people were given information on osteoporosis and advice on bone density measurements by osteoporosis patients. As a result, more people were prepared to undergo a bone

density measurement and to accept advice on treatment.^[33] The Osteoporose Vereniging [Osteoporosis Association] believes that patients with a fracture should always be referred to the Osteoporose Vereniging for information and the opportunity for peer-to-peer contact.

To increase awareness among patients with a fracture, the Osteoporose Vereniging launched a campaign on 'Over-50s+ and fractures' in 2019. This consists of a set of educational material to go in the plaster and/or consulting room, which can be ordered by healthcare providers or hospital departments involved in the care of patients with a fracture.^[34]

Osteoporosis experts say that it is also important to motivate patients and to invite them repeatedly if they initially ignore an invitation to a DEXA scan. In practice, there does not always seem to be a safety net for people who do not respond, either from the hospital or from the general practitioner. In Tilburg a transmural care programme is under way, in which patients with a fracture who have not responded to the call from the hospital are invited again by the general practitioner for an osteoporosis diagnosis. Examination of the results is still ongoing.^[35-37]

So that more patients with a fracture are ultimately given a DEXA scan, it is important for a DEXA scan to become a standard component of care for a fracture. The appointment for this can be made in A&E or in the plaster room. It is important that patients are given a proper explanation of the risk of a new fracture there, so that the purpose and importance of the DEXA scan are made clearer. This includes also mentioning the existence and importance of the Osteoporose Vereniging. If patients do not attend the appointment for a DEXA scan, they should be telephoned to make a new appointment. This method is expected to lead to an increase in the number of patients who are given a DEXA scan after a fracture. In this way, treatment can be initiated in more patients in order to prevent new fractures.

2.1.2

Bone density measurement also for patients at risk of secondary osteoporosis

Osteoporosis may be the result of (other) diseases or the use of medicines. This is referred to as secondary osteoporosis. According to our study, these patients too are often not given a bone density measurement. One example is patients who are taking high doses of glucocorticoids on a long-term basis. Glucocorticoids are anti-inflammatory drugs such as prednisolone and dexamethasone. Many people (in 2018: almost 900,000) use these drugs for all kinds of conditions.^[38]

High doses of these increase the risk of osteoporosis and the occurrence of fractures (glucocorticoid-induced osteoporosis; GIOP). Consequently, according to the multidisciplinary guideline, premenopausal women and men under the age of seventy who take a high dose (>7.5 to 15 mg prednisone equivalent per day) of glucocorticoids on a long-term basis (>3 months) should have a bone density measurement. Other patients who are going to take glucocorticoids on a long-term basis or patients who take >15 mg prednisone equivalent per day over a long period do not require a DEXA scan, but must be treated immediately with bone-sparing medication.^[5] In practice, however, not even 5% of men under the age of 70 who are taking a high dose of glucocorticoids on a long term basis get a DEXA scan, according to claims data.^[11]

Even patients with a disease that may cause osteoporosis or increases the chance of fractures are very often unlikely to be given a bone density measurement. This relates to, for example, conditions such as the lung disease COPD, rheumatoid arthritis and coeliac disease (gluten allergy). The multidisciplinary guideline recommends the inclusion of these diseases in the calculation of patients' fracture risk, and determining whether a bone density measurement is necessary.^[5]

¹ We studied this in patients aged fifty to seventy who in 2016 were taking a high dose of glucocorticoids on a long-term basis and were not given bone-sparing medication.

However, the guidelines relating to the relevant conditions do not always mention use of a DEXA scan to investigate for osteoporosis. In addition, sometimes there is only a non-binding recommendation, such as in the draft guideline on rheumatoid arthritis: “It is the responsibility of the prescriber to check for the presence of osteoporosis in case of long-term use of glucocorticoids.”^[39] This may mean that the relevant healthcare providers do not pay enough attention to osteoporosis diagnosis.

To prevent fractures, it is important for more people to be checked for osteoporosis by means of a DEXA scan. This applies to patients with a fracture and to patients who are at risk of secondary osteoporosis as a result of diseases or use of medicines. As soon the diagnosis of osteoporosis is established, treatment can be started to reduce the risk of fractures.

2.2 Improve diagnosis and reporting of vertebral fractures

It is important to carry out a diagnosis of the spinal column in people with a fracture or at high risk of fractures, because vertebral fractures frequently occur in these people without them having any symptoms. Patients with osteopenia and a vertebral fracture qualify for treatment with bone-sparing medication because of the increased chance of a new fracture, even if they do not have osteoporosis. However, a diagnosis to identify vertebral fractures is not carried out frequently enough. In addition, the guidelines give different advice regarding in whom and how a diagnosis of the spinal column should be done. If a diagnosis of the spinal column is indeed carried out, the recommendation in the guideline for reporting the results is not followed adequately.

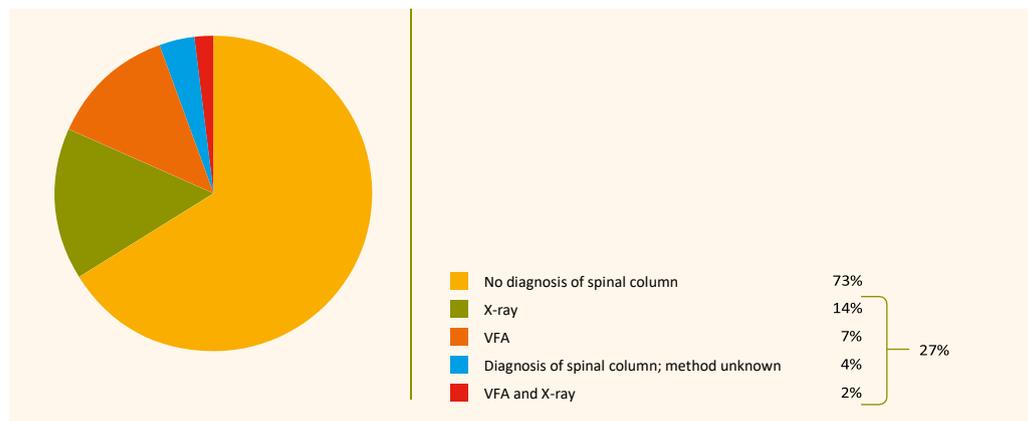
2.2.1 Carry out more VFAs to diagnose vertebral fractures

The recommendations in the guidelines to carry out a diagnosis of the spinal column are not applied adequately. A diagnosis of the spinal column can be done by carrying out a VFA with a DEXA scanner. If a VFA is not possible, an X-ray can be taken of the spinal column.

It is not possible for us to deduce from hospital claims data how many patients have had a VFA, because there is no separate procedure code for the VFA. Consequently, the PHARMO Institute carried out a study of general practitioners’ case records on behalf of the Zorginstituut. This shows that, for 27% of patients aged 50 and over who were given a DEXA scan, a diagnosis of the spinal column was also reported in the GP case records.^[3] This is not many, since the NHG standard recommends that a VFA should also be carried out in all patients aged sixty and over who are eligible for a DEXA scan.^[6] Of the patients for whom a diagnosis of the spinal column was found, about half of them had an X-ray of the spinal column and a quarter a VFA (see figure 2.3). When a VFA was carried out, that was done nearly always (96%) at the same time as the DEXA scan.

Figure 2.3. | Diagnosis of the spinal column in primary-care patients aged ≥50 with a DEXA scan (8,135 patients).

Source: Case record study by PHARMO Institute^[3]



The data from the GP case records provide a comparable picture of underdiagnosis to that provided by the quality indicators from hospitals. It is apparent that in 2018 29% of patients aged 50 and over with a fracture were given a VFA or an x-ray in order to examine whether they also had a vertebral fracture.^[19] No distinction was made between diagnosis by a VFA or by an x-ray. In addition, there are big differences between the hospitals in the reported percentages, varying from 2% to 100% of the patients for whom a spinal diagnosis was carried out.

The importance of carrying out a diagnosis of the spinal column is clear from various studies.^[17, 40-42] A study of over-50s with a fracture showed that 14% had osteopenia and a vertebral fracture.^[17] This 14% therefore qualified for treatment with bone-sparing medication. However, when these people were given only a DEXA scan, without VFA, the vertebral fracture remained undetected. No treatment was initiated in these patients, as a result of which their risk of a subsequent fracture remained high.

Osteoporosis experts argue for a VFA to be routinely carried out in all patients who have a DEXA scan. Currently there are still hospitals where the VFA must be requested separately. In addition, osteoporosis experts state that healthcare providers do not always think of requesting a VFA at the same time as a DEXA scan. If more people with a fracture are investigated for vertebral fractures by means of a VFA, more patients will be found who qualify for treatment with bone-sparing medication. Their risk of a subsequent fracture is reduced as a result. It is important for the VFA to be given a separate procedure code. This allows for reimbursement for the extra time and costs associated with that investigation. Furthermore, it is then possible to monitor the use of the VFA.

2.2.2 *Bring guidelines into line with each other*

The needs assessment for carrying out a diagnosis of the spinal column with a VFA or an x-ray differs between the NHG standard and the multidisciplinary guideline.

This can lead to uncertainty among healthcare providers. The NHG standard recommends a VFA in all patients aged sixty and over who also qualify for a DEXA scan.^[6] The multidisciplinary guideline recommends carrying out a diagnosis of the spinal column only in patients aged sixty and over with osteopenia (reduced bone density but not yet osteoporosis), or in patients aged fifty and over with a recent non-vertebral fracture.^[5] The multidisciplinary guideline does not recommend spinal diagnosis in patients who are already known (from a DEXA scan) to have osteoporosis, arguing that there is already a reason for these people to start taking bone-sparing medication. However, according to the NHG standard, these patients should be given a VFA.

In addition, the multidisciplinary guideline recommends carrying out an x-ray diagnosis if a VFA is not available, or if, based on the VFA, there is doubt as to whether someone has a vertebral fracture.^[5] This might explain why we found x-rays as well as VFAs in the case record study. The NHG, however, does not say anything about x-ray diagnosis for possible vertebral fractures. The differences between the guidelines are explained partly by the fact that, when the multidisciplinary guideline was drawn up, not all hospitals had equipment for carrying out VFAs. Over the last few years, the number of healthcare establishments which can carry out a VFA would have increased and they would be available in virtually all hospitals. Consequently, osteoporosis experts believe that the recommendation in the multidisciplinary guideline regarding who qualifies for a diagnosis of the spinal column is outdated. This will be amended in the new multidisciplinary guideline which is currently being developed.

Uniform guidelines provide greater clarity for healthcare providers and promote uniform practices. We expect that, as a result, more patients will get a diagnosis of the spinal column.

2.2.3 *Improve the reporting of vertebral fractures*

In addition to underdiagnosis for detecting vertebral fractures, the case record study also shows that the recommendation in the multidisciplinary guideline for reporting vertebral fractures is not followed adequately. As a result, the healthcare provider does not get all the necessary information in order to present the patient with a proper choice of treatment.

The reporting shows that the Genant method was used only for 15% of more than 2,200 patients in the GP case record study for whom a diagnosis of the spinal column was reported.^[3] This was the case although the multidisciplinary guideline recommends use of this method and thus standardisation of reporting.^[5] According to the Genant method, vertebral collapse is classified on the basis of the percentage of height loss of the vertebra. The majority of the reports in the case record study by the PHARMO Institute stated only whether the patient had or did not have a vertebral collapse or fracture, without any explanation. For one fifth of the patients there was no communication from the radiologist, only a note by the general practitioner that a spinal diagnosis had been carried out. Without a clear explanation by the radiologist in the report, a practitioner cannot interpret the severity of the vertebral collapse or fracture. [Bosch 2018] This may mean that patients are treated incorrectly or not at all with bone-sparing medicines. In order to be able to reach a decision on treatment together with the patient, it must be clear to the practitioner whether there is a vertebral fracture and how serious it is.

In order to be able to provide better treatment for patients with a fracture, it is necessary to have good and unambiguous information on the severity of the vertebral fracture. Clear and uniform communication about this is important. It is up to the working group on the new multidisciplinary guideline being developed to reach agreements and make recommendations in this respect.

2.3 **Carry out a fall risk estimation and, where necessary, a fall risk assessment**

People with a fracture after a fall have a greater chance of having another fall and suffering a further fracture. It is important, therefore, that after the first fracture an estimate is made of whether the risk of a second fall is increased, by asking about how often someone has fallen and whether they have difficulty moving, walking or keeping their balance (fall risk estimation). If a patient has an increased risk of falling, a fall risk assessment must be carried out.^[9] This involves questions regarding, among other things, mobility, dizziness, fear of falling, vision, footwear and use of medicines. The patient can then be given targeted advice in order to prevent falls in the future. Osteoporosis experts have indicated that too little attention is paid to the subject of 'falls'.

The PHARMO Institute has studied on our behalf how often a fall risk estimation is made for patients after a fracture or a recent diagnosis of osteoporosis. That study entailed examining the GP case records of patients over the age of fifty with a fracture (47,000 people) or with a new diagnosis of osteoporosis without a new fracture (7,400 people). The study showed that a fall or risk factor for a fall was recorded in the case record within a year for just over half of the patients. This was slightly more frequent for patients after a fracture (63%) than for patients with a new diagnosis of osteoporosis (48%).^[4] It proved impossible to find out for how many patients a fall risk estimation was carried out in accordance with the recommendations in the NHG standard.

The multidisciplinary guideline recommends doing an evaluation of the fall risk for all patients over the age of fifty with a fracture. The guideline also refers to the *Guideline on the Prevention of Falls in older people*, which was revised in 2017.^[43, 9] This states that there are many different risk factors for falls. A previous fall and disorders of balance, walking and muscle strength are the strongest predictors for falls.^[44] In addition, the use of certain medicines, other conditions such as cardiovascular diseases and arthrosis, sight and hearing disorders, dementia and alcohol use increase the risk of falls. The fall risk often consists of a combination of factors. It is desirable for a doctor to ask about all of these factors, so that factors can be addressed specifically where possible.

The study shows that it is important for a fall risk estimation and, where necessary, a fall risk assessment to be carried out for people with a fracture. Fall risk factors are frequently found in these individuals. These factors increase the chance of a new fracture, irrespective of bone density.^[45] A study of people aged over fifty with a fracture showed that fall risk factors were present for three-quarters of them, whereas only one third also had osteoporosis.^[46] To prevent a new fracture, it is important to identify the fall risk factors and to act accordingly, and not only to treat osteoporosis with medicines.

We have no evidence that in recent years too little attention has been paid in osteoporosis outpatient clinics to fall risk estimation and, where necessary, fall risk assessment after a fracture, because we have not investigated this subject in hospitals. Little information is available from scientific literature regarding the amount of attention given to fall risk in patients with a fracture in the Netherlands. According to the quality indicators for specialist medical care, in 2018 people over the age of 50 with a fracture were routinely given information on fall risk, either on paper or digitally, in 89% of the hospitals.^[19] It is not known whether a full fall-risk estimation and, where necessary, a fall risk assessment were carried out for these people. In osteoporosis clinics the emphasis is primarily on bone density measurement.^[5]

Clinical geriatricians and physiotherapists indicate that there is still insufficient focus on fall risk estimations and, where necessary, fall risk assessments for people with a fracture. An accurate fall risk estimation and, where necessary, a fall risk assessment is a prerequisite for personal advice on preventing falls in the future and, thereby, reducing the risk of a new fracture.

3 Improve the treatment of osteoporosis

There are various possibilities for treating patients with osteoporosis or an increased fracture risk: lifestyle advice, measures to prevent falls and medicines which affect bone density; bone-sparing medication. Our study shows that it is possible to make improvements in the treatment of patients with bone-sparing medication. Not enough over-50s who have had a fracture are treated with drugs to prevent new fractures. Also, too few patients who take glucocorticoids and therefore have an increased fracture risk are prescribed bone-sparing medication. Patients who do take bone-sparing medication often stop prematurely. If bone-sparing medication is not used or is used for too short a time, patients have an increased risk of new fractures. A third concern is patients who stop taking the drug denosumab without follow-up treatment, and who are therefore at additional risk of having vertebral fractures. As a result of improvements in the treatment of patients with osteoporosis, fewer people will suffer a new fracture. Finally, there are indications that the use of fall prevention for people with a fracture and increased fall risk can be improved. Preventing falls means that fewer people will suffer a new fracture.

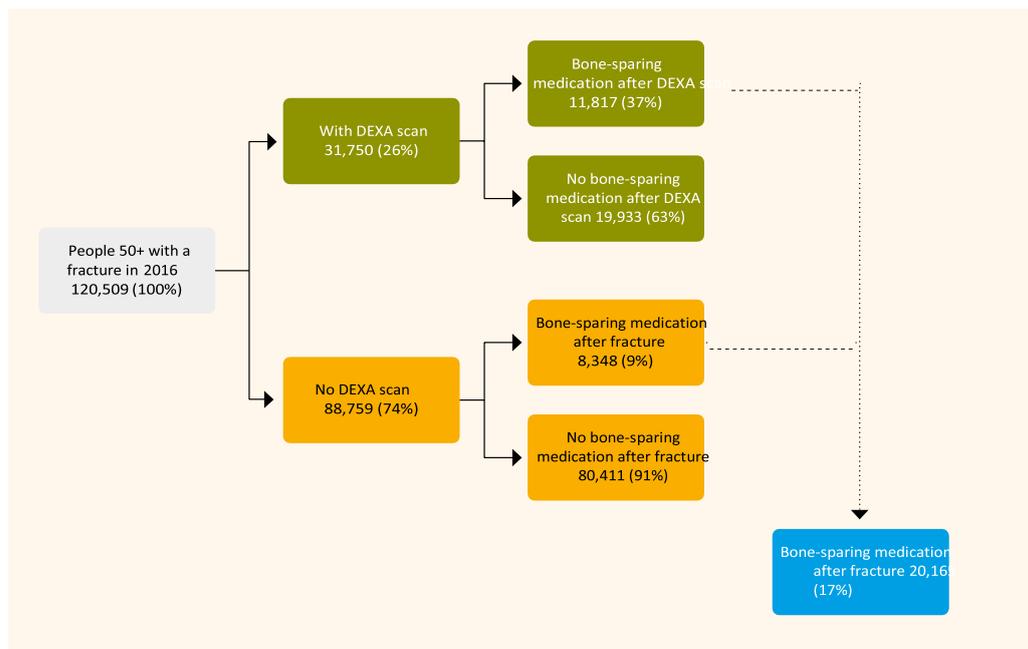
3.1 Treat more patients with bone-sparing medication after a fracture

Our study shows that too few over-50s use bone-sparing medication after a fracture. That is a problem, as bone-sparing medication reduces the chance of a new fracture. That reduction in the chance of a fracture depends on the drug and type of fracture, and varies from 20% to 70% (where used in combination with vitamin D and calcium).^[5, 6]

The drugs of first preference are the bisphosphonates in tablet form. Bisphosphonates inhibit bone resorption and in this way reduce the chance of new fractures. These are tablets which have to be taken daily or weekly. If bisphosphonates are not tolerated in tablet form or do not work adequately, different medication may be prescribed, such as: a bisphosphonate annually via infusion (zoledronic acid), a six-monthly injection of denosumab or a daily injection of teriparatide. However, many over-50s who have had a fracture do not use any medicines afterwards to prevent a subsequent fracture. This can be seen in figure 3.1.

Figure 3.1 | Use of bone-sparing medication in patients aged ≥50 with a fracture in 2016, with and without a DEXA scan in the year before or the year after that fracture

Source: Claims data ^[11, 46]



Just 17% of over-50s who have had a fracture use bone-sparing medication afterwards. This is too few, since, according to guidelines and research results, more than 40% of them should be treated. About 30% of over-50s with a fracture in fact have osteoporosis and must be treated for this. In addition, patients with osteopenia who also have a vertebral fracture must also be given bone-sparing medication. This concerns about 14% of over-50s with a fracture.^[6, 5, 14-17]

Figure 3.1 shows how important the DEXA scan is: people who have had a DEXA scan are often given bone-sparing medication as well, namely 37%.

Moreover, the number of patients in the Netherlands who use bone-sparing medication has been falling steadily for a number of years: from 270,000 in 2012 to 223,000 in 2018.^[47, 48] Given the trend in population structure and the associated increase in the estimated number of patients with osteoporosis, this is an indication of increasing undertreatment.

It is possible that undertreatment occurs partly because patients themselves do not want to use bone-sparing medication. In a Dutch study of general practitioner practices, more than 1,400 patients qualified for bone-sparing medication. However, more than 30% of them had not started to use it.^[49] From a qualitative follow-up study it is apparent that, among non-starters, there was an aversion to medicines in general, fear of the side-effects or a low estimation of their risk of a fracture. However, failure to start also appeared to be the result of insufficient or ambiguous information from the doctor. Many non-starters had the impression that their doctor readily accepted their decision and agreed with it.^[24]

Healthcare providers also contribute to undertreatment. Various national and international studies show that, among healthcare providers, there may be doubts regarding the effectiveness of bone-sparing medication or a lack of knowledge, awareness or urgency of osteoporosis care.^[27, 50-52, 30, 25, 24]

When patients are prescribed bone-sparing medication, these are mainly the drugs which are named as first preference in the guidelines, namely bisphosphonates in tablet form.^[6, 5] In 2016 there were 44,000 over-50s who were given bone-sparing medication for the first time. 87% of them started taking alendronic acid, risedronic acid or ibandronic acid.^[46]

To prevent new fractures, it is important for more over-50s to be treated with bone-sparing medication after a fracture. Carrying out bone density measurements can contribute to this, likewise a consultation with a specialist nurse, physician assistant or a fracture nurse in full knowledge of the facts, under the supervision of medical specialists in a fracture prevention team (see section 5.2).

3.2 Give bone-sparing medication to more patients who are taking glucocorticoids

In addition, people at increased risk of fractures as a result of long-term use of high doses of glucocorticoids qualify for bone-sparing medication to prevent bone loss. However, it is apparent from our study that, in practice, few patients who are using glucocorticoids are also given bone-sparing medication.

3.2.1 Prescribe bone-sparing medication more frequently for glucocorticoid users

Within 3 months of starting glucocorticoids (prednisone equivalent >7.5 mg per day) 27% of people aged 50 and over also start to take bone-sparing medication. Within two years of starting the treatment that figure has risen to 35% (see figure 3.2). Thus, the large majority of glucocorticoid users are not given any bone-sparing medication. That is clear from the 2016 data from the Genees-en Hulpmiddelen Project [Drug and Medical Devices Information Project] (GIP) which includes claims data from all health insurers in the Netherlands.^[46] For patients over the age of 50 who take a daily dose of >15 mg prednisone equivalent glucocorticoids, these figures are 34% and 45% respectively. This relates to people who have had more than two consecutive prescriptions for oral glucocorticoids for more than three months. People who take high doses over a short period – so called ‘short courses’ – are not included in the above calculations.

Figure 3.2 | Use of bone-sparing medication in people aged ≥50 who started long-term use of >7.5 mg/day glucocorticoids in 2016

Source: Claims data^[46]

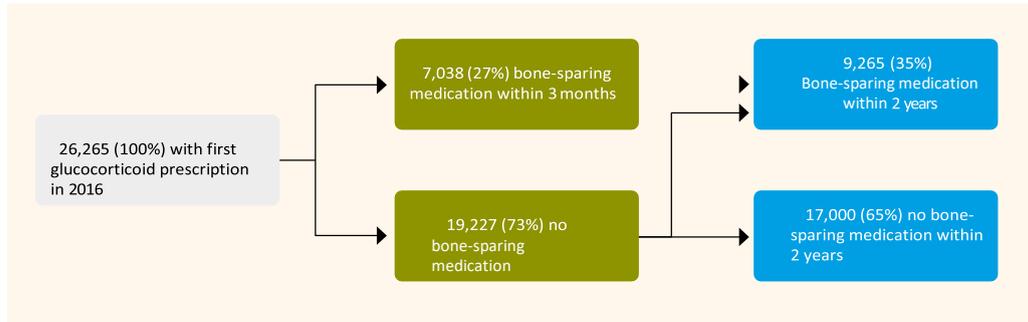
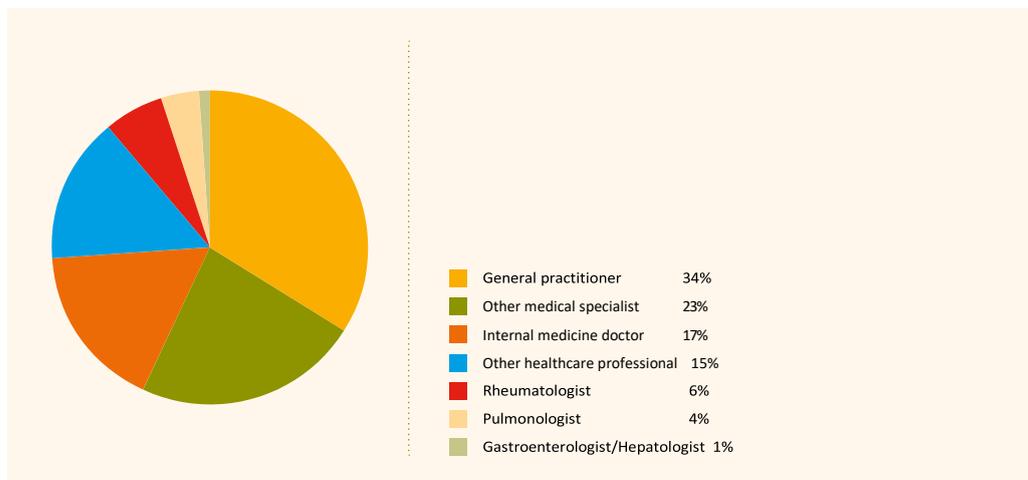


Figure 3.3 shows that these glucocorticoids are prescribed by the general practitioner for one third of the patients. For half of the patients, the prescriber is a medical specialist, and 15% of the people got the glucocorticoids from another healthcare professional.

Figure 3.3 | Prescribers of glucocorticoids for people aged ≥50 who started long-term use of >7.5 mg/day glucocorticoids in 2016

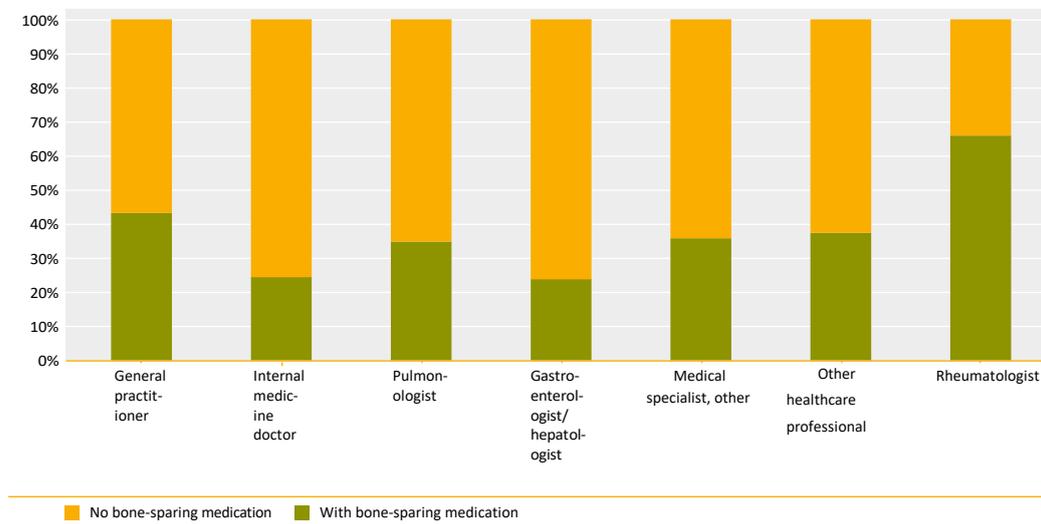
Source: Claims data^[46]



Of the patients who started using these glucocorticoids on prescription from their general practitioner, 43% were also given bone-sparing medication. For those patients who had received glucocorticoids from a medical specialist, that figure varied from 24% (internal medicine doctor, gastroenterologist/hepatologist) to 66% (rheumatologist), as shown in figure 3.4. These results appear to correspond to various international studies, which show that rheumatologists also prescribe bone-sparing medication for long-term glucocorticoid users more often than general practitioners or other medical specialists.^[53, 54] The Nederlandse Vereniging voor Reumatologie [Dutch Association for Rheumatology] recently published a new opinion on GIOP.^[55] It is not yet known how this opinion will change the recommendations in the multidisciplinary guideline.

Figure 3.4 | Percentage of people aged ≥ 50 who started long-term use of >7.5 mg/day glucocorticoids in 2016 and who were also prescribed bone-sparing medication, according to the prescriber of glucocorticoids

Source: Claims data^[46]



The current osteoporosis guidelines state that bone-sparing medication should be prescribed for people who will be using glucocorticoids at a dosage of >15 mg/day prednisone equivalent for more than three months; and to postmenopausal women and to men over 70 who will be using glucocorticoids at a dosage of 7.5-15 mg/day prednisone equivalent for more than three months.^[6, 5] The multidisciplinary guideline also states that bone-sparing medication should be started for premenopausal women and men under the age of 70 who will be using 7.5-15 mg/day prednisone equivalent glucocorticoids for more than three months, depending on the result of the DEXA scan.^[5]

However, some of the guidelines for treatment of diseases for which glucocorticoids are prescribed do not make any recommendations regarding bone-sparing medication. This is the case, for example, for the *NHG Standard for Arthritis*, the guideline on *Inflammatory bowel diseases in adults* of the Nederlandse Vereniging van Maag-Darm-Leverartsen [Dutch Association of Gastroenterologists and Hepatologists] (NVMDL) and the *COPD Care Standard*.^[56-58]

Patients may experience serious adverse effects if their doctor does not follow the guidelines. A patient with a chronic lung disease, who was using glucocorticoids on a long-term basis, suffered several vertebral fractures in 2012. He brought a lawsuit against his pulmonologist because the latter had not prescribed bone-sparing medication. The court found in the patient's favour.^[59]

Furthermore, the percentage treated with bone-sparing medication now seems to be lower than ten to fifteen years ago. Examination of data from 9 pharmacists shows that, in the period from 2001 to 2005, on average 43% of long-term users of glucocorticoids were also given a bisphosphonate (prednisone equivalent >7.5 mg per day). Moreover, the proportion of bisphosphonate users rose in those years from 38% to 54%.^[60]

The inadequate prescribing of bone-sparing medication for patients using glucocorticoids on a long-term basis may be related to insufficient knowledge or awareness among prescribers. In 2004 and 2007 a questionnaire survey was conducted among Dutch general practitioners and medical specialists. In that survey both professional groups answered only half of the questions correctly with regard to bone-sparing medication for glucocorticoid users. For example, just 66% of the doctors gave the correct answer (yes) to the statement: "Corticosteroids increase the risk of a fracture in the first six to twelve months". 11% replied 'no' and 23% did not know. Furthermore, general practitioners often considered the prescribing of bone-sparing medication to be the responsibility of a medical specialist. In addition, they were reluctant to do so if the patient was already taking various medicines or suffered side-effects.^[31]

Thus, the osteoporosis guidelines are not applied satisfactorily in the treatment of patients who take glucocorticoids on a long-term basis. There does not seem to be an easy solution to this problem. Indeed, a review of literature regarding various kinds of interventions, such as education or different organisation of care, shows that none of them really led to substantial improvements. However, interventions at system level – mainly electronic decision support which alerts prescribers of corticosteroids to prescribe bone-sparing medication – seemed to be more effective than interventions aimed at education.^[61] In addition, a number of British experts advocate such a practical solution in a recent study.^[62]

Osteoporosis experts regard the lack of bone-sparing medication among chronic users of glucocorticoids as worrying. They propose, among other things, incorporating alerts in the electronic prescribing systems of GP practices and hospitals. Doctors can be made aware of the importance of bone-sparing medication by means of a notification or pop-up when prescribing glucocorticoids. Another option is to develop quality indicators for prescribers on this subject. In addition, the Zorginstituut will clarify the wording on medicinal products in the *Farmacotherapeutisch Kompas* with regard to glucocorticoids and put more emphasis on the importance of bone-sparing medication. Finally, the Osteoporose Vereniging has established cooperation with other organisations of patients who have to take glucocorticoids for their illness. The aim is to provide better information for patients on the importance of bone-sparing medication before they start using glucocorticoids.

3.2.2 *Ensure better monitoring of medication for glucocorticoids*

In addition to prescribing doctors, pharmacists can also play a role in improving the use of bone-sparing medication by patients who are taking high doses of glucocorticoids on a long-term basis, by monitoring medication.

For a number of years pharmacists have used the Medisch Farmaceutische Beslisregels [medical pharmaceutical rules for decision-making] (MFBs) for monitoring medication.^[63] With this, a prescription for a medicine is combined with a number of the patient's characteristics, such as age, sex, diseases, contraindications, renal function and other medicines used by the patient. The pharmacy staff receive a signal on the computer, when these characteristics indicate that it is necessary to adjust the prescribed medication or to add a medicine. In order to be able to make these adjustments, the pharmacist must consult the prescriber of the medicine. Some health insurers pay pharmacists who use the MFBs an additional fee on top of the usual price of prescriptions.^[64-68]

An 'MFB Osteoporoseprohylaxe bij corticosteroïdgebruik' [Rules on osteoporosis prophylaxis with corticosteroid use] came into operation in 2013. The substance of this is that, for patients who are not yet getting bone-sparing medication, the pharmacist checks whether the glucocorticoid is intended to be used at a daily dose of ≥ 7.5 mg prednisone equivalent for longer than three months. In that case, the recommendation is to add a bisphosphonate. In addition, the pharmacist must check whether the patient is taking calcium and vitamin D and add this where necessary.^[69] In 2017 pharmacists dealt with almost 42,000 signals resulting from this MFB, with the therapy being adjusted in accordance with the guidelines in 19% of the cases. In 81% of cases, that was not the case. Reasons for departing from the guidelines were: that the general practitioner did not want to prescribe bone-sparing medication; the patients did not want to take bone-sparing medication; the dose or the use of the glucocorticoid had since been changed; there were side-effects or a contraindication; or the patient had been given information on bone-sparing medication, but had not yet decided about their use.⁶ This percentage is in line with national figures for dealing with MFBs in general: in 2017 a total of almost one million MFBs were dealt with by pharmacists. In 20% of cases the medication was adjusted or supplemented in response to an MFB.^[70]

⁶ Information by email from the KNMP [Royal Dutch Pharmacists Association] to Zorginstituut Nederland; 28 November 2019, 2 January 2020 and 15 January 2020

Pharmacists identify various barriers to applying the MFBs in practice. For example, the rules cannot always be installed in the computer system, which can lead to incorrect signals. In addition, pharmacists often have difficulties contacting the prescribing doctor. They find that the regional communication structure with general practitioners and medical specialists is inadequately set up for this. Finally, pharmacists believe that the funding that they receive from the health insurers for MFBs is not always in proportion to the time it takes them to deal with these.

In the Netherlands a study has been carried out as to what the effect is when pharmacists contact the prescriber of the glucocorticoids. That appeared to lead to a significant improvement in the prescribing of bisphosphonates only for men and the over-70s: from 5% to 13%. For other patients this increased only from 8% to 11%.^[71]

Another way in which treatment with bone-sparing medication may possibly be improved for long-term glucocorticoid users is via regional pharmacotherapeutic consultation (FTO) between general practitioners and pharmacists.^[72] The Instituut voor Verantwoord Medicijngebruik [Institute for Responsible Medicine Use] (IVM) has developed an FTO module for fracture prevention for this purpose.^[73] It is not known how many pharmacists and general practitioners use this in practice and with what result. Finally, pharmacists can use the report on *Fracture prevention* by the Stichting Farmaceutische Kengetallen [Foundation for Pharmaceutical Statistics] (SFK). This provides, among other things, an understanding of the extent to which general practitioners prescribe bisphosphonates for chronic users of high doses of corticosteroids.^[74] As two-thirds of glucocorticoids are prescribed by medical specialists, it is important to have closer cooperation and consultation between medical specialists and pharmacists.

To prevent fractures in patients taking high doses of glucocorticoids long-term, they should be treated with bone-sparing medication more frequently. In the first place this is the responsibility of the doctors who prescribe glucocorticoids. Factors such as insufficient knowledge, 'awareness of' and time may play a part in failure to prescribe bone-sparing medication. This might in part be overcome by incorporating an alert signal in the electronic prescribing system. Pharmacists can help to solve this problem by taking action when patients are not given a prescription for bone-sparing medication by their doctor.

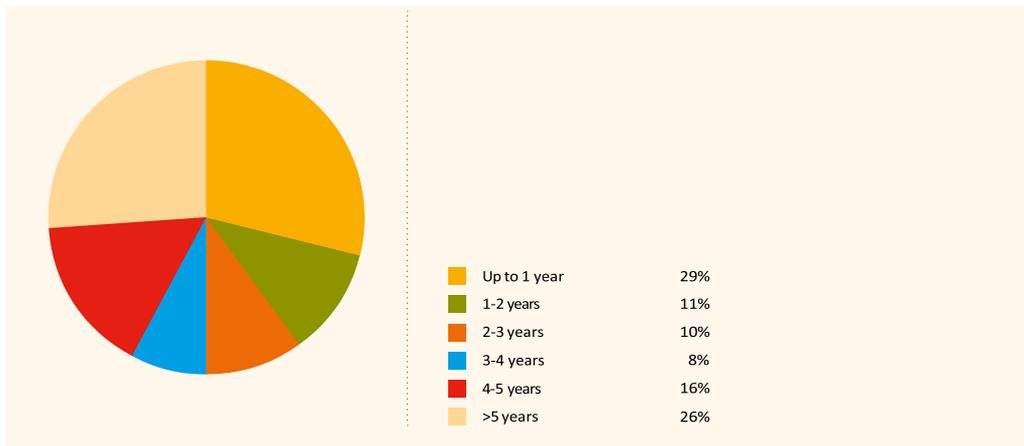
3.3 Encourage persistence with treatment with bone-sparing medicines

Bisphosphonates in tablet form, the drugs of first choice, are in principle prescribed for a period of five years. Persisting with treatment with bisphosphonates is important for effectively reducing the risk of a fracture. It is apparent from our study, however, that many patients stop too early. That is a problem because patients who do not adhere to treatment have a 30% to 40% greater risk of a fracture than patients who do.^[75] People who take bisphosphonate for less than twelve months have a 2x higher risk of fractures compared to people who use them for longer than three years.^[76] However, it seems to be difficult for patients to persist with the treatment with bone-sparing medication for five years. It is important therefore that they are helped and encouraged in this by prescribers as well as pharmacists.

Analysis of claims data shows that most patients discontinue their bone-sparing medication too early. Of the over-50s who started taking bisphosphonates in 2016, 36% had already discontinued taking them within 1 year and a total of 49% within 2 years. A further 10% stopped between 2 and 3 years. This relates to patients who were not given any other medicine after discontinuing. Of those using denosumab, 33% stop within 1 year and a total of 55% within 2 years. We also carried out the aforementioned analysis specifically for over-50s who started bone-sparing medication in 2012 after a fracture; see figure 3.5. Of those who started bisphosphonates, 29% had discontinued using them within 1 year, and in total 40% had discontinued within 2 years. A further 10% discontinued between 2 and 3 years. Thus, adherence by patients with a fracture is slightly higher than that for other patients who started taking bisphosphonates.

Figure 3.5 | Duration of bisphosphonate use by patients aged ≥ 50 with a fracture who started taking bone-sparing medication in 2012

Source: Claims data^[46]



These data are in line with studies carried out previously in the Netherlands. Those showed that in 2007-2008 about 25% to 57% of the patients were no longer taking bisphosphonates after one year, and that this figure had risen to 45% to 75% after 5 years.^[77-80] Patients with a fracture persisted with the treatment with bone-sparing medication longer than other patients.^[22, 78, 81] Furthermore, the absolute risk of discontinuing appears to be highest in the first month.^[82]

In other countries too, many patients discontinued their bone-sparing medication too early, and this proportion increases during the course of treatment.^[83] In patients who had previously suffered a fracture, adherence is higher than in other patients who use bone-sparing medicines.^[84, 85]

The recommendations on adherence in the guidelines amount to joint decision-making at the start of medication and to structural attention to adherence throughout treatment. The NHG standard recommends making check-up appointments, for example after four weeks, three and six months after the start, and then annually. At these, the doctor should check whether the medicine is being taken correctly, whether there are side-effects and discuss reasons for any non-adherence.^[6] The multidisciplinary guideline also recommends regular follow-up, at least three months after the start and then annually, with particular attention to side-effects and to tolerance of and persistence with the treatment.^[5]

However, it appears that, in practice, monitoring of adherence by the prescribing doctor is not carried out adequately. A check-up visit at the hospital within one year was found in the 2016 claims data for only 7% of the patients aged 50 and over who were prescribed bone-sparing medication by a medical specialist because of a fracture. In half of the patients who had a check-up visit, this occurred in the first three months after the start of treatment.^[11, 46] It is possible that people who did not have a check-up visit at the hospital were seen by the general practitioner, but that is not apparent from claims data. We have had indications from osteoporosis experts that follow-up and attention to adherence, both in hospitals and among general practitioners, are unsatisfactory. It is said that the current organisation of care does not have a good call-up and transfer system for this.

The low number of check-ups may explain in part the low adherence with regard to use of bone-sparing medication. It is known from various studies that inadequate education of patients and insufficient support by healthcare providers can lead to lower adherence. It also follows from this that low adherence is related to misunderstanding among patients concerning osteoporosis and the benefit of treatment with bone-sparing medication.^[86] In the Netherlands, 31% of the patients who started bone-sparing medication at 13 pharmacies in 2006-2007 stated that they had obtained information regarding its effectiveness and use and regarding the importance of adherence only from the pharmacy. Only half of the patients had been given information by their doctor or nurse.^[82] It is clear from the study that people who faithfully take their medicines in the first year are more inclined to continue to use them in subsequent years.^[80] This underlines the importance of good monitoring and support particularly in the first year after starting with bone-sparing medication.

There has been extensive research into ways of increasing adherence to the use of bone-sparing medication, but none of those interventions really offered a clear solution.^[87, 88] Possible ways of increasing adherence are good education and information at the start of treatment, monitoring and counselling during treatment and simplified or more flexible doses of the medication. However, non-adherence may be linked to many factors. Consequently, it is crucial to ascertain and understand the reasons for non-adherence for each patient, and to find an appropriate solution for each person.^[87, 88]

The pharmacists' organisation KNMP states that improving adherence requires constant attention in order to have a lasting effect. Incorporating this health care in the pharmacy processes – as laid down in the *Professionele Standaard Farmaceutische Zorg* [Professional Standard for Pharmaceutical Care] – is therefore essential according to the KNMP.^[89,90] Part of the Professional Standard is the (draft) *Richtlijn Consultvoering* [Guideline for consultations].^[91] Consultations by pharmacists can help to improve adherence.

An example of such a personalised, continuous and structured approach is the MeMo programme (*Medication Monitoring and Optimisation*). This proved to be effective in increasing adherence by patients who are using bone-sparing medication. Patients were given oral and written information with the first prescription. When the second prescription was collected, the pharmacy staff asked about the patients' experiences with regard to taking the medicine and side-effects. Patients who had not collected their medicines subsequently according to the prescription were telephoned by the pharmacy. Problems with taking the medicines and solutions to these were discussed. The proportion of patients who discontinued the bone-sparing medication within one year fell as a result of this intervention from 28% to 16%.^[82] The MeMo programme is now available at two-thirds of pharmacies. Pharmacists decide for themselves whether to use MeMo or other comparable programmes or systems. In addition, pharmacists may use the SFK report on *Therapietrouw* [Adherence]. With this they can monitor adherence to bisphosphonates and identify patients who should be considered for improvement of adherence.^[92, 93] Another example of a proven effective intervention is *Telephone Counselling Intervention* (TelCIP).^[94] Because we do not yet know enough about the (cost) effectiveness of interventions which may encourage adherence, the KNMP advocates more research into this.^[89, 95]

Osteoporosis experts recognise the problem of low adherence. They say that patients must be properly informed of the importance of bone-sparing medication. In addition, it is necessary to evaluate side-effects shortly after the start of bone-sparing medication. The Osteoporose Vereniging says that a change of lifestyle is necessary in order to improve adherence. It provides information and support for this by means of peer-to-peer contact. Consequently, the Osteoporose Vereniging believes that doctors and pharmacists should draw the attention of patients who (are starting to) use bone-sparing medication to the Osteoporose Vereniging.

Furthermore, osteoporosis experts advocate an annual check-up with the general practitioner to discuss adherence, in which any side-effects of the medicine should be discussed. The pharmacy also plays a role in improving adherence. It can detect when patients do not collect their medication and discuss this with the patient or pass it on to the general practitioner. The pharmacist can also alert the prescriber where there is persistent non-adherence by a patient or a patient discontinues the medication prematurely. Good regional cooperation between general practitioners and pharmacies is necessary for long-term counselling of patients and encouraging adherence. Quality indicators for general practitioners regarding adherence to bone-sparing medication might possibly help.

3.4 Do not simply discontinue use of denosumab

Patients who use denosumab to prevent fractures cannot simply discontinue it; they have to go on to a different medicine afterwards. This is because, in the period after discontinuing denosumab, they have an (additional) increased risk of a vertebral fracture. Continued treatment with another bone-sparing medicine is therefore important. However, our research shows that over the last few years this has happened on too few occasions, namely for only 19% of patients who discontinued denosumab.

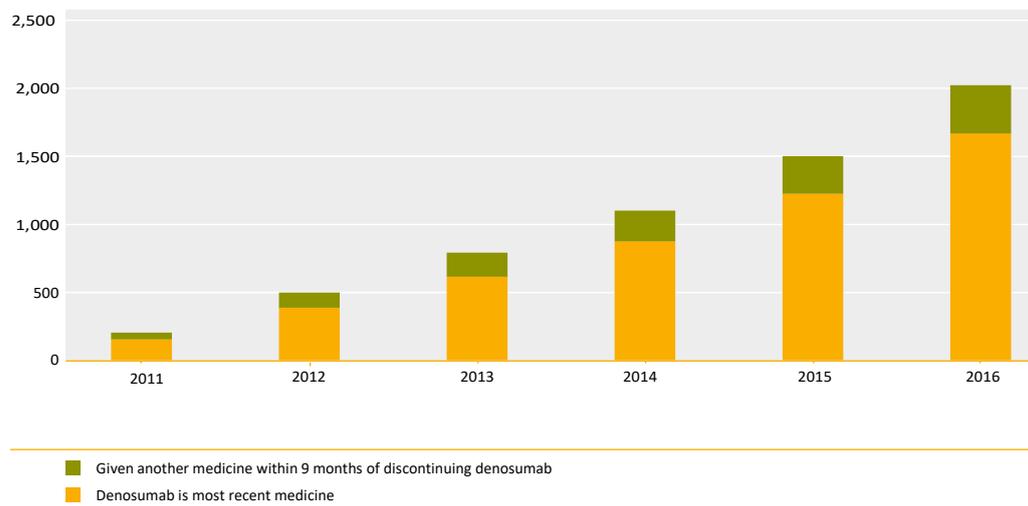
Denosumab is a newer and different kind of drug from bisphosphonates. It is more convenient for patients because it is administered only twice a year via a subcutaneous injection. When the guidelines were developed, there were still no studies in large numbers of patients concerning the long-term effects and side-effects of denosumab, and the consequences of discontinuing the drug. Therefore, the NHG standard recommends caution when prescribing denosumab.^[6] The multidisciplinary guideline states that denosumab can only be prescribed where there are problems with the use of bisphosphonates, for example if these are not tolerated, cannot be used because of poor renal function, or if the patient is not compliant.^[5]

In recent years more and more people have started using denosumab. The number of patients who started denosumab between 2011 and 2017 tripled from 1,598 in 2011 to 4,600 in 2017. The total number of users was 24,000 in 2018, according to claims data.^[46]

Around 2017 it became known that patients who discontinue denosumab have an increased risk of vertebral fractures in the period after stopping. This is because denosumab does not bind to the skeleton and bone density rapidly decreases in the first year after discontinuing denosumab, to a pre-treatment value.^[96-99] Thus, it became clear that patients who discontinue denosumab must go on to use another medicine in order to maintain their bone density. However, that is not yet set down in the current multidisciplinary guideline, which dates from 2011. In practice, most practitioners discontinue denosumab after five years, just like bisphosphonates.^[97, 98, 100]

In 2011-2016 a total of more than 6,000 people discontinued use of denosumab. Only 19% of them were then given another bone-sparing medicine, as is apparent from claims data (see figure 3.6). The number of patients who discontinued denosumab without then being prescribed another medicine increased from 158 in 2011 to 1,692 in 2016.^[46]

Figure 3.6 | The number of people who discontinue denosumab without follow-up with another medicine (yellow) and with follow-up with another medicine (green), according to the year in which denosumab was discontinued (excluding people who died within two years of discontinuing denosumab)
Source: Claims data^[46]



In February 2019, the KNMP, together with the Bot-netwerk [Bone network] of the Nederlandse Vereniging voor Endocrinologie [Dutch Society for Endocrinology] (NVE) and the Osteoporose Vereniging, drew up a warning letter for all patients who are taking denosumab or recently discontinued it. They were informed about the risks of discontinuation and the options for follow-up treatment. Depending on the risk of a fracture, prescribers are advised to continue treatment with denosumab or to provide after-treatment with bisphosphonates.^[101, 102] Other doctors have also been informed of this recommendation by their professional organisations.^[103, 104] The Zorginstituut has adopted the recommendation in the *Farmacotherapeutisch Kompas*: “Therefore, do not discontinue treatment with denosumab without considering an alternative treatment.”^[105]

These warnings are expected to lead to a fall in the number of patients who discontinue denosumab without follow-up with a different bone-sparing medicine. The Zorginstituut will continue to monitor this development annually. If it emerges that in the next few years patients are still discontinuing without being given a follow-up treatment, we will examine, together with parties in health care, what actions are necessary to improve this.

3.5 Give advice on preventing falls

People with a fracture after a fall have a greater chance of having another fall and breaking something again. Therefore, it is important that, after the first fracture, patients are given targeted advice on preventing falls. The advice may consist of a referral to a physiotherapist for strength and balance training or to a doctor or pharmacist to have the medication adjusted. There are indications that too little attention is paid to fall prevention in people with a first fracture.

As described in Chapter 2, the PHARMO Institute carried out a study of general practitioners' case records with regard to the extent of fall risk estimation by general practitioners. Follow-up actions after the fall risk estimation were also examined. This showed that only 5% of people with an increased fall risk were referred to a physiotherapist and 1% to 9% to a medical specialist. Where people were taking medicines which increase the risk of falls before the fracture (two-thirds of the total), that medication was adjusted in only 2% to 3% of cases. The drawback of that study was that the period in which outcomes were measured was short: only one month. In addition, it is not known whether those people were given advice about preventing falls by a medical specialist.^[4] Finally, there may be underreporting of follow-up actions in the general practitioners' records.

The NHG standard recommends adopting tailor-made measures for anyone with an increased fall risk, such as balance and strength training, adjusting medication and, where necessary, giving additional vitamin D.^[6] The recommendation in the multidisciplinary guideline is that fall interventions in patients who have had a fall must be focussed on the factors which emerged from the fall risk evaluation.^[5]

Falling is a risk factor for fractures, irrespective of bone density. Fall prevention is an additional measure for people with osteoporosis in order to reduce the fall risk.^[45] There is a great deal of research showing that fall prevention measures reduce the chance of falling, primarily among older people. Training for muscle strength and balance can reduce the number of falls by 30%.^[106] Not only falls, but also the number of fractures can be reduced in this way.^[107] Improving vision, adjusting medication and adapting environmental factors also reduce the number of falls in people aged 70 and over. Furthermore, a vitamin D supplement can also reduce the chance of falls among older people with too little vitamin D, because of the effects on muscle power and bone density.^[106] An Australian study of falls clinics showed that about three-quarters of the participants adhered to the fall recommendations.^[108] Retaining independence is an important reason for participating in fall prevention programmes for older people.^[109]

Some experts say that fall prevention is given too little attention in current osteoporosis care. This may be linked to the fact that in general little attention is paid to osteoporosis and fracture prevention in hospitals, and that osteoporosis outpatient clinics focus primarily on identifying osteoporosis and treating it with medication. Among general practitioners a lack of time and knowledge may play a role in providing targeted fall prevention advice. However, we do not have any figures to substantiate that such care is in fact substandard. Furthermore, some experts say that the absence of any payment under the basic package makes it unattractive for patients to follow a fall prevention programme.

4 Improve patient information about osteoporosis

There are a number of flaws in the available patient information about osteoporosis, according to our study. This has consequences for the quality of care. This is because, in order to prevent fractures, it is important for patients to have adequate knowledge of the risk factors, the diagnosis and the treatment of osteoporosis. Only well informed patients can take reasoned decisions about their care pathway and about the appropriate lifestyle for them. Improving patient information, more references to the patients' association website and making the decision aids easier to find are important steps in this process.

4.1 Ensure full and accurate patient information

Patient information about osteoporosis is often incomplete and also sometimes inaccurate. That emerges from an analysis by the Zorginstituut of thirteen sources (twelve websites and one book) with public patient information and decision aids published by patients' associations, professional associations and government (see Annex C for an overview of the sources examined and a description of the analyses carried out). 31 subjects were examined which are covered by the themes: risk factors, diagnosis and treatment of osteoporosis. For these 31 subjects we examined whether the information was complete and accurate (in accordance with Dutch guidelines). See figure 4.1 for the results.

4.1.1 *Improve patient information about risk factors for fractures*

Patient information about the risk factors which play a role in fractures does not seem to be complete in many sources, but in general does seem to be accurate. Our study shows that the risk factors for osteoporosis are reported to varying degrees in the thirteen sources analysed. Risk factors which are most often missing from the patient information are alcohol (7x) and parent with hip fracture (6x). The multidisciplinary guideline names 10 risk factors for getting fractures: age over 50, underweight (BMI <20, weight <60 kg), fall risk, parent with hip fracture, smoking, alcohol (>2 glasses a day), 1 or more fractures after the age of 50, medicines which reduce bone density, diseases which reduce bone density and reduced mobility/physical activity.^[5]

Smoking is the only risk factor for which incorrect information is given (2x), for example: "Smoking is the principal cause of osteoporosis." A number of sources also name risk factors which are not included in the guidelines: too much caffeine, protein, fibre and/or salt.

Accurate and full information about risk factors is important to make people aware of their risk of having a (new) fracture.

Figure 4.1 | Completeness and accuracy of mention of osteoporosis subjects in thirteen sources with patient information



4.1.2 *Offer patients information on all four elements of the diagnosis*

Of the thirteen sources with public information for patients, only four mention all elements of a diagnosis of osteoporosis. These are DEXA scan, spinal column diagnosis (VFA or X-ray), laboratory analysis and estimation of fall risk. The other nine sources, therefore, lacked information on one or more elements of the diagnosis. Where information is provided on a particular part of the diagnosis, this is generally complete and accurate.

The DEXA scan is the first step in the diagnosis of osteoporosis. In six of the thirteen sources examined, however, there was no reference to the use of a DEXA scan to determine bone density. Furthermore, one website contained incorrect information on the DEXA scan. This relates to an appeal to people without a fracture to request a DEXA scan proactively. The Dutch guidelines state that a bone density measurement should only be carried out in people without a fracture if there is an increased risk of a fracture.

Good patient information on diagnosis increases not only knowledge but also awareness that it is important to undergo these examinations. As a result of this information patients will more readily see the connection between their fracture and the invitation to have a bone density measurement. They will then decide at an earlier stage to respond to it. This can reduce underdiagnosis of osteoporosis (as described in Chapter 2).

4.1.3 *Provide better patient information on fall prevention and lifestyle*

Patient information on fall prevention and lifestyle can also be better. The guidelines make two recommendations for fall prevention: adjustment of medication and strength and balance training.^[6, 5] Strength and balance training is mentioned in half of the thirteen sources of patient information and adjustment of medication in just three sources.

Lifestyle advice in the guidelines consists of: adequate physical activity and healthy diet (specifically sufficient calcium), exposure to sunlight to produce sufficient vitamin D or supplementary intake (supplementation) of vitamin D, stopping smoking and avoiding excessive consumption of alcohol.^[6, 5] Half of the sources giving patient information, however, make no recommendations on reducing alcohol or stopping smoking. Various sources do give lifestyle advice which is not included in the guidelines, such as recommendations to use vitamin K and advice against salt and coffee and avoidance of stress.

The quality of patient information about calcium and vitamin D and supplementation of these is inadequate. In one third (vitamin D) to a half (calcium) of the sources examined there was no information at all or the information was incorrect or incomplete.

Under the guidelines the calcium supplement dosage depends on the amount of calcium ingested via the regular diet. Supplementation with 1000 mg is recommended if people do not consume dairy and 500 mg if people's daily intake is less than 1000 to 1200 mg calcium via their diet (or 1 to 3 portions of dairy). The recommended dose for vitamin D supplementation is 800 IE per day.^[6, 5]

A number of sources of patient information establish no relationship with diet for calcium, or no dosage is given. The dosage is also missing for vitamin D sometimes, or it is suggested that patients can get sufficient vitamin D via their diet.

Inaccurate information about calcium and vitamin D on various websites studied

- *If you have 2 to 3 portions of dairy products per day, additional calcium is generally not necessary.*
Comment: According to the guidelines, 500 mg extra calcium supplementation is required with 1 to 3 portions of dairy products.
- *Patients are sometimes prescribed calcium. Whether you are prescribed this depends on how many symptoms you have and how great a chance you have of breaking a bone.*
Comment: The guidelines recommend calcium supplementation depending on calcium intake via the diet.
- *If you are diagnosed with osteoporosis, you will be prescribed extra calcium tablets.*
Comment: The guidelines recommend calcium supplementation depending on calcium intake via the diet.
- *Patients are sometimes prescribed vitamin D. Whether you are prescribed this depends on how many symptoms you have and how great a chance you have of breaking a bone.*
Comment: The guidelines recommend vitamin D supplementation for all patients with osteoporosis.
- *In winter you can opt for vitamin D pills.*
Comment: The guidelines recommend daily vitamin D supplementation.

Good patient information on lifestyle is important because this can offer patients tools for making responsible choices in their day-to-day living with osteoporosis. In this way they can actively contribute to reducing their risk of a (new) fracture.

4.1.4 Improve patient information on medicines

The available patient information on osteoporosis medication is often unsatisfactory: more than half of the thirteen sources include absolutely no information on the medicines, or it is inaccurate or incomplete. In addition, some sources provide information on medicines which are not mentioned in the (Dutch) guidelines, or medicines which are mentioned but which are not recommended. Finally, not all sources provide information on the duration of treatment or the importance of adherence.

Bisphosphonates in tablet form are the medicines most often prescribed for patients with osteoporosis or an increased risk of a fracture (see Chapter 3), and under the guidelines are the first treatment option.^[6, 5] It is remarkable, therefore, that the quality of the patient information falls so far short specifically with regard to these medicines: two-thirds of the sources include no information at all, or it is inaccurate or incomplete.

Inaccurate information about bisphosphonates on various websites studied

- *For serious osteoporosis, you will be treated with bisphosphonates.*
Comment: Under the guidelines, osteoporosis is a treatment indication for bisphosphonates regardless of how serious it is.
- *Other very rare side-effects are (...) a slightly increased chance of oesophageal cancer.*
Comment: The statement regarding the relationship between bisphosphonates and the chance of oesophageal cancer is too strong; according to the guidelines, there are only indications/suspicions, no conclusive proof.
- *You could only use bisphosphonates for five years, after that they no longer worked.*
Comment: The treatment period of five years is not because bisphosphonates no longer work after that, but is, according to the multidisciplinary guideline, because of the lack of research into the most effective treatment period and into the long-term side-effects. After five years treatment it is necessary to evaluate to whether continued treatment is required.

There is no information regarding denosumab and teriparatide in about half of the sources of information studied. Furthermore, some of the information provided regarding denosumab is inaccurate. On the other hand, the information provided with respect to teriparatide is always correct.

Patient information on the duration of treatment is regularly missing: five of the thirteen sources do not contain any information on this. Under the guidelines, treatment with bisphosphonates lasts five years in principle, but this may be extended in patients who still have a high risk of a fracture.^[6, 5] Information on the importance of adherence is also limited: seven of the thirteen sources with patient information have nothing to say about it.

It is important that patients are properly informed about osteoporosis medication, so that they can decide for themselves with their doctor about starting on medication. Knowledge about the importance and effect of the medication is also essential for persisting with the treatment and thus for adherence. Only then can treatment of patients with osteoporosis medication help to reduce their risk of fractures.

4.1.5 *Provide more patient information about check-ups and aftercare*

Finally, it is important that patients are given more information about check-ups and aftercare that are part of treatment for osteoporosis. Current patient information in this respect is incomplete. For example, twelve of the thirteen sources say nothing about check-ups with the doctor, and nine sources do not state that patients should have a (new) DEXA scan after a number of years as a check. The guidelines recommend several check-ups during the first year of treatment and then an annual check. These are important in order to discuss adherence. The multidisciplinary guideline also recommends a DEXA scan at the end of pharmacological treatment before a decision is made about stopping or continuing. Finally, the guidelines recommend carrying out a DEXA scan (two to) three years after discontinuing medication, or earlier if the patient suffers a fracture.^[6, 5]

Without information about check-ups and aftercare, it is not clear to patients what they can expect from the doctor during their treatment or where they themselves can ask about this.

4.2 **Refer patients to the website of the Osteoporose Vereniging [Osteoporosis Association]**

Our study shows that, of all the sources investigated, the website of the Osteoporose Vereniging is the best in terms of accuracy and completeness. However, professional organisations of healthcare providers do not refer to this website in their patient information.

The subject 'check-up with the doctor' is the only one for which the Osteoporose Vereniging website does not provide any information. The other thirty osteoporosis subjects are all accurately reported. Although the website makes a few recommendations which are not found in the guidelines, most of the information can be fully, clearly and explicitly traced back to the guidelines. For example, there is a page with a risk test based on the risk factors in the multidisciplinary guideline, it is explicitly stated that the diagnosis consists of four elements, and the treatment is described as a combination therapy consisting of three parts: good exercise, correct diet and medication.^[110]

The thirteen sources with patient information examined have been developed by patients' organisations, professional organisations of healthcare providers and the Voedingscentrum [Netherlands Nutrition Centre Foundation]. These organisations might be expected to refer patients to the Osteoporose Vereniging for appropriate information. However, this does not always happen. The websites of professional organisations of healthcare providers and of the Voedingscentrum (a total of five websites) do not refer patients to the Osteoporose Vereniging for information about their condition. Sources of patients' organisations do that or have been developed in cooperation with the Osteoporose Vereniging.

If patients are referred more often to the Osteoporose Vereniging website, they will get an accurate and full overview of all things related to osteoporosis more quickly. The website also gives links for getting in touch with other osteoporosis patients, for example via information evenings or a telephone helpline. This allows for the exchange of experiences and knowledge.

4.3 Link the ‘PATIENT+Keuzehulp’ [Decision Aid] to the new Fracture Prevention guideline and make the decision aid more accessible

Various decision aids are available to help patients with osteoporosis make a decision regarding a particular treatment. However, the content of these decision aids varies, which can be confusing for patients. In addition, the decision aids are not easy to find.

There are two decision aids for the content of treatment. The possibilities that they describe vary. The *Osteoporosis Decision Aid: whether or not to take any medicines to prevent fractures* gives information on two possibilities:

- 1) Do nothing
- 2) Medicines^[111]

This decision aid is based on the multidisciplinary guideline and has been developed by all healthcare providers’ and patients’ organisations, which have been involved in drawing it up. However, the decision aid is not attached to the guideline and cannot be found on the Guidelines Database of the Federatie van Medisch Specialisten [Federation of Medical Specialists] (FMS).

This decision aid is only found on a separate page of decision aids on the website Thuisarts.nl (<https://keuzehulpen.thuisarts.nl/>) of the Nederlands Huisartsen Genootschap [Dutch College of General Practitioners] (NHG). However, the Thuisarts.nl page with patient information about osteoporosis does not include a reference to this decision aid.^[112] In addition, none of the other sources in this study draw patients’ attention to the existence of this decision aid.

Option	Benefits	Disadvantages
Do nothing	<ul style="list-style-type: none"> • You do not need to do anything 	<ul style="list-style-type: none"> • Your risk of a fracture is not reduced
Medicines	<ul style="list-style-type: none"> • Treatment with medicines reduces your risk of a fracture much more than a change of lifestyle alone • The benefit that you get from medicines depends on your individual chance of a fracture in the future 	<ul style="list-style-type: none"> • You have to take these medicines every day, week or month and continue for a long time • Medicines may have side-effects • You still have a chance of fractures

For both the ‘do nothing’ and ‘medicines’ options, it is important that you live as healthily as possible. A healthy lifestyle means that you eat healthily, exercise sufficiently, do not smoke and have moderate alcohol-intake. It is particularly important that you consume sufficient calcium and vitamin D in your diet.

The Osteoporose Vereniging, together with PATIENT+, has produced a new decision aid which focuses more on lifestyle. The *PATIENT+Keuzehulp* provides information on choosing from four different options:

- 1) Do nothing
- 2) Adjust day-to-day life
- 3) Adjust day-to-day life and take food supplements
- 4) Adjust day-to-day life and take food supplements and medicines^[113]

One of the authors of this decision aid is the chair of the working group on the multidisciplinary guideline. Only the website of the Osteoporose Vereniging draws patients’ attention to this decision aid; it is not mentioned on the other sources.^[110]

	Do nothing	Adjustments in day-to-day life	Adjustments and food supplements	Adjustments, food supplements and medicines
What does it mean?	<ul style="list-style-type: none"> No changes 	<ul style="list-style-type: none"> Eat differently More exercise Take care with lifting Adapt home 	<ul style="list-style-type: none"> Adjust day-to-day life Take calcium and vitamin D 	<ul style="list-style-type: none"> Adjust day-to-day life Take calcium and vitamin D Take medicines
Results	<ul style="list-style-type: none"> Osteoporosis gets worse 	<ul style="list-style-type: none"> Improvement in osteoporosis; not known by how much 	<ul style="list-style-type: none"> 15% less chance of a hip fracture 15% less chance of a fracture in any other place in the body 	<ul style="list-style-type: none"> 40% less chance of a hip fracture 25% less chance of a fracture in any other place in the body 55% less chance of a vertebral fracture
Benefits	<ul style="list-style-type: none"> No changes 	<ul style="list-style-type: none"> No medicines Good for overall health 	<ul style="list-style-type: none"> Less chance of fractures, apart from vertebral fractures 	<ul style="list-style-type: none"> Least chance of a fracture
Disadvantages	<ul style="list-style-type: none"> Increasingly greater chance of fractures 	<ul style="list-style-type: none"> Difficult to change lifestyle 	<ul style="list-style-type: none"> Difficult to change lifestyle Take tablets every day Small chance of side-effects: <ul style="list-style-type: none"> Nausea Diarrhoea or indeed constipation 	<ul style="list-style-type: none"> Difficult to change lifestyle Take a tablet once a week or infusion 1 to 4 times a year Chance of side-effects from bisphosphonates

It is important to opt for one decision aid and that this is made easier to find and more accessible. It will then be easier for patients with osteoporosis to make decisions with their healthcare provider about the most appropriate treatment for them. The guidelines also recommend such shared decision-making in order to encourage adherence.^[6,5] The *PATIENT+ Keuzehulp* decision aid examines both pharmacological and non-pharmacological treatment and seems to have support among osteoporosis experts. Therefore, we recommend this should be aligned to the new Fracture Prevention guideline and also that this decision aid should be made more accessible.

5 Improvement actions, fracture prevention pathway and impact analysis

5.1 Improvement actions

As a result of this study, we have agreed a number of specific improvement actions with parties who are involved in care for patients with osteoporosis or an increased fracture risk. In this chapter we describe these improvement actions. Currently, the multidisciplinary guideline on Osteoporosis and Fracture Prevention is being revised under the direction of the NIV [Dutch Association of Internal Medicine]. An update of the NHG standard on Fracture Prevention is expected, aligned to the multidisciplinary guideline. Our improvement actions focus on adjustments in these guidelines, the creation of quality indicators and the application of health care in practice. The majority of the improvement actions relate to care which is already included in the guidelines. As this care is applied inadequately, we have indicated that *more* needs to be done here. The wording of improvement actions is based on the current guidelines. If these are amended, we will reformulate the improvement actions in accordance with the applicable guidelines. Where possible, we define: zero measurement, follow-up measurement, product, interested parties, coordinators and targets for the coming years.

5.1.1 Make the care pathway explicit

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Clarify the fracture prevention pathway for people aged 50+ with a fracture, so that it is comprehensible for all interested medical specialisms and fracture patients	-	-	NIV guideline; NHG standard, Thuisarts.nl, Osteoporose Vereniging website	NIV, NVR, NHG, NVT, NOV, V&VN, Zorginstituut, Osteoporose Vereniging	NIV, NVT	n.a.
2. Alert healthcare vendors of hospitals to the importance and desired form of the care pathway for fracture prevention	-	-	Report to hospital healthcare vendors, 2020	NVZ, ZN, Zorginstituut, NIV, NOV, NVR, NVT	NVZ	n.a.

5.1.2 Adapt guidelines

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Make clear in the NIV and NVvH guidelines that, for over-50s with a fracture, a DEXA scan and VFA must be requested in the A&E or plaster room by an (orthopaedic or trauma) surgeon, under the responsibility of the fracture prevention team (see figure)	-	-	NIV guideline NVvH guidelines	NIV, NOV, NVT, NVKG	NVT	n.a.
2. Make the inclusion/exclusion criteria for diagnosis as regards fracture type clear in the NIV and NVvH guidelines	-	-	NIV guideline NVvH guidelines	NIV, NOV, NVT	NIV, NVT	n.a.
3. Coordinate the NIV guideline and the NHG Standard with regard to diagnosis and treatment of people with an increased fracture risk	-	-	NIV guideline NHG standard	NIV, NHG	NIV, NHG	n.a.
4. Make recommendations about bone-sparing medication in guidelines for the treatment of diseases for which glucocorticoids are prescribed	-	-	Relevant guidelines	NVR, NIV, NHG	NVR	n.a.
5. Make recommendations in the NIV and NHG guidelines about the procedure for follow-up after discontinuation of denosumab	-	-	NIV guideline NHG standard	NIV, NHG	NIV, NHG	n.a.
6. Try to ensure that the NIV guideline and NHG standard comply with the assessment framework of the Zorginstituut and submit them for inclusion in the Register of the Zorginstituut	-	-	Submission form sent to the Zorginstituut	NIV, NHG, Osteoporose Vereniging, ZN, Zorginstituut	NIV, NHG	n.a.

5.1.3 Give more patients a bone density measurement

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Request a DEXA scan more often for over-50s with a fracture on arrival at A&E or in the plaster room	DIS claims data, 2016: % patients with a DEXA	DIS claims data, 2022, 2025: % patients with a DEXA	Implementation plan of the guidelines, protocols	NVT, NOV, NIV, NVR, NVKG, ZN, NVZ	NVT, NOV, NIV	2022: 50% get DEXA 2025: 75% get DEXA
2. In case of 'no show' for the DEXA scan, telephone patients within the first 6 weeks after the fracture	-	-	Implementation plan of the guideline, protocols	NVT, NOV, NIV, V&VN	NIV, NVT	-
3. Make it easier to request a DEXA scan through an electronic facility in the EPD	-	-	Facility in hospital EPD	NVT, NOV, NVR	NVT, NOV	-
4. Make doctors and patients aware of requesting a DEXA scan in the A&E/plaster room by means of a poster/sign, e.g. the Osteoporose Vereniging information set '50+ and a fracture'	-	-	Poster/sign in every A&E/plaster room	NVT, NOV, Osteoporose Vereniging	NVT, NOV	2022: 75% of hospitals have a poster/sign in A&E 2025: 100%
5. Give patients aged 50+ with a fracture information about the Osteoporose Vereniging, both in the A&E and at the first consultation, e.g. via the Osteoporose Vereniging information set '50+ and a fracture'	-	-	Osteoporose Vereniging information set in every A&E/ plaster room	NVT, NOV, NIV, V&VN, Osteoporose Vereniging	NVT, NOV, NIV	n.a.
6. Add a quality indicator: % fracture patients for whom DEXA scan is requested (as addition to % of fracture patients who have undergone a DEXA scan)	MSZ Quality indicators 2019: www.zorginzicht.nl	MSZ Quality indicators 2022: www.zorginzicht.nl	Quality indicators	Zorginstituut, NVZ, ZN, NOV, NIV, NVR, NVKG, V&VN, Osteoporose Vereniging	Zorginstituut	n.a.
7. Request a DEXA scan for men under the age of 70 and premenopausal women who start taking glucocorticoids at a dose of 7.5- 15 mg prednisone equivalent per day and who are expected to be using them for longer than 3 months (in accordance with recommendations in the current osteoporosis guideline)	GIP and DIS claims data, 2016: % glucocorticoid users >7.5mg with a DEXA scan	GIP and DIS claims data, 2022, 2025: % glucocorticoid users >7.5mg with a DEXA scan	Implementation plans guidelines, protocols	NVR, NIV, NHG	NVR	2022: 25% get DEXA scan 2025: 50% get DEXA scan

5.1.4 Improve diagnosis and reporting of vertebral fractures

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Have a procedure code created for the VFA	NZa procedure codes, 2019	NZa procedure codes, 2022, 2025	Procedure code	NVvR (in cooperation with NVNG)	NVvR	n.a.
2. Always link the request for a DEXA scan electronically to a request for a VFA for people aged 50+ with a fracture in the A&E/ plaster room	MSZ Quality indicators, 2019	MSZ Quality indicators, 2022; Claims data DIS, 2022, 2025	Facility in hospital EPD	NVT, NOV, NIV, NVR	NVT, NOV	2022: 50% get VFA 2025: 75% get VFA
3. Ensure a standardised record of the VFA in accordance with recommendations in applicable osteoporosis guideline	Reporting to general practitioner with VFA record (Pharmo study, 2019)	Case record study of fracture patients 50+ with VFA	Implementation plan NIV guideline, protocols	NVvR, NIV	NVvR	2022: record in acc. with guideline for 75%; 2025: for 100%

5.1.5 *Do a fall risk estimation and, where necessary, a fall risk assessment*

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Do fall risk estimation during the first consultation of the fracture patient 50+. For individuals with an increased fall risk, then carry out a fall risk assessment	-	Subject of fall risk estimation and, where necessary, fall risk assessment indicated in the status	Implementation plan NIV guideline	NIV, KNGF, NVKG, NVR, NOV, NVT, NHG, KNMP, V&VN	NIV	2022, 2025: Fall risk estimation and, where necessary, fall risk assessment carried out in all fracture patients 50+

5.1.6 *Treat more people after a fracture*

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Ensure that more people with a treatment indication are prescribed bone-sparing medication by a specialist nurse/physician assistant or fracture nurse under a doctor's supervision, and explain the importance of this to the patient	GIP and DIS claims data, 2016	GIP and DIS claims data, 2022	Implementation plan NIV guideline	NIV, NVR, NOV, NVT, NVKG, V&VN, Osteoporose Vereniging	NIV	2022: Bone-sparing medication for 35% of the fracture patients 50+
2. Also, give all fracture patients 50+ advice on diet and exercise, and in addition draw attention to the Osteoporose Vereniging for more information, assistance and peer-to-peer support	-	-	Implementation plan NIV guideline	NIV, NVR, NOV, NVT, NHG, NVKG, V&VN, Osteoporose Vereniging	NIV, NHG	n.a.
3. Give every fracture patient 50+ personal advice on preventing falls, based on the outcomes of the fall risk estimation and, where necessary, fall risk assessment, for example a reference to strength and balance training	-	Advice and reference specified in status	Implementation plan NIV guideline	NIV, KNGF, NVKG, NVR, NOV, NVT, V&VN, NHG, KNMP	NIV, NHG	2022: fall prevention discussed for all fracture patients 50+ at the first consultation after the DEXA/VFA
4. Align the PATIENT+ Keuzehulp (decision aid) with the new Fracture Prevention guideline and make the decision aid more accessible	-	-	Adapted PATIENT+ Keuzehulp, references to the decision aid in guidelines and on websites of patients' associations, professional associations and authorities	NIV, NHG, NVR, Osteoporose Vereniging	Osteoporose Vereniging	n.a.

5.1.7 Give bone-sparing medication to more patients who are taking glucocorticoids

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Prescribe bone-sparing medication more often for glucocorticoid users in accordance with the current guideline	GIP data, 2016	GIP data, 2022, 2025	Implementation plan guideline	NVR, NIV, NHG	NVR	2022: 50% use bone-sparing medication within 3 months after starting glucocorticoids >7.5 mg. 2025: 75% use bone-sparing medication in accordance with the recommendations in the current guideline
2. Clarify the recommendations in the Farmacotherapeutisch Kompas regarding bone-sparing medication with glucocorticoids, as outlined in the applicable osteoporosis guideline	-	-	Text of Farmacotherapeutisch Kompas, 2020	Zorginstituut, NVR, NIV, NHG	Zorginstituut	n.a.
3. Ensure an electronic reminder about bone-sparing medication where glucocorticoids are prescribed	-	-	Electronic reminder (pop-up) in GP and hospital information systems	NVR, NHG, NIV, KNMP	NIV, NHG	n.a.
4. Formulate quality indicator 'Bone-sparing medication with long-term use of high doses of glucocorticoids' for general practitioners	-	-	NHG indicators, 2022	NHG, NVR	NHG	n.a.

5.1.8 Encourage persistence with treatment with bone-sparing medicines

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. General: encourage adherence	GIP claims data, 2013-2018	GIP claims data, 2022-2027	-	NHG, KNMP, NIV, NVR, NVT, NOV, NVKG, V&VN	NHG, KNMP	2025: of those starting in 2022 85% were still using them after the first year and 70% after the third year
2. Provide for standard contact time (physical, telephone or e-consultation) 3 months after starting medication with prescribing healthcare professional or secondary care nurse	-	DIS claims data, 2022 or Dutch Hospital Data	Implementation plan guideline, protocol in hospital	NIV, NVR, NVT, NOV, NVKG, V&VN	NIV	2022: 100% have a consultation after starting bone-sparing medication
3. Contact the patient if he does not collect bone-sparing medication	-	-	Protocol pharmacists	KNMP, NHG	KNMP	n.a.
4. Formulate a quality indicator 'Adherence to bone-sparing medication' for general practitioners	-	-	NHG indicators, 2022	NHG	NHG	n.a.
5. Establish arrangements as to who should contact, and when, (persistently) non-adherent users of bone-sparing medication and comply with those arrangements	-	-	Local agreements	NHG, KNMP	NHG, KNMP	n.a.
. Aim for periodic check-ups with the general practitioner for people who use bone-sparing medication	-	Analysis of primary care data: GP consultations	Implementation plan NHG standard	NHG	NHG	n.a.
7. Put the subject of 'adherence to bone-sparing medication' on the agenda at the regional consultation between general practitioners and pharmacists, as required	-	-	-	NHG, KNMP, ZN	NHG, KNMP	n.a.

5.1.9 Do not simply discontinue use of denosumab

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. After discontinuation of denosumab, give patients an oral bone-sparing medicine or 1 dose for at least one year	GIP claims data, 2016	GIP claims data, 2022-2025	-	NHG, KNMP, NIV, NVR, NVT, NOV, NVKG	NIV	2022: 50%; 2025: 100% with another bone-sparing medicine
2. Monitor the follow-up of denosumab with other bone-sparing medicine and warn prescribers if there is no improvement	GIP claims data, 2016	GIP claims data, 2020-2025	Six-monthly reporting	Zorginstituut, NHG, KNMP, NIV, NVR, NVT, NOV	Zorginstituut	2020: 30% are treated with another bone-sparing medicine after denosumab 2021: 40% 2022: 50% 2025: 100%

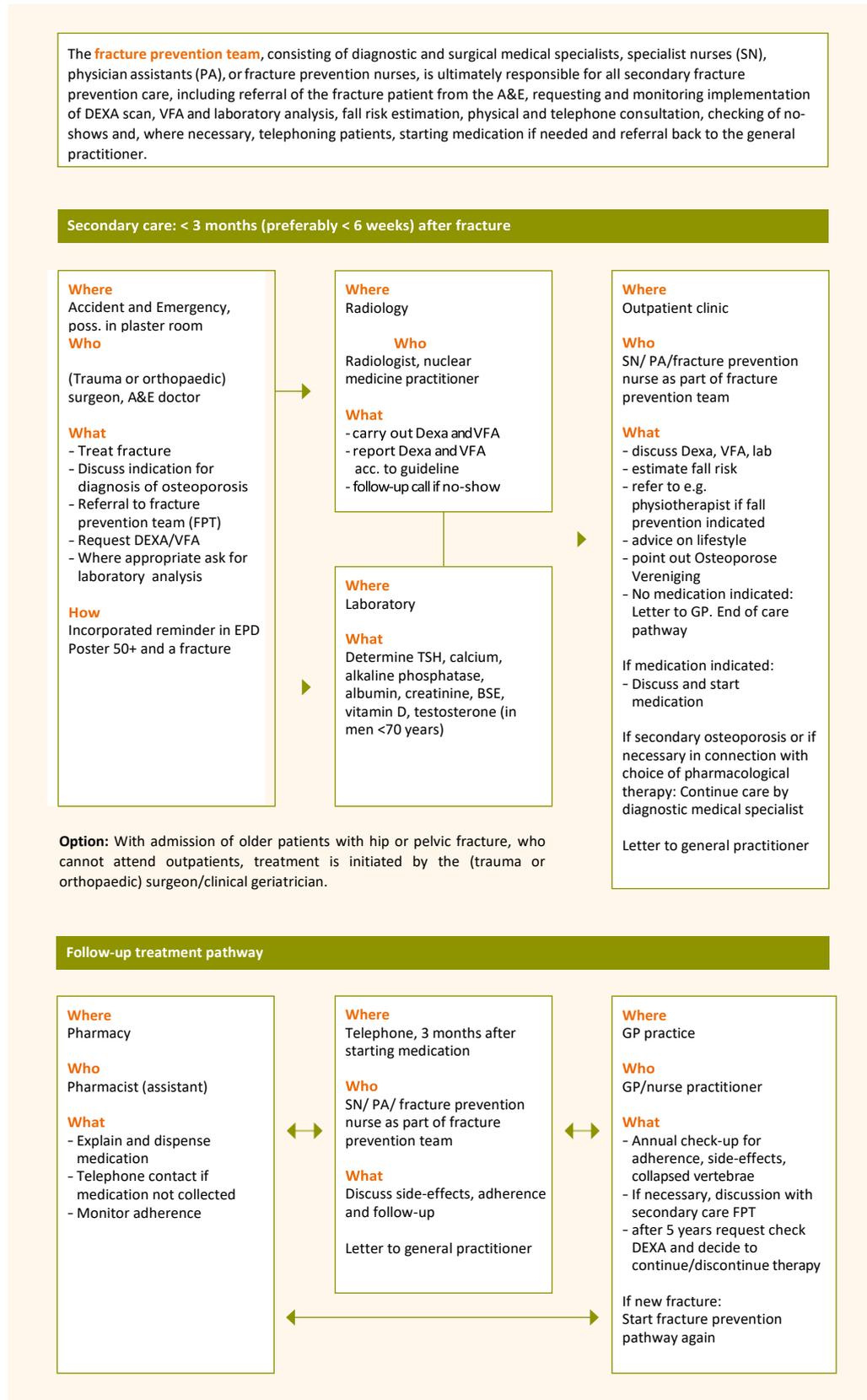
5.1.10 Improve patient information on osteoporosis

Improvement action	Zero measurement	Follow-up measurement	Product	Interested parties	Coordinators	Target
1. Ensure complete and accurate information on websites regarding diagnosis, fall prevention, lifestyle, medicines, check-up and aftercare	Website analysis Zorginstituut, 2019	Website analysis Zorginstituut, 2021	Websites of Osteoporose Vereniging, Patiëntenfederatie Nederland, Reuma Nederland, NHG, NOV, KNMP, KNGF, Voedingscentrum	Zorginstituut, NHG, NOV, KNMP, KNGF, Osteoporose Vereniging	Zorginstituut	n.a.
2. Refer to the Osteoporosis Association website	Website analysis Zorginstituut, 2019	Website analysis Zorginstituut, 2021	Websites of NHG, NOV, KNGF, Voedingscentrum	Zorginstituut, NHG, NOV, KNGF, Osteoporose Vereniging	Zorginstituut	n.a.

5.2 Fracture prevention pathway

The improvement commitments which we describe in this report relate to only bits of the care pathway. All of these bits fit into a larger whole. We set out this overall care pathway in figure 5.1. That care pathway also includes all other necessary steps, such as carrying out a laboratory analysis. In addition, we have inserted the care pathway of the subgroup of patients who are admitted to hospital with, for example, a hip or pelvic fracture. By defining responsibilities and time periods, we expect that the steps will be easier to understand and implement. This care pathway concerns people aged fifty and over with a fracture. It is not aimed at the treatment of osteoporosis, but primarily at the prevention of new fractures. The care pathway has been designed together with the parties.

Figure 5.1 | Fracture prevention care pathway



5.3

Impact analysis

Better health and lower costs through prevention of fractures

If all improvement actions are implemented, more than 22,000 additional people will be treated annually with the aim of preventing a new fracture. To achieve this, from 2021 more will gradually be spent on diagnosis and consultations in secondary care, up to 10.4 million euros per year in 2025. From 2022 expenditure on GP care and medication will be gradually increased to 9.4 million per year in 2025. Because the chance of a new fracture in people taking medication is almost halved, a fracture can be prevented in almost one and a half thousand people every year. Improvements in fall risk inventory and fall prevention measures will lead to an even bigger fall in the number of fractures. This results in a substantial reduction in disabilities and complications, and an improvement in the quality of life of this vulnerable group of people. In addition, there will be a substantial fall in the use of hospital, rehabilitation and nursing home care, which entails a saving of 13.5 million euros per year. Thus, for health care the total annual costs associated with the improvement actions are 6.3 million euros. For society, the additional healthcare costs are offset by savings as a result of increased labour productivity, among other things.

The methods, sources, assumptions and choices which have been used and made for this impact analysis are described in Annex D. In some cases costs or savings will be underestimated and in others overestimated. For this impact analysis the number of people over the age of fifty with a fracture in 2025 is the same as the number in 2016. It has been decided here to show purely the effect of the improvement actions, not distorted by a change in the age structure of the population (rise in the number of elderly people). We calculate the costs and returns in the period up to five years after the fracture. When all improvement actions have been implemented, the same costs and savings will be made again each year.

5.3.1

Fewer fractures

40% of people aged 50 or over with a fracture have osteoporosis or a vertebral fracture with osteopenia. These people benefit from treatment with bone-sparing medication, since they have an increased risk of a new fracture. At least one third of these people get a vertebral or hip fracture and two-thirds get a wrist or other fracture.^[114] If treatment is started promptly, the risk of a second fracture can be reduced by about half.^[115] In 2016 120,000 people suffered a fracture. According to the literature, about 48,000 people had a treatment indication (40% of 120,000). However, 23% (about 28,000 people) of the over-50s with a fracture were incorrectly *not* treated with bone-sparing medication. The chance of a new fracture within 5 years in people with a first fracture is about 16% on average.^[12, 13] That percentage is higher for people with a treatment indication: We assume 20% for our calculations. We estimate that in the 5 years after the fracture 5,500 of the untreated people suffered another fracture.

Only 17% (48,000-28,000=20,000) of the people aged 50 and over with a fracture were in fact treated. Bone-sparing medicines reduce the chance of a second fracture. For the most frequently prescribed drug (bisphosphonate alendronate), the chance of a vertebral fracture decreases by 45%, the chance of a hip fracture by 53% and the chance of another fracture by about 23%.^[5] As a result of taking medication, the chance of a vertebral fracture in the 5 years after the first fracture fell to 10.4%, the chance of a hip fracture to 9.6% and the chance of another fracture to 15.4%. In the total group of 20,000 people who were treated, therefore, it is estimated that about 13% had a new fracture (2,800), instead of 20% (4,100) if they had not been treated. In the combined untreated and treated groups, there were probably about 8,300 (5,500+2,800) with a new fracture within 5 years of the first fracture.

By tripling the number of DEXA scans (from 25% to 75%) we expect that three times as many people will be treated as a result of a DEXA scan. In 2016 treatment was started in 37% of patients following a DEXA scan. In 2025 that should involve 33,400 patients, namely 37% of 90,000. In addition, in 2016 there were a small number of people with a fracture who started or were already being treated with bone-sparing medication without a DEXA scan. For the calculation we assume that this number will be the same in 2025 (8,300). It may also be the case that these people will be identified by means of a DEXA scan (which would mean that the percentage treated as a result of a DEXA scan is higher and this 'remainder' category perhaps smaller). In total we anticipate that in 2025 35% (33,400+8,300=42,000) of people with a fracture (120,000) will be treated with bone-sparing medicines. In this group the chance of a new vertebral, hip or other fracture is on average about 13%, as described above. The (48,000-42,000=) 6,000 people with a treatment indication, who have not yet been identified by means of a DEXA scan, or who have declined treatment, still have a 20% chance of a new fracture. Instead of the estimated 8,300 patients who would suffer a new fracture in the old situation, it is expected that, of the people who have a fracture in 2025, only 6,900 people (out of the 120,000) will suffer a new fracture within 5 years. Thus, if all people with a treatment indication (42,000 a year) start to take medication, about 1,400 fractures can be prevented every year.

Furthermore, after five years the chance of a new fracture is increased even further. An Icelandic study showed that the chance of having a second fracture within 10 years varied from 37% to 49% in people with a vertebral, wrist or humerus fracture. For a hip fracture, that percentage was slightly lower (35%) because mortality in this group was higher.^[116]

Another improvement action is that all people with a fracture should be given fall prevention advice after a fall risk estimation and, where necessary, a fall risk assessment. The fall prevention measure resulting from that advice may perhaps also reduce the risk of a new fracture. The more people who are given fall prevention measures, the greater the number of additional fractures, which are prevented, is expected to be. Because we do not know what fall prevention measures will be adopted in the future, and for how many people that will happen, we cannot calculate how many additional fractures can be prevented as a result.

5.3.2 Lower mortality

Mortality will also decline if more fractures are prevented. This is because people with a fracture have a greater chance of dying prematurely than people who do not have a fracture, with the chance being highest in the first years after the fracture.^[117] Women with a vertebral fracture have a two times greater chance of dying, and with a hip fracture a three times greater chance, compared to women without fractures. For men, these chances are three to five times as high.^[118] In a Dutch study, one third of the people with a fracture (other than a vertebral fracture) had died within five years.^[119] Men, older people and people with a second fracture have the greatest chance of dying prematurely. A second hip fracture can double the chance of death compared to people with only one hip fracture.^[120] Some of these people die of underlying conditions and some die of the consequences of the fracture itself.^[121]

The extent of the effect of bone-sparing medication on the reduction in mortality differs between studies. A major literature review showed that osteoporosis patients who used bone-sparing medication had 10% less chance of dying than those who did not take any medication.^[122] A British study showed that mortality was reduced by 20% with the use of bone-sparing medication.^[123] Not only the medication itself is effective in reducing the risk of a second fracture and death. In several countries, the 'osteoporosis outpatient clinics' (fracture liaison services), where diagnosis, fall prevention, lifestyle advice and treatment of people with osteoporosis are integrated, proved to be cost-effective in preventing fractures and deaths and increasing the quality of life.^[124]

5.3.3 *Fewer disabilities and better quality of life*

If there are fewer fractures as a result of bone-sparing medication, the disease burden will also fall. A large study among women showed that in the first six weeks after a fracture about half of the women were dependent on others in terms of self-sufficiency, housekeeping and other daily activities. In the initial period they were also restricted in exercise, sport and caring for others. In addition, the women experienced psychological effects. 60% of the women reported that they had less self-confidence.^[125] Research indicates that the physical and psychological health and the quality of life enjoyed by elderly people decline after a hip fracture.^[126] Quality of life declines in general with age; in people with a vertebral fracture and hip fracture this occurs more rapidly than in healthy people.^[116]

5.3.4 *Less use of health care and fewer complications*

Fewer fractures also mean less pressure on health care. People with a hip fracture on average stay in hospital for nine days.^[127] From a major study in four hospitals among people with a broken hip (three-quarters women, average age 83) it emerged that 43% of the patients got a complication during admission, including delirium, wound infection, pneumonia or pressure ulcers. In addition, in 19% of the patients there was (in part, culpable) care-related damage to health, which led, for example, to re-admission or further surgery. Only one fifth of the patients admitted with a hip fracture were discharged to their home. The rest went to a nursing home, care home or rehabilitation centre.^[128]

5.3.5 *Savings as a result of fewer fractures*

A fracture entails high costs. Some of these costs can be saved after implementation of the improvement actions. Most costs are incurred in the first year after the fracture. In the case of a hip fracture, almost 100% of the patients require surgery. A study has shown that a hip operation cost more than 2,900 euros. The hospital length of stay of an average of 10 days cost an additional 5,700 euros. After discharge from hospital, 56% of the patients went to a rehabilitation centre or care home, with a stay lasting 10 and 18 days respectively. During the rehabilitation period, patients had an average of 52 physiotherapy sessions. There were also visits to hospital for check-ups or further surgery. In the first 10 weeks the patient with a hip fracture entailed on average 15,000 euros in care costs. In one year that was 24,000 euros.^[129] Another study among elderly people shows that a hip fracture cost about 27,000 euros in the first year. In the second half of that year 80% of the costs were spent on care in nursing homes.^[127] In the case of vertebral fractures there is usually no requirement for an operation and hospital admission. However, it is estimated that a quarter of the people with a vertebral fracture received weekly home care for at least one year.^[125] The costs of other fractures vary greatly and are dependent on, among other things, the need for surgery, the length of admission and the intensity of rehabilitation. According to a study, the medical costs for a wrist fracture were 1,300 euros^[130] and for a humerus fracture reached 11,000 euros.^[131] In this impact analysis, in order to calculate savings in total healthcare costs (including home care, rehabilitation and nursing home care) we work on the basis of a calculation by the Institute for Medical Technology Assessment (iMTA): 25,000 euros per person for a hip fracture, 5,000 euros for a vertebral fracture, 3,500 euros for a wrist fracture and 2,800 euros for other fractures.^[132] We assume that most of these costs are incurred in the five years after the fracture.^[127] By multiplying the total number of fractures which can be prevented each year with the costs per fracture, it appears that, after implementation of the improvement actions, **13.5 million euros** can be saved each year in healthcare costs.

In addition, there are savings for society. A Dutch study of people aged 50 and over with osteoporosis showed that half of the costs in the first year after the first fracture related to indirect costs. Most of these could be attributed to sick leave and loss of productivity. That was the case particularly for people with a vertebral, humerus or wrist fracture.^[130] People with a second fracture will also generate indirect costs, although the proportion is probably less than 50%, because of the slightly more advanced age and lower employment rate. Nevertheless, the savings associated with preventing second fractures amount to **20 million euros** a year.

5.3.6 *Costs resulting from treatment of osteoporosis*

If the improvement actions concerning bone-sparing medication are achieved, about 22,000 additional people (42,000-20,000) will be treated with medication in 2025. We assume that the proportion in which the various drugs are prescribed remains the same: 87% start on bisphosphonates in tablet form (majority alendronic acid), 11% on denosumab, 1% on zoledronic acid and 1% on teriparatide. Alendronic acid treatment costs about 15 euros per patient per year. Denosumab treatment costs about 360 euros per patient per year and zoledronic acid treatment 250 euros. Thus, the costs of medication will increase substantially from 2025. The patient will entail costs for medication not only in the first year, but also in the five years after the fracture. For each patient these costs will decrease slightly each year as adherence declines. In 2016 70% of the people were still using their bisphosphonates after 1 year, and 50% after 3 years. In 2025 we expect that, as a result of the improvement actions on adherence, these percentages will be 85% and 70%. Thus, the adherence percentages within the whole patient group are higher in 2025 than in 2016. The average medication costs per patient will therefore rise. In 2016 about 2.9 million euros were spent annually on bone-sparing medication for people aged 50 and over with a fracture. In 2025 that is expected to be 8.6 million euros: an increase of **5.8 million euros** a year.

Another improvement action is that all 4,500 people who take denosumab will afterwards start to use a different drug to maintain bone quality, preferably a bisphosphonate for 1 year. In 2016 17% (375) of denosumab users were given a different drug to maintain bone quality. Therefore, this concerns an increase in the patients given a 'follow-up medication' for one year, from 375 to 4,500: a difference of more than 4,100. The annual costs for follow-up medication after denosumab then rise from 5,000 to 61,000 euros, a difference of **0.06 million euros**.

Under the improvement actions, all patients who use bisphosphonates or denosumab will be seen annually by their general practitioner while they are taking their medication. Allowing for a higher number of people starting on the medication, rising adherence and follow-up medication after denosumab, there will be 154,000 additional consultations each year. In this analysis we calculate about nine euros for a consultation. The additional GP consultations involve **1.3 million euros**. In pharmacies the greater number of starters and the rise in adherence will also lead to more prescriptions with corresponding monitoring and supervision of medication. 12 euros is calculated for a first prescription and 6 euros for a repeat prescription. Most patients take medication for five years. For bisphosphonates that is (5x4) prescriptions plus an additional 6 euros at the beginning. Allowing for declining adherence over the years, the additional annual costs for pharmacies amount to **2.3 million euros**. The total additional costs for medication, pharmacy and GP check-ups which will be incurred after full implementation of the improvement actions are **9.4 million euros** a year.

5.3.7 *More diagnoses and treatment in hospital*

More DEXA scans and VFAs will have to be carried out to identify more people with a treatment indication. The improvement action states that the number of DEXA scans in people over the age of 50 with a fracture will rise from 26% to 75%. This means that, if the number of people over the age of 50 with a fracture remains the same in 2025 compared to 2016 (120,000), the number of DEXA scans will rise from 31,800 to 90,400. That is an extra 58,600 DEXA scans per year. A DEXA scan (with VFA) costs 104 euros. Thus, in the future an additional (58,600x104=) **6.1 million euros** will be spent on DEXA and VFA examinations. As well as a DEXA scan these people will all have a laboratory analysis. In spite of the fact that no specific improvement action has been drawn up for that, we include it in the calculation. A full laboratory analysis costs 22 euros (without testosterone measurement: this applies only to men under the age of 70). With 60,000 new laboratory analyses, additional costs of 1.3 million euros would be incurred. Since many people over the age of 50 with a fracture (including people without a DEXA scan) already get a partial or full laboratory analysis in the current situation, these additional costs are lower: **0.4 million euros**. The diagnostic examination is followed by a physical consultation. In half of hospitals, it is expected that this will be a one-hour consultation (including preparation) with a private specialist nurse or physician assistant, and in the other half of hospitals a 45-minute consultation with a fracture prevention nurse

combined with a 10-minute consultation with a medical specialist. The first variant costs about 64 euros, the second about 57 euros. The people who are treated with drugs will also get a telephone check-up consultation three months after starting the medication. If this telephone call does not lead to a change in the treatment policy, then no costs are involved. Only the people with secondary osteoporosis will be seen more often by a medical specialist. They are then treated for their underlying condition. The costs of this are not counted in this calculation of additional costs for osteoporosis care. There will be additional expenditure of about **3.9 million euros** on costs for consultations with people with a fracture. The costs for fracture prevention in hospital for people over the age of 50 with a fracture are estimated to be $(6.1+0.4+3.9=)$ **10.4 million euros** a year.

The costs for diagnosis and treatment of people over the age of 50 with a fracture increase by $(9.4+10.4=)$ **19.8 million euros** a year. On the other hand, there are savings on health care as a result of preventing fractures to the value of **13.5 million euros** a year. For health care, the total additional costs connected with the improvement actions are $(19.8 \text{ million} - 13.5 \text{ million} =)$ **6.3 million euros**. For society, these additional healthcare costs are offset by savings as a result of increased labour productivity, among other things.

Annex A Account of the Zinnige Zorg working method

Starting points

Zorginstituut Nederland has designed a systematic working method for the 'Zinnige Zorg' programme in order to assess the way in which the insured basic package is used. The focus of this systematic assessment is to identify and reduce ineffective and unnecessary care, in order to improve the quality of care for patients, increase health gains and avoid unnecessary costs. We carry out a systematic assessment in all ICD-10 chapters. We use a number of starting points for our work:

Patients' perspective

We examine the entire care pathway from the patient's perspective.

Package manager

Our focus is primarily on care falling within the scope of the Care Insurance Act (Zorgverzekeringswet) or the Long-Term Care Act (Wet langdurige zorg).

Good care in practice

We start from the perceptions of good care of the professionals themselves, as set out in guidelines or as demonstrated by scientific research. We then look at how care is implemented in practice. This leads to identification of under- or overdiagnosis, under- or overtreatment and detection of gaps in knowledge.

Involvement of parties

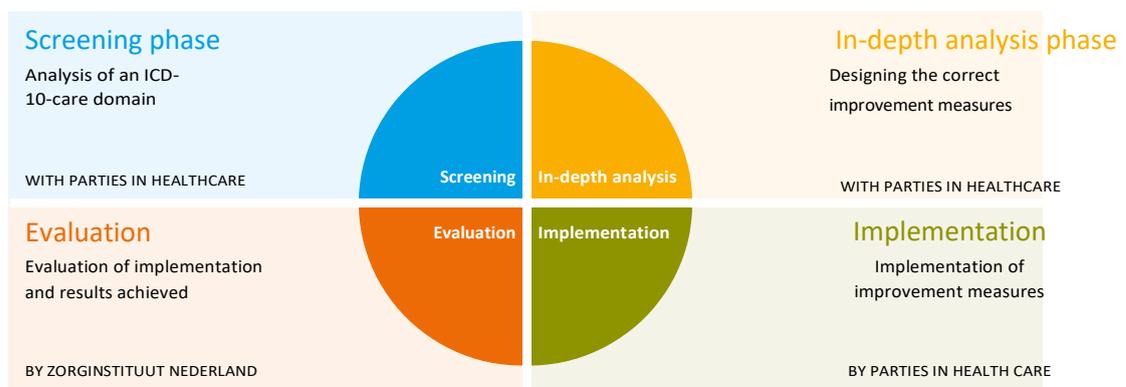
At all stages of the systematic assessment we cooperate with the relevant responsible parties: patients, healthcare professionals, institutions and health insurers. We invite them to attend meetings and make recommendations concerning research. Before publication of reports, we invite parties to participate in a written administrative consultation.

Cycle

To promote good care, we carry out a systematic assessment according to a PDCA cycle as illustrated in figure A.1.

This circle consists of four sequential phases: screening, in-depth analysis, implementation and evaluation.

Figure A.1 | Zinnige Zorg PDCA cycle



Screening phase

The objective of the screening phase is to select one or more care pathway(s) for patients with a specific disease from a designated ICD area for the in-depth analysis phase.

The essential feature here is that the care pathways are selected on the basis of the following criteria: large number of patients, high care costs, high individual disease burden, availability of guidelines (views on good health care) and opportunities for study of implementation in practice (availability of claims data or otherwise). The choice of these care pathways is set out together with the underlying analysis in a report, 'Systematic analysis' which is presented to parties in health care and to the Minister of Public Health, Welfare and Sport.

In-depth analysis phase

The objective of the in-depth analysis phase is to reveal, for the selected care pathways, where care is not being implemented in practice as may be expected on the basis of the (scientific, substantiated) recommendations in guidelines or the scientific state of the art. In other words: where is it perhaps a question of inappropriate care? Here we are looking for under- or overdiagnosis, under- or overtreatment and knowledge gaps. On the basis of this study, agreements are reached with the interested parties on improvement measures. The study and the improvement actions (including impact analysis) are set out in a room for improvement report which is presented to parties in health care and to the Minister of Public Health, Welfare and Sport.

Implementation phase

The objective of the implementation phase is to implement the improvement actions. This is the responsibility of the parties in health care. The Zorginstituut can have a supporting and facilitating role in this phase, for example by organising meetings, providing data and mirror information and undertaking supplementary research. The Zorginstituut reports on progress periodically to the responsible parties and to the Minister of Public Health, Welfare and Sport.

Evaluation phase

The objective of the evaluation phase is to establish whether the improvement actions have been implemented. The results of the evaluation are set out in a report which is presented to parties in health care and to the Minister of Public Health, Welfare and Sport.

Research

In the systematic assessment we can make use of various forms of research, including:

- analysis of national guidelines;
- analysis of international guidelines;
- systematic reviews into (cost-)effectiveness;
- analysis of claims data.

We use claims data (Declaration Information System (DIS), Care Interventions and Claims (ZPD) and Medicines and Medical Devices Information Project (GIP)) to get an impression of healthcare practice. Claims data reflect registration practice and not always the care actually delivered. Nevertheless, these data are an important and, sometimes, the only source of information and they can provide valuable indications of the quality of health care. Protection of privacy is paramount. Therefore, the personal data used are pseudonymised and cannot be traced to individuals.

The Zorginstituut does not commission or subsidise clinical research in the 'Zinnige Zorg' programme.

Annex B List of parties involved

In this in-depth analysis phase we have cooperated with the following parties.

Invited organisations	Start meeting 6 November 2018	Follow-up meeting 21 May 2019	Final meeting 3 October 2019	Response to draft report
Koninklijk Nederlands Genootschap voor Fysiotherapie [Royal Dutch Society for Physiotherapy]				
Koninklijke Nederlandse Maatschappij ter bevordering der Pharmacie [Royal Dutch Pharmacists Association]				
Nederlandse Federatie van Universitair Medische Centra [Dutch Federation of University Medical Centres]				
Nederlands Huisartsen Genootschap [Dutch College of General Practitioners]				
Nederlandse Internisten Vereniging [Dutch Association of Internal Medicine]				
Nederlandse Vereniging voor Klinische Geriatrie [Dutch Association for Clinical Geriatrics]				
Nederlandse Orthopaedische Vereniging [Dutch Orthopaedic Association]				
Nederlandse Vereniging voor Nucleaire Geneeskunde [Dutch Association for Nuclear Medicine]				
Nederlandse Vereniging voor Radiologie [Radiological Society of the Netherlands]				
Nederlandse Vereniging voor Reumatologie [Dutch Rheumatology Association]				
Nederlandse Vereniging voor Traumatologie [Dutch Trauma Society]				
Nederlandse Vereniging van Ziekenhuizen [Dutch Hospitals Association]				
Osteoporose Vereniging [Osteoporosis Association]				
Verpleegkundigen & Verzorgenden Nederland [Dutch Nurses and Caregivers]				
Zorgverzekeraars Nederland [Association of Dutch Health Insurers]				

■ attended the meeting
■ did not attend the meeting
■ response to draft report during consultation phase June 2020

Annex C Overview of sources and research methods

1 Secondary-care diagnosis and treatment at patient level

To get an impression of healthcare practice we used claims data from two sources for the systematic analysis:

- The DTC information system (DIS), provided via the Nederlandse Zorgautoriteit (Dutch Healthcare Authority) (NZa)
- The Zorginstituut's Medicines and Medical Devices Information Project (GIP).

Explanatory notes on the sources used

DTC information system

The diagnosis treatment combination (DTC) information system (DIS) includes claims data on all DTC care pathways and procedures provided by Dutch hospitals. When this report was written, 2017 was the latest year for which the data were 95% complete. The data from the analysed years also include people who were diagnosed before that year, but were still undergoing treatment. The DIS database was used for the analyses relating to the diagnosis (chapter 2), check-up DEXA scans and annual check-ups (chapter 3).

Medicines and Medical Devices Information Project (GIP)

The database of the Medicines and Medical Devices Information Project (GIP) contains information on the use of medicines and medical devices in the Netherlands. It concerns resources which are supplied extramurally, outside institutions such as hospitals and nursing and care homes, and are included in the basic package under the Care Insurance Act. The information is based on the database of Zorginstituut Nederland containing all claims from the health insurers. The GIP database was used for the analyses relating to glucocorticoids (chapters 2 and 3) and bone-sparing medication (chapter 3).

Disclaimer

Claims data reflects registration practice and not always the health care actually delivered. Nevertheless, these data are sometimes the only source of information, and this can provide valuable indications of the use of health care and trends in that.

2 Secondary-care diagnosis and treatment at hospital level

The quality indicators are public data which are supplied annually for publication on www.zorginzicht.nl as part of the Transparency Calendar. The indicators are drawn up and adopted by the scientific associations. Hospitals are required to supply their data annually regarding the indicators, valid for the preceding year. These data have been used to describe the various components of the diagnosis (chapter 2).

3 Primary-care fall risk estimation and VFA reporting at patient level

A case record study of primary-care patients was carried out in order to get an understanding of the fall risk estimation by general practitioners in patients after a fracture or diagnosis of osteoporosis, and of the reporting of diagnoses of vertebral fractures. Data from the General Practitioners Database of the PHARMO Data Network were used for this purpose. This database contains data from electronic patient records registered by general practitioners. Anonymised journal entries and correspondence between general practitioners and specialists were made available for further analysis. Correspondence and journal entries were available for more than 1.4 million patients aged ≥50 between 1 January 2013 and 31 December 2017. After application of all inclusion and exclusion criteria, 45,750 patients were identified with a new fracture for the analysis of fall risk estimation and diagnosis.

4

Public patient information

Desk research was carried out to get an overview of the quality of the available public patient information (including decision aids) about osteoporosis. First of all, the necessary topics regarding osteoporosis were defined, by category (risk factors, diagnosis, lifestyle advice, fall prevention, medication, aftercare) on the basis of the current guidelines. Then, the information sources were identified, in consultation with the stakeholders, which included examination of how the information on the topics was presented. After that, each source (website, decision aid or book) was scored on whether the relevant topic was or was not mentioned, and whether the text contained accurate or inaccurate information. Finally, in the case of inaccurate information, the following question was answered for each category: 'To what extent does this information source contain inaccurate information (for example, not in accordance with guidelines) about:' The quotation from the source with the inaccurate information was described, followed by comments by the researchers and the quotations from guidelines.

Table C1 | List of sources studied^[112, 111, 110, 133, 134, 113, 135-141]

Owner	Name
1 NHG	Thuisarts.nl: Botbreuken en botontkalking (Osteoporose) [Fractures and osteoporosis]
2 NHG	Keuzehulp Osteoporose: wel of geen medicijnen slikken om botbreuken te voorkomen [Osteoporosis decision aid: whether or not to take medicines to prevent fractures]
3 Osteoporose Vereniging	Corporate Website
4 Osteoporose Vereniging	Platform Sterke Botten [Strong bones platform]
5 Osteoporose Vereniging	Book 'Broze botten breken' [Brittle bones break]
6 Osteoporose Vereniging and Patient+	Patient+ Keuzehulp osteoporose
7 Osteoporose Vereniging and Patiëntenfederatie Nederland [Dutch Patients' Federation]	Keuzehulp voor osteoporose: Vind de zorginstelling die het beste bij u past [Osteoporosis decision aid: find the best care institution for you]
8 Patiëntenfederatie Nederland	Zorgkaart Nederland: Osteoporose [Netherlands care map: osteoporosis]
9 KNGF	De Fysiotherapeut: Osteoporose [The Physiotherapist: Osteoporosis]
10 KNMP	Apotheek.nl: Botontkalking [Osteoporosis]
11 NOV	Zorg voor Beweging: Osteoporose [Keep exercising: Osteoporosis]
12 ReumaNederland	Wat is Osteoporose? [What is osteoporosis?]
13 Voedingscentrum	Botontkalking en osteoporose [Osteoporosis]

Table C2 | Topics studied, by category

Risk factors
<ul style="list-style-type: none"> • Age over 50 • Underweight (BMI <20, weight <60 kg) • Fall risk • Parent with hip fracture • Smoking • Alcohol (>2 glasses per day) • 1 or more fractures after the age of 50 • Drugs which reduce bone density • Diseases which reduce bone density • Reduced mobility/physical activity
Diagnosis
<ul style="list-style-type: none"> • Fall risk inventory • DEXA • VFA • X-ray where (vertebral) fracture is suspected • Laboratory analysis
Lifestyle advice
<ul style="list-style-type: none"> • Diet: 4 portions of dairy • Calcium (depending on individual dairy intake) • Alcohol • Stopping smoking • Physical activity • Sunlight exposure • Vitamin D (800 IE or 20 micrograms perday)
Fall prevention
<ul style="list-style-type: none"> • Adjustment of medication • Strength and balance training
Medication
<ul style="list-style-type: none"> • Bisphosphonates • Denosumab • Teriparatide
Aftercare
<ul style="list-style-type: none"> • Check-up with doctor • Adherence • Duration of treatment • Check-up DEXA

Annex D Explanatory note on the impact analysis

We use an impact analysis to answer the question of what effects the improvement actions may have on costs and savings within health care. In this annex we describe the method which we used to carry out the impact analysis.

Starting points in the impact analysis

For the improvement actions relating to diagnosis and treatment, we calculated what the costs and savings will be for health care. This relates only to care which is reimbursed under the Care Insurance Act. Where possible, we start from the cost prices of diagnostic procedures, consultations and medicines. In addition, we assume that the improvement actions will be implemented in full. In practice the costs will increase gradually over the coming years. The number of fractures that can be prevented and the savings this will bring are an estimate based on the literature. In addition, we expect the savings to increase gradually. Whether these savings are actually achieved depends on, among other things, implementation of the improvement actions.

Which patient group is concerned?

The calculation of costs of diagnosis and treatment concerns people aged fifty and over who report to the accident and emergency department with a fracture. The majority of the people with osteoporosis are 'caught' in this way. In the impact analysis we assume that the number of patients aged fifty and over with a fracture will be the same in 2025 as in 2016, in spite of the anticipated rise in the number of over-50s. This is because this shows purely the effect of the improvement actions, not distorted by a rise in the number of elderly people.

What time period after the fracture is concerned?

We take as our basis the costs incurred for diagnosis and treatment within the first five years after a fracture. We do not include the costs of (general practitioner) care and medicines for people who are treated for longer than five years. To calculate the total costs incurred for patients with a fracture in 2025, we take the sum of the people who are included in the first, second, third, fourth and fifth years of treatment.

To calculate the savings as a result of fractures *prevented*, we take as our basis the total medical costs entailed by a fracture. We do that on the basis of an economic analysis by the iMTA.^[132] The major part of these costs is incurred in the first five years after the fracture. Thus, for savings, we use the same time period as for the costs. The savings which are made after the fifth year (for example, by preventing permanent admission to a care or nursing home) are not included in the calculation.

Which sources were used?

Vektis claims data, the Farmacotherapeutisch Kompas, NZa rates and the Zorginstituut Nederland 2016 guideline for the performance of economic evaluations were used for calculating costs (see Table D1). Where possible, the cost price of care activities was used, otherwise the rates applied by the NZa were used. To determine the savings as a result of fractures prevented, we assume that 20% of the people with a first fracture suffer a second fracture. This is inferred from the literature, agreed with the representatives of the NIV. PubMed was searched for international literature for a description of other consequences of a fracture (disabilities, quality of life, mortality). A Dutch report was consulted for a description of care-related harm.

What was not included in the calculations?

A number of things are not included in the calculations:

- The patient's own payments for e.g. transport from and to the hospital and reimbursements from supplementary insurance;
- Costs of developing guidelines, adjustments to systems within health care (for example, the EPD), adjustments to websites and further training;
- The procedures for which no specific improvement actions have been agreed, such as check-up DEXA scans. At the same time, these are things which are not (yet) clearly defined in the guideline;
- The costs incurred for patients who are treated for longer than five years;
- The savings which are achieved more than five years after the prevented fractures, such as permanent admission to a nursing or care home after a hip fracture;
- The impact on labour productivity and pensions.

Table D1 | Sources used for the impact analysis

Improvement actions, diagnosis	Amount (euros)	Source
Full bone-densitometric examination with DEXA apparatus (including VFA)	104.00	NZa, weighted average DTC healthcare activity codes 080080, 120032, 120033, 120037
Laboratory analyses, full set (albumin, alkaline phosphatase, BSE, calcium, creatinine, TSH, vitamin D, testosterone)	Incl. testosterone: 30.16 Excl. testosterone: 21.42	NZa rates, laboratory analysis, 2020 ^[142]
Improvement actions, treatment	Amount (euros)	Source
Bisphosphonates in tablet form: alendronic acid (per year, excl. VAT)	13.39	www.farmacotherapeutischkompas.nl ^[143]
Denosumab (per year, excl. VAT)	361.08	www.farmacotherapeutischkompas.nl ^[105]
Zoledronic acid (per year, excl. VAT)	247.41	www.farmacotherapeutischkompas.nl ^[144]
Pharmacy costs for dispensing medicines	First prescription: 12.00 Repeat prescription: 6.00	Guideline for the performance of economic evaluations in health care ^[145]
Cost price, specialist nurse 60 min	63.36	Hospitals Collective Agreement, salary scales 2020 ^[146] function group 60 ^[147] and Guideline for the performance of economic evaluations in health care ^[145]
Cost price, fracture nurse 45 min	37.28	Hospitals Collective Agreement, salary scales 2020 ^[146] function group 50 ^[148] and Guideline for the performance of economic evaluations in health care ^[145]
Cost price, medical specialist 10 min	19.33	Guideline for the performance of economic evaluations in health care ^[145]
Rate for a GP consultation	9.59	ZPD/Vektis claims data 2018 , claims code 12000

Annex E Implementation and evaluation

The Executive Board of the Zorginstituut agrees the final room for improvement report. The implementation phase of the Zinnige Zorg (Appropriate Care) project for osteoporosis then starts. The objective of this phase is to implement the improvement actions. Responsibility for this lies with the parties in health care. The Zorginstituut itself has control of individual improvement actions (see chapter 5).

The Zorginstituut, together with the interested parties, looks for opportunities to facilitate implementation. The Zorginstituut periodically organises a meeting with all parties to discuss and coordinate on this. The Zorginstituut monitors the progress of implementation. We do this by examining whether the products have been delivered. In addition, we measure the effects of the improvement actions by examining to what extent change occurs in the declaration data.

Finally, about five years after publication of this room for improvement report, the Zorginstituut will carry out an evaluation of the improvements achieved and submit a report on this to the parties and to the Minister for Medical Care and Sport. Afterwards, the Zorginstituut will maintain contact with parties in health care in order to help safeguard the improvements.

Annex F Responses to administrative consultation

Comments on content of written consultation with response by the Zorginstituut Nederland (in italics)

KNGF

1. We have previously stated that, in our opinion, expressly including fall prevention programmes given by the physiotherapist in the care pathway might and should be better. We still believe that the room for improvement report could be even more explicit on this point. These programmes have, after all, proven to be effective. Nevertheless, we note improvement on this point:

Page 48: "Do a fall risk inventory during the first consultation with fracture patients 50+"

Page 49/50: "Give every fracture patient 50+ personal advice on preventing falls, based on the outcomes of the risk inventory, for example a referral for strength and balance training"

Good to have improvement pointed out in this respect.

2. Our main observation concerns page 36 (last paragraph). Possible causes are given there for why too little attention is paid to fall prevention. However, during the meetings it was repeatedly stated (not only by KNGF, but also by NHG) that the absence of reimbursement from basic insurance makes it unattractive for patients to follow a fall prevention programme. In our opinion, if the report ignores this aspect, it lacks a significant added value. What is more, an observation to this effect is in line with the Systematic Advice for Physiotherapy and Exercise Therapy issued at the end of 2016.

We have added the following sentence "Furthermore, some experts say that the absence of reimbursement under the basic package makes it unattractive for patients to follow a fall prevention programme" to the paragraph in question. The 2016 Systematic Advice for Physiotherapy and Exercise Therapy describes the steps which are necessary for reimbursement.^[149] The current state of affairs is set out in the progress report which the Minister sent to the House of Representatives in April 2020.^[150]

3. In addition, some further observations:

On page 10 (last paragraph) it is stated that diagnosis comprises *inter alia* a fall risk analysis. This is repeated once more on page 11 (first paragraph). However, in figure 1.1 there is reference to a fall risk estimation. On page 22 (3rd paragraph) it states:

"Therefore, it is important that, after the first fracture, a fall risk estimation is made by a healthcare professional." However, on the basis of the guideline on Prevention of fall events in elderly people (NVKG 2017), a multifactorial fall risk assessment is indicated in the case of a fall combined with an increased fracture risk. The improvement actions refer to a fall risk inventory. However, it is not entirely clear whether this concerns a fall risk estimation or a fall risk assessment, but if the NVKG guideline is followed, this would have to be an assessment (namely fall combined with an increased fracture risk). Our advice would therefore be to refer consistently in the document to fall risk assessment in people with a fracture (as a result of a fall) and osteoporosis, and in this way fit in with the NVKG 2017 guideline in terms of terminology. Currently various terms are used interchangeably, with the resulting risk particularly that fall risk estimation and fall risk assessment will be used interchangeably, whereas these are different activities.

The terms are in fact mistakenly used interchangeably. We shall replace the terms fall risk analysis and fall risk inventory with "fall risk estimation and, where necessary, fall risk assessment". In addition, the description and the improvement action can be more specific with regard to diagnosis concerning falls.

We propose that a fall risk estimation should be carried out for all people aged 50 and over with a fracture, to examine whether there is an increased fall risk. Such an estimation can be found in the Fall Risk Test (part of the Fall Analysis) of VeiligheidNL ("Have you fallen more than once in the last 12 months"; "do you have difficulty moving, walking or keeping your balance").^[151] If the answer to these two questions is 'no', there is no need to do an assessment of the risk factors for falling. People with an increased fall risk are eligible for the fall risk assessment.

We have amended the introductory words in section 2.3as follows: "It is important, therefore, that after the first fracture an estimate is made of whether the risk of a second fall is increased, by asking about how often someone has fallen and whether they have difficulty moving, walking or keeping their balance (fall risk estimation). If a patient has an increased risk of falling, a fall risk assessment must be carried out."^[1] This involves questions regarding, among other things, mobility, dizziness, fear of falling, vision, footwear and use of medicines."

The improvement action is also amended: "Do a fall risk estimation during the first consultation with the fracture patient 50+. Then, in people with an increased risk of falling, carry out a fall risk assessment."

KNMP

The answer to the question "Are you satisfied with the proposed improvements to the osteoporosis pathway and with the improvement actions?" is: no, not yet! The impact on the pharmacist is missing from the impact analysis.

Fall risk estimation and fall prevention. It states on page 22 that the fall risk consists of a combination of factors (multifactorial). There are 13 factors in all, of which medication is one. If a fall risk inventory (or estimation or analysis) is carried out, the pharmacist has to be involved: is the patient taking medicines which increase the risk of falling? Are there alternatives?

Regarding the use of vitamin D and calcium: removing it from reimbursement is a barrier to use.

Proposed amendments

1. On page 36 in 3.5, first paragraph, replace medical specialist with doctor or pharmacist: "...or to a doctor or pharmacist to have the medication adjusted."

We have made this amendment in the report.

2. In the improvement action 5.1.3 (fall risk inventory, page 48) and 5.1.5 (personal advice, page 49), add the KNMP

We have added the KNMP as an interested party in both improvement actions.

Monitoring of medication with glucocorticoids (3.2)

On page 26 (3.2. give bone-sparing medication to more patients who are taking glucocorticosteroids) reference is made only to starting bone-sparing medication after starting a particular dose of glucocorticosteroid + time period. It is wise, certainly in the context of appropriate care, to describe what action must be taken regarding bone-sparing medication when those glucocorticosteroids are discontinued. On page 29/30 there is reference to the MFBs and reimbursement for them. Zilveren Kruis intends to change reimbursement as from 2021. Therefore, the wording must be adjusted.

Footnote on page 30 and the improvement action 5.1.6 (electronic pop-up): the basis for monitoring medication (for general practitioners, pharmacists and hospitals) is the G-Standaard from Z-Index (or information from SHB/Pharmacom). The KNMP Medicines Information Centre is responsible for developing and maintaining monitoring of medication in G-Standaard and for the information in the Informatarium Medicamentorum (IM). The IM contains information on when to start bone-sparing medication with regard to the use of glucocorticosteroids. MFBs have already been developed which draw attention to bone-sparing medications with glucocorticoids. These MFBs are also available for the various electronic prescription systems (as a result of which separate pop-ups are not necessary or desirable), but are not yet available in most software systems. Therefore, Z-Index and the KNMP should also be mentioned among the interested parties (5.1.6).

Proposed amendments

3. Include something in actions about discontinuing bone-sparing medication when indication lapses (glucocorticoid is discontinued)
How to deal with bone-sparing medication after discontinuation of glucocorticoids was not part of the analyses in this project. Therefore, we are not able to draw up any improvement actions regarding this.

4. On pages 29/30 amend the wording on reimbursement.

We have seen that Zilveren Kruis is in fact intending to stop the quality module 'Healthcare Providers (MFBs)'. Therefore, we have amended the relevant sentence as follows: "Some health insurers pay pharmacists who use the MFBs an additional fee on top of the standard price of prescriptions."

5. In interested parties 5.1.6 (Reminder in HIS and ZIS [GP and hospital information systems]) add Z-Index and the KNMP.

We have added the KNMP as an interested party in 5.1.7 reminder in ZIS and HIS. Because Z-Index was not a stakeholder in the ZZ In-depth analysis phase, we shall not mention it here. We may, however, involve Z-Index in the implementation phase, in consultation with KNMP.

6. Adherence Figure 3.5 (page 32): In principle, when bisphosphonates are prescribed for 5 years, the percentage of people who use bisphosphonates declines from 70% in year 1, 50% in year 3 to just 26% in year 5. The target (5.1.7) is therefore high!

The target is indeed ambitious. We expect that adherence will rise gradually. This calls for a joint effort by patients, pharmacists and healthcare professionals.

Page 33: the professional standard and the guideline for consultations can be mentioned here. MeMo is not the only intervention!

Page 34: halfway through first paragraph: "Pharmacists can also play a role in improving adherence."

No, pharmacists play a role (currently very informally documented)!

Improvement action 5.1.7 (pages 51/52): Encourage adherence: is this target realistic? These figures currently 70% after the first year and 50% after the third year (figure 3.5)! Target 85% and 70% respectively in 2025 is therefore very high! There is no comment on standard point of contact at the start of medication by the pharmacist. Get in touch when bone-sparing medication is not collected: GPs and pharmacists must agree together who does what to monitor and promote adherence. This applies not only to bone-sparing medication, but also to all uncollected medication.

A separate protocol will not be drawn up. There is also duplication with the improvement action. "Establish agreements as to who gets in touch ...". Combine these 2 actions! A regional consultation held at least once a year on adherence to bone-sparing medication is not feasible: a number of consultations are held annually, but there are many more subjects to discuss!

5.1.8. GIP data are about 2 years behind. Monitoring with these figures means lagging behind.

Proposed amendments

7. Amend the wording on page 33: "Incorporating this health care into the pharmacy processes – as laid down in the Professionele Standaard Farmaceutische Zorg [Professional Standard for Pharmaceutical Care] - is therefore essential according to the KNMP [Royal Dutch Pharmacists Association 2019c]. Part of the Professional Standard is the (draft) Richtlijn Consultvoering [Guideline for Consultations]. Consultations by pharmacists can help to improve adherence. <https://www.knmp.nl/praktijkvoering/richtlijnen/knmp-richtlijnen-farmaceuti-schezorg/consultvoering-1/consultvoering>

An example of a personalised, continuous and structured approach is the MeMo programme (Medication Monitoring and Optimisation). This 2015]. Another good example of a proven effective intervention is Telephone Counselling Intervention (TelCIP) <https://interventienet.nl/umbraco/Surface/Interventions/RenderIntervention/113>."

The wording is amended as follows: "Incorporating this health care in the pharmacy processes – as laid down in the Professionele Standaard Farmaceutische Zorg [Professional Standard for Pharmaceutical Care] - is therefore essential according to the KNMP.^[89,90] Part of the Professional Standard is the (draft) Richtlijn Consultvoering [Guideline for Consultations].^[91] Consultations by pharmacists can help to improve adherence. An example of a personalised, continuous and structured approach is the MeMo programme (Medication Monitoring and Optimisation). This (...) 2015. Another example of a proven effective intervention is Telephone Counselling Intervention (TelCIP)."^[94]

8. On page 34: Amend the wording in: Pharmacists play a role in improving adherence.

The sentence: "The pharmacy also plays a role in improving adherence" is amended as proposed.

9. Improvement action 5.1.7: - amend target for percentage adherence. - insert: "Ensure standard point of contact (physical, by telephone or e-consultation) at the start of medication by pharmacist" (product: KNMP Guideline on Consultations; interested party/ coordinator: KNMP).

A standard point of contact at start of medication is indeed important. This form of care is not examined because we were given no indications by interested osteoporosis experts that this care is not provided. Therefore, we have not included an improvement action for it.

10. Combine improvement actions regarding getting in touch into 1 improvement action and do not develop separate protocols or agreements.

The improvement actions "Contact the patient if bone-sparing medication is not collected" and "Lay down arrangements as to who should get in touch, and when, with (persistently) non-adhering users of bone-sparing medication" are combined as follows: "Establish arrangements as to who should contact, and when, (persistently) non-adherent users of bone-sparing medication and comply with those arrangements."

11. Amend: "Adherence to bone-sparing medication is incorporated, as required, in the consultation between GPs and pharmacists"

The improvement action "At least once a year, hold a regional consultation with general practitioners and pharmacists in which adherence to bone-sparing medication by patients is evaluated and solutions are sought for suboptimal adherence" has been amended as follows: "Put the subject of 'adherence to bone-sparing medication' on the agenda at the regional consultation between general practitioners and pharmacists."

12. Improvement action 5.1.8: - Use GIP data? Or alternative.

In fact there is a delay of six to nine months before the data become available in the GIP. Since we have used these data for the zero measurement, we shall also use these for the follow-up measurements.

Patient information

KNMP provides full and accurate information at apotheek.nl regarding drugs (and indication texts in cooperation with NHG). As already stated, we shall not refer to the website of the osteoporosis association. Apotheek.nl only refers to other websites when this is logical because of the context and offers added value for the patient.

Proposed amendments:

13. Split improvement action 5.1.9:

- Ensure complete and accurate information on websites regarding diagnosis, fall prevention, lifestyle, medicines, check-up and aftercare (you can leave the reference to the KNMP here).
- On the website provide a reference to the Osteoporose Vereniging website (do not refer to the KNMP here).

We believe that a reference to the Osteoporose Vereniging website is logical because of the context and offers added value for the patient. Nevertheless, the improvement actions have been split as indicated.

Fracture prevention pathway

14. A question about figure 5.1: why is primary care not involved until >9 months after the fracture?

In practice, the general practitioner and pharmacist are already concerned with this patient at an earlier

In the model proposed by us, with which NHG agrees, the general practitioner is not involved until a few months after the diagnosis. On the other hand, the pharmacy is in fact involved earlier, namely from the first prescription for medicines. This was insufficiently clear in the model presented. We have therefore amended the model. In doing so, we have highlighted the pharmacy and removed the stated time of nine months.

Impact analysis

On page 58/59, section 5.3.6 deals with the costs resulting from treatment of osteoporosis. This section sets out the costs for the increase in use of medication and additional GP consultations. However, more treatment makes some demands on the pharmacy: more patients (more starters, more stayers) and more medication means more medication monitoring, supervision (including adherence alerts and supervision) and pharmaceutical consultations, but also more consultation and cooperation. Thus, more work in pharmacies. This also has to be included in the costs.

Proposed amendments:

15. In 5.3.6 point out also the impact on pharmacies.

The impact on pharmacies was not part of the impact analysis. Pharmacies receive a fee for every prescription for medicines. This includes contact with the doctor, provision of information for the patient and monitoring of medication.^[15] The amount depends on the agreements with health insurers. Under the 'Guideline for the performance of economic evaluations' the amounts for first and repeat prescriptions are 12 and 6 euros respectively.^[16] The following is added to section 5.3.6: "In pharmacies the greater number of starters and the rise in adherence will also lead to more prescriptions with corresponding monitoring and supervision of medication. 12 euros is calculated for a first prescription and 6 euros for a repeat prescription. The total additional costs for pharmacies amount to 2.3 million euros." The last sentence is amended: "The total additional costs for medication, pharmacy and GP check-ups which will be incurred after full implementation of the improvement actions are 9.4 million euros a year."

NHG

Broadly speaking, the report provides a thorough analysis of the issues. However, that does not mean that we do not want to make any comments.

1. Almost all possibilities for improvement outlined in the report are based on the observation of differences between current guidelines and actual practice. The report does not raise any significant questions about the guidelines themselves. An important defect in these guidelines concerns the absence of a clear picture of the health gains which the patient can expect from the proposed policy: how much lower will his or her chance of fractures be in the short but also longer term? How many people have to take medication for a fracture to be prevented in one of them? Only in this way can a patient assess whether taking medication for a considerable time to prevent fractures is worthwhile for him or her.

The lack of a clear view of the expected health gains is particularly problematic for relatively younger people (roughly up to the age of 60). It is difficult to see how taking a bisphosphonate for 5 years without a clear follow-up policy for them will lead to a substantial reduction in the chance of the much feared hip fracture at a (very) advanced age, and one may even wonder whether the policy currently outlined in the guidelines, with little attention to the question of the way forward after more than 5 years, provides any significant health gains for this group.

The lack of a clear view of health gains, in terms of extent and numbers, is not particularly motivating for patients or for treating doctors and seems to us to be a major explanation for the low take-up of bone density measurements and poor adherence and also for why there is so little systematic attention to detection of osteoporosis in A&E departments in hospitals.

There are plenty of studies in literature regarding the health gains in the first years after a fracture. These studies are cited in the guidelines, with reduction in the risk of a new fracture being mentioned specifically. Nevertheless, better communication of the risk to doctors may possibly improve willingness to request a DEXA scan and to monitor the patient for a longer time. The new multidisciplinary guideline is expected to include recommendations for the policy in the longer term. As the NHG standard follows them, we expect greater clarity on this subject in it.

Risk communication to patients is also important for encouraging them to have a DEXA scan and to start and persist with medication. A clear explanation by the healthcare professional of the benefits of detection and treatment is required for this. In this room for improvement report we have agreed to alert patients at an early stage to the importance of a diagnosis of osteoporosis in A&E. The discussion about treatment of osteoporosis concerns not only medication, but also the benefits of a healthy lifestyle and the prevention of falls. A decision aid could help patients in understanding the quantitative information about their chance of benefiting. One of the improvement actions is to adapt the Patient+ keuzehulp (decision aid) to the new guideline and make it more accessible. The decision aid has been developed together with patients and gives a great deal of comprehensible information, including with regard to the option of 'doing nothing'. In the implementation phase the parties could explore whether it is possible to develop a risk communication tool (app) to facilitate the discussion of personal risk.

2. As you are aware, the multidisciplinary guideline on fracture reduction and osteoporosis is currently being revised and the NHG standard will shortly follow. The new versions may perhaps remedy this problem, but it could be that it will lead to modifications in the policy, for example by focussing on higher age groups. In our opinion, it is at any rate right to take into account possible modifications in the guidelines.

The chair of the guidelines working group has been a stakeholder in this ZinnigeZorg project from the beginning. As a result we have an insight into the subjects where possible changes will be made. As a general point, we have added the following observation in the improvement actions "The wording of improvement actions is based on the current guidelines. If these are amended, we shall reformulate the improvement actions in accordance with the applicable guidelines."

3. Accordingly, the report devotes relatively little attention to the patient's opinion. It does not seem hypothetical to us that, even after detailed explanations, many patients cannot be motivated to take medication on a long-term basis for the indication of osteoporosis and are satisfied with recovery from their fracture. Perhaps it will first be necessary to work on developing a new decision aid for patients with quantitative information on the chance of benefiting, providing a basis for them to make a reasoned decision as to whether or not to embark on the care pathway of bone density measurement and possible medication. If the people treated are mainly well informed and motivated, it will presumably be possible to prevent large groups discontinuing again after a short time. A decision aid can indeed provide good support for the patient. See our response to comment 1.

4. Regarding the improvement actions. A substantial number of these have our approval, including those relating to clarification of the care pathways and amendment of the guidelines. For example, in our opinion it is appropriate to make it clear that the issues should be addressed and a bone density measurement and VFA should be offered to people in the A&E department and in secondary care.

We are pleased that NHG endorses most improvement actions and backs our recommendation to initiate the DEXA scan and VFA in secondary care.

5. As regards the actions relating to carrying out bone density measurements more often, we wonder whether in fact 75% of the people concerned will prove to be interested after an explanation, perhaps this needs closer investigation. The same applies to VFAs targeted at vertebral fractures.

We have agreed on this percentage with parties since the quality indicators show that this should be realistic and achievable. About one tenth of hospitals already carry out a DEXA scan in 70% or more of patients (see fig. 2.1). In addition, we expect that, if a DEXA scan is planned immediately after the fracture, as a standard component of care, more patients will undergo a DEXA scan. The most obvious place to request the DEXA scan and to initiate the care pathway is the accident and emergency department.

6. Most reservations we have regarding the actions concern persistence with treatment with bone-sparing medicines, where the general practitioner is assigned a kind of watchdog role. Getting in touch when medicines are not collected, regular check-ups (what has to be checked) and annual consultations between GPs and pharmacists require considerably more effort by GP practices. In principle, a large proportion of these activities can be undertaken by nurse practitioners, but that still requires the necessary training, the setting up of a care programme or care procedures with, among other things, a system for monitoring whether or not this type of medication is collected on time and attendance at check-ups and a scheme for adequate financing of these activities. It certainly cannot be the case that general practitioners simply take on these tasks. We understood that these observations had been repeatedly brought to your attention, but so far without much result. We would recommend that you should first reach agreement with the LHV [Dutch General Practitioners Association], before making it appear that actions have been agreed in this respect. It might perhaps be an idea to add an improvement action on organising appropriate framework conditions to the list of actions.

When formulating this improvement action, we took the current NHG standard as our starting point. That sets out the frequency and content of the periodic check-ups.

If additional patients are identified in the future, that will mean extra work for general practitioners. We understand that capacity is limited. We propose further discussion in the implementation phase, including with the LHV and ZN, as to how the role of the GP or nurse practitioner in the care of osteoporosis patients can be developed and what is required for this.

As regards the annual consultations: based on the comments by the NHG and the KNMP we have amended the improvement action "At least once a year, hold a regional consultation with general practitioners and pharmacists in which adherence to bone-sparing medication by patients is evaluated and solutions are sought for suboptimal adherence" to "Put the subject of 'adherence to bone-sparing medication' on the agenda at the regional consultation between general practitioners and pharmacists."

These are our observations so far. We hope that they can contribute to further improvement of this room for improvement report.

NIV/NVE

General observations: In 2017 the subject of osteoporosis was nominated by the NVE network BoNe for the 'appropriate care' programme in the ICD-10 field of endocrine, nutritional and metabolic diseases. Following the exploratory study in the screening phase, the subject of osteoporosis was selected for the in-depth analysis phase as it was shown that there is evidence from data and literature that diagnosis and treatment with medication do not seem to be successful for some patients. The draft room-for-improvement report confirms that osteoporosis care in the Netherlands is inadequate. This is demonstrated specifically with regard to diagnosis and treatment of patients over the age of 50 with a recent fracture, and patients who are being treated with glucocorticoids and in relation to adherence.

A large proportion of the improvement actions relate to items recommended with effect from 2011 in the multidisciplinary guideline (such as in 5.1.3, 5.1.4, 5.1.5, 5.1.6). Although it is good to note that a number of things should be improved, the question is whether the current improvement actions will actually lead to improvement in osteoporosis care. Based on the current room-for-improvement report, one might get the impression that healthcare providers are not aware of these recommendations, that attention still needs to be drawn to this and that guidelines should be adapted. However, we believe that, in spite of the clear and good guidelines which we already have, care is not delivered appropriately.

The reason for this is to be found in the organisation and costing structure of osteoporosis care rather than in lack of awareness of the subject among healthcare professionals. In that respect, it is important to note that, in secondary care, the DTC osteoporosis can be registered by surgeons, orthopaedic surgeons, internal medicine doctors, rheumatologists and geriatricians and that DTC prices differ greatly from each other according to specialism and hospital. As a result of this, there is no clear 'stakeholder' in the field of osteoporosis in secondary care and divisions may arise as to which specialism coordinates this care, registers the DTC and what form the content of that care takes. Particularly with regard to the fracture prevention pathway in secondary care, for patients over the age of 50 with a recent fracture, this DTC/funding model does not correspond to the content of the pathway required for appropriate osteoporosis care. In primary care there is often no nurse practitioner or other form of funding for osteoporosis care, apart from a few (often temporary) regional project funding packages. This means that general practitioners are not sufficiently able to provide the appropriate structure for long-term care for the large group of patients being treated with anti-osteoporosis medication, and as a result there is no motivation to do so.

Establishing a primary care structure in relation to fracture prevention as an integrated care pathway including funding of nurse practitioners could substantially improve implementation of the guideline and, as a result, the quality of care. In our opinion, this room for improvement report does not pay sufficient attention to the fact that the way in which osteoporosis care is currently financed in primary and secondary care contributes to the inadequate delivery of that care. We ask ZIN to address these aspects more explicitly in the report. We refer to our replies to the following questions for additional observations and suggestions.

In each case, please answer the following questions:

1. Are you satisfied with the proposed improvements to the osteoporosis care pathway?
2. Are you satisfied with improvement actions which have been agreed with your organisation?
3. Are you satisfied with the impact analysis; are the assumptions valid and/or are there still omissions?

1. Observations regarding questions 1 and 2: The items where improvement is desirable are correctly formulated. The way in which improvement could be achieved contributes little in a number of cases. In 5.1.2 to 5.1.7 inclusive, the guidelines, indicators and protocols are referred to as product. However, the majority of these improvement actions have already been recommended in the current guideline, which has been in existence since 2011. In many hospitals local protocols have already been drawn up and EPD amendments are available, and there has been a quality indicator set for osteoporosis since 2012 (to which the draft report refers). Of course, there are still gains to be made by an update of the guidelines, of local protocols and the fine-tuning or adjustment of quality indicators, but the question is whether care will fundamentally improve as a result. It is clear that the current guidelines and protocols are not being followed.

The purpose of the in-depth analysis phase was to examine whether the care provided is in line with the guidelines. The study results indicate that in many hospitals that is not yet the case. The improvement actions are therefore partly a repeat of the recommendations in the guidelines. Possible specific solutions are mentioned for some subjects (such as a pop-up in the EPD to make it easier to request a DEXA scan), precisely to facilitate implementation.

Initiating actual change in practice must happen in the implementation phase. Coordinators will have to draw up an action plan for this. An inventory will have to be drawn up of limiting and facilitating factors for each improvement action, and any necessary additional players (such as software developers, executive boards, NZa) can be involved. In addition, best practices can be shared. The implementation plans of the new guidelines to be published will also offer tools for implementing the improvement actions. We shall discuss and measure progress periodically.

2. As regards the improvement actions in the fracture prevention pathway described in 5.2: In the proposed model the specialist nurse/physician assistant/ nurse has a central role in the process. Although that is a good starting point in organisational terms, it is not explained how this should be developed in practice. Currently, 50% of hospitals do not have a specialist nurse/physician assistant working in this care pathway. A nurse (not specialist nurse/physician assistant) cannot carry out the tasks defined in figure 5.1 independently. That means that the proposed model is not practicable in a large proportion of hospitals in the Netherlands. The role of the medical specialist is not developed in more detail. Also, it is not clear how the fracture prevention care pathway would have to be structured financially in the current DTC system, with a fracture prevention team consisting of surgical and diagnostic specialists. For detailed explanation and suggestions for additional improvement actions, see answer to question 3.

With this room for improvement report we are calling on hospitals to be aware of the importance of a specialist nurse. We appreciate that one is not available in every hospital. For the time being, the diagnostic doctor has a more prominent role in the fracture prevention pathway in hospitals. The last paragraph of section 3.1 ("To prevent new fractures, it is important for more over-50s to be treated with bone-sparing medication after a fracture. Carrying out bone density measurements can contribute to this, likewise a consultation with a specialist nurse, physician assistant or fracture nurse in knowledge of the facts") is supplemented with "under the supervision of medical specialists in the fracture prevention team."

3. Observations regarding question 3: Section 5.3.6.: if the costs for 4,500 people who go on to take another drug after discontinuing denosumab are taken into account, then the costs which are saved because there are fewer fractures should also be included.

That is a good point. However, as there are as yet no clear figures available in the literature regarding the actual number of fractures to be prevented, we have not included these in the impact analysis.

4. Section 5.3.7.: The direct costs of DEXA, lab and nurse (PA/SN) are calculated in this section. An important comment here is that no costs are calculated for the additional input of medical specialists. This does not seem right to us. Translation of the direct additional costs into the method used for encoding this in the DTC system is not described. The outlined approach: a significant increase in the number of patients with a recent fracture who will additionally be given a DEXA, lab and outpatient appointment implies that there will have to be additional room for this in hospital budgets. This aspect is not mentioned. As stated in the general observations, this report pays too little attention to the way in which osteoporosis care is financed in secondary care and the possible solutions to this. For this reason the NVE proposed at an earlier stage that the setting up of a Fracture Prevention Pathway (FPP)-DTC as an improvement action should be considered.

This consideration has not been incorporated into the draft report, but we wish to put it forward for consideration again. This could be incorporated as follows into a new FPP-DTC to be set up: A uniform DTC cost price for all hospitals is established for the FPP for patients aged 50 and over with a recent fracture. This DTC includes DXA/VFA/lab as essential procedures, including secretarial time, nurse/SN/PA time and surgical and non-surgical specialists' time for supervision and, in part, for direct patient contact. This FPP-DTC does not include mandatory 'hand-shake' contact with a medical specialist, so that reallocation or delegation of tasks within the FPP can be facilitated and – as a condition for DTC claim – the pathway must have a multidisciplinary structure (in accordance with figure 5.1 page 54 of the draft report).

The FPP-DTC could be operational one-off for a maximum of 90 days, and in this way the diagnostic process is time-limited after a fracture and is separated from a treatment pathway (and thus from the osteoporosis DTC by surgeons, orthopaedic surgeons, internal medicine doctors, rheumatologists and geriatricians). The FPP-DTC price may be lower as a result compared to the current osteoporosis DTC pathways. Following on from this, the DTC pathway for osteoporosis for surgical specialisms could lapse (the osteoporosis DTC for surgical specialisms was developed at the time to facilitate osteoporosis care for patients with a recent fracture). Through registration of the FPP-DTC fracture prevention care in secondary care becomes directly measurable (through linking to the fracture DTC for patients aged > 50 and through the essential procedures within that pathway) both qualitatively and quantitatively. That would mean a substantial improvement compared to the current situation.

The introduction of this model could contribute to a more stable care structure, embedded in the hospital organisation, for patients aged 50 and over with a fracture. Part of the anticipated volume increase could be financed from the cheaper (compared to the current osteoporosis DTC) FPP DTC and the 'internal discussion' within hospitals about who can invoice the DTC of this pathway ceases since all parties and procedures involved are funded from the FPPDTC.

We understand that the introduction of a new DTC is not easy. However, that does not detract from the fact that this option must be given serious consideration. In line with this, we ask the ZIN to give a clearer picture in the room for improvement report of how the proposed improvements could be achieved within the current secondary care funding model.

In an impact analysis the Zorginstituut always looks at the cost price of the procedures and not at the prices of DTCs. ZinnigeZorg makes recommendations concerning the reduction or increase in specific procedures in health care. The associated costs or savings are calculated and compared with the current situation. In addition, no price tag can be put on a DTC: the price differs between hospitals and between specialisms. Calculation using cost prices is a widely used method in economic evaluations of health care.^[145]

Although we aim for a specialist nurse in all hospitals in the future, that is currently not the case. In the hospitals where a (fracture prevention) nurse does the consultation, the medical specialist will also be involved and paid. In the impact analysis (5.3.7) the following has been amended: "The diagnostic examination is followed by a physical consultation. In one half of hospitals that will be a one-hour consultation (including preparation) with a private specialist nurse or physician assistant, and in the other half of hospitals a 45-minute consultation with a fracture prevention nurse combined with a 10-minute consultation with a medical specialist."

The prices applied are explained in table D1 in Annex D.

An FPP-DTC can be a good way of organising care. It promotes cooperation between specialisms, encourages task reallocation, shortens turnaround time and, furthermore, provides a clear overview of fracture prevention care in hospitals. This idea can be explored and developed in the implementation phase, in which the NZa can also be involved. At your suggestion, we have added in the chapter on diagnosis, section on 'raise awareness ...': "Experts say that the costs of scaling up fracture prevention care may be a limiting factor for hospitals. They propose setting up a short-term multidisciplinary fracture prevention DTC with just the essential procedures and focus on reallocation of tasks, which will replace the current DTCs."

5. In addition, establishing a primary care structure in relation to fracture prevention as an integrated care pathway including funding of nurse practitioners is a prerequisite for improving the quality of that care. We ask the ZIN to incorporate this aspect more explicitly in the room for improvement report.

As regards improvement actions concerning funding of primary care: we are going to discuss this further with the NHG and LHV in the implementation phase.

NOV

The NOV has received a draft of the final report (room for improvement report) of the Zinnige Zorg (Appropriate Care) Osteoporosis project from the Zorginstituut (ZIN).

In that the NOV is asked to answer the following questions in each case:

1. Are you satisfied with the proposed improvements to the osteoporosis care pathway?
2. Are you satisfied with improvement actions which have been agreed with your organisation?
3. Are you satisfied with the impact analysis; are the assumptions valid and/or are there still omissions?

Responses can, of course, also be given to the other parts of the report.

1. Role of NOV in the completion of this report: Peter van Roermund, as the agent of the NOV, cooperated on completion of this report. In addition, at the request of the DSS, Paul Willems (MUMC) also provided input for the ZIN. The DSS and the quality commission were asked to provide input for a recommendation to the NOV board. Recommendation: They indicate unanimously that the answer to the aforementioned questions is 'yes'. The input from the NOV has been adopted and is accurately reproduced in the report.

Response of the NOV board: It is made quite clear that the care for osteoporosis in the Netherlands is inadequate. For example, only 25% of fracture patients get a DEXA scan with corresponding low percentages for VFA. This must be improved if prevention is to become more effective. This report shows that more awareness is needed and that work is being done to ensure that in all hospitals in the Netherlands fracture centres come forward with formalised cooperation with an osteoporosis centre for the desired screening and case finding; all this in close cooperation with primary care of course.

We are happy that the NOV is satisfied with the proposed improvements and improvement actions.

2. The DSS has indicated that the clinical multidisciplinary aspect is missing. This is essential with regard to the contribution of direct therapy for people who go to the doctor with actual symptoms (pain, disability) of osteoporosis, namely a fracture. The report devotes too little attention to the treatment of patients with an osteoporotic vertebral fracture, as well as the specific problems of fracture treatment in frail elderly people in general. These concerns were shared by Mr Willems (NOV) at an earlier stage with Ms Iris Groeneveld of the ZIN.

In fact, we have previously been in touch with the Dutch Spine Society (DSS) concerning the treatment of pain with osteoporotic vertebral fractures. We have also shared the concerns expressed in this respect by the DSS with other experts involved in the Zinnige Zorg project. In section 1.1 we have extended the wording "Osteoporosis can also lead to collapsed vertebrae (vertebral fractures), as a result of which patients get more stooped or shorter. Changes in the shape of the spinal column may cause pressure on the internal organs" with the sentence "Osteoporotic vertebral fractures can cause a great deal of pain and invalidity."

The specific treatment advocated by the DSS is not recommended in the current multidisciplinary guideline. We have therefore not studied this and cannot formulate an improvement action in this respect. To determine the place of treatment for pain for osteoporotic vertebral fractures, we have advised the DSS (email of 4 December 2019) to contact the NIV working party dealing with the development of the new multidisciplinary guideline, and to provide new scientific evidence that such treatments can be effective in (a well-defined subgroup of) such patients.

3. Comment: chapter 5.1.5: "Treat more people with a fracture"; this does not concern treatment of the fracture itself, rather bone-sparing medication, to prevent new fractures; a misleading term therefore. The report deals with prevention, not treatment of fractures. Perhaps a better title for the report would be: "Strategies to prevent (new) fractures in people with osteoporosis".

We have changed the heading of 5.1.6 as follows: "5.1.6 Treat more people after a fracture". We have also changed the heading of 3.1 to: "Treat more patients with bone-sparing medication after a fracture".

4. If we want to tackle the problem of osteoporosis in a multidisciplinary way, as was rightly pointed out, there must be more attention among "surgeons" (orthopaedic surgeons, traumatologists) to fracture prevention and screening and appropriate referral for this, but equally among "non-surgeons" (internal medicine doctors, geriatricians, rheumatologists, general practitioners) the focus must be on treatment of pain and discomfort as a result of fractures. The Osteoporosis patients association has serious concerns about the very limited referrals for treatment of pain and disability resulting particularly from osteoporotic vertebral fractures, given the already limited arsenal of treatments that we in the Netherlands make available to our patients. We would like to see this problem mentioned as well and also want the DSS to continue to work constructively on this with other disciplines, the Osteoporosis patients association and interested parties.

See our response to point 2.

NVKG

1. General: This is a comprehensive report in which the summary does not immediately give a clear overview of the improvement actions. We propose that the actions should be shown somewhere on page 1. Both background information and also findings on the subject are presented, although variable in terms of quality of the evidence, with sufficient possible solutions.

The final version of the room for improvement report includes a graph giving an overview of the subjects for which an improvement action has been agreed. For the implementation phase, we shall in due course write out the improvement actions in a more compact form.

2. Method: A study of GP case records has been carried out 2x; however, I want to be careful in my observations regarding the findings as we are directly dependent here on the quality/extent of the recorded input by the GP.

This may therefore lead to an underestimation.

We are aware of the limitations of study based on case records. Therefore, we have presented only a very limited number of results from these studies in this report. Because of the comments on the methodology, these results have not led to improvement actions.

3. Method: The fracture-DEXA measurement relationship is taken from care claims. However, these should be adjusted for diagnosis, and such-and-such fracture. After all, it may be that an individual

1. Has had a DEXA previously,
2. Is already known to have osteoporosis,
3. Does/does not take osteoporosis medication,
4. May have a high impact fracture.

The 2001 multidisciplinary guideline states that all over-50s with a fracture should have a DEXA scan, regardless of the type of fracture. This means: even those who are already known to have osteoporosis, are already taking osteoporosis medication or have already had a DEXA scan (more than a year before the fracture). Thus, all these patients are included in the analysis.

4. Solutions: Would a national campaign be an idea? Or, as known for fall prevention, an annual fall prevention week? Surely cooperation with Veiligheid NL would be an option here?

Good idea; as a result of this, we shall have the implementation phase of this Zinnige Zorg project start during the Fall Prevention Week. In addition, on World Osteoporosis Day (20 October) we shall devote more attention to questions.

5. On page 44 it is called commercial to opt for Patient+ keuzehulp. The position of FMS is for the guideline to indicate whether it is necessary to develop a decision aid, or an existing decision aid is chosen. In this case the initiating WV of the guideline is also responsible for cyclical maintenance (correct update information) of the decision aid! Please draw up this addition, see also the FMS position 'Deciding on decisions aids together' from 2019.

The choice of Patient+ Keuzehulp has been made by the osteoporosis experts who have been involved in this project. This still has to be adapted to the new guideline, which is currently being developed under the direction of the NIV.

6. On page 45 the NVKG should be named as an interested party in the improvement action "Clarify the fracture prevention pathway for people aged 50+ with a fracture, so that it is comprehensible for all interested medical specialists and fracture patients."

We have added the NVKG to the list of associations concerned.

7. The NVKG could be added on page 47 in the improvement action "request a DEXA scan more often" and on page 51 in the improvement actions "encourage adherence" and "routinely provide for contact times 3 months after starting medication".

The NVKG has also been added to the list of interested associations for these improvement actions.

8. The time factor is missing from the improvement plan. Over what period is improvement to be achieved? What are the target standards here?

In the case of improvement actions which are to be monitored quantifiably over time (all improvement actions for which we currently have data; see column 'zero measurement') the targets and corresponding time periods are shown in the last column 'target'.

9. Perhaps the fall clinic could be mentioned as an option for older patients with a high fall risk?

The fall clinic is not mentioned in the osteoporosis guidelines and was not part of this study. Hence, we do not refer to this in the improvement actions or the fracture prevention pathway.

10. See also the attached PDF-document for more input.

10.1 Observation in section 1.1 regarding the wording "Osteoporosis can also lead to collapsed vertebrae (vertebral fractures), as a result of which patients get more stooped or shorter. Changes in the shape of the spinal column may cause pressure on the internal organs.": In particular, osteoporotic vertebral fractures may cause a great deal of pain and invalidity. I cannot find this in the text.

We have expanded the wording with the sentence "Osteoporotic vertebral fractures may cause a great deal of pain and invalidity."

10.2 Observation in section 2.2.3 regarding the wording "The reporting shows that the Genant method was used only for 15% of more than 2,200 patients in the GP case record study for whom a diagnosis of the spinal column was reported.": Vertebral fractures are often seen in an x-ray of the thorax for a different indication, but these do not appear in the radiologist's report. This also leads to underreporting. A recommendation could be made for radiologists to look out for this.

The subject of pointing out vertebral fractures when taking x-rays of the thorax for other indications was raised in our discussions with radiologists. However, it was not part of the analysis, and so we do not have enough reference points for drawing up an improvement action in this respect.

10.3 Observation in section 3.5 regarding the wording "Among general practitioners a lack of time and knowledge may play a role in providing targeted fall prevention advice. However, we do not have any figures to substantiate that such care is in fact standard.": or is this a matter of underreporting? Is this included in the discussion with the patient, but it is not always recorded?

Under-reporting may indeed play a role. In addition, some osteoporosis experts maintain that in practice too little attention is paid to fall prevention. Apart from the case record study, we have not carried out any research on this practice in this project and so cannot draw any conclusions in this respect. However, we have added the following to the second paragraph of 3.5: "Finally, there may be underreporting of follow-up actions in the general practitioners' records."

10.4 Observation in section 5.1.3 regarding improvement action "Request a DEXA scan more often for over-50s with a fracture on arrival at A&E or in the plaster room": DEXA scan with VFA.

The link between DEXA scan and VFA is mentioned separately in 5.1.4 in the improvement actions regarding diagnosis of vertebral fractures.

10.5 Observation in section 5.1.3 regarding improvement action "Add a quality indicator: % fracture patients for whom DEXA scan is requested (as addition to % of fracture patients who have undergone a DEXA scan)": this is a process indicator, we are reluctantly in agreement here. Outcome indicator of new fracture after first fracture and proven osteoporosis would be better (but more complex).

Outcome indicators are in fact preferable. We might possibly be able to formulate outcome indicators for the fracture prevention care pathway in the future. However, because of the problems concerning the diagnosis of osteoporosis, the proposed process indicator seems more applicable to us as present.

Response to specific questions to the NVKG:

1. Are you satisfied with the proposed improvements to the osteoporosis care pathway? Yes, the NVKG is satisfied with them.
2. Are you satisfied with improvement actions which have been agreed with your organisation? Yes, the NVKG is satisfied with them.
3. Are you satisfied with the impact analysis; are the assumptions valid and/or are there still omissions? Yes, the NVKG is satisfied with them.

NVNG

The suggestion as to who should/should not benefit from a DEXA examination to assess existing osteoporosis on the basis of the location of a fracture prior to this is supported by means of the accompanying article.^[153]

On the whole an excellent and practical piece. Very useful for departments and clear in communicating to executive boards. I would like to make 2 points:

1. The piece finds a wide spread between hospitals in respect of procedures (fig. 2.1): This picture will largely be related to the organisation of care and recording method and is nuanced in the accompanying text. Under the heading Clarify which patients qualify or do not qualify for a DEXA scan, it states: "Hospitals say that, for example, they do not call for a DEXA scan patients with hip, hand, foot and facial fractures, people with (many) comorbidities), patients with limited life expectancy, patients who (are going to) live in a residential home, patients who are not able to get to the osteoporosis clinic because of somatic or psychological problems and patients who are already being treated by an internal medicine doctor or a rheumatologist". Perhaps this can be put in a more practical format:

a. For example, skull fractures and finger, toe, scaphoid and triquetral fractures do not require a DEXA given the small chance of underlying osteoporosis. This could be made more explicit. In addition, they must be removed from the indicator.

b. Also, it could be codified when it is a rational decision not to carry out a DEXA examination.

Both points could make the quality indicator more reliable.

It is for the people drafting guidelines to indicate inclusion and exclusion criteria for the DEXA scan. In this respect, see the following improvement action in section 5.1.2: "Make the inclusion/exclusion criteria for diagnosis as regards fracture type clear in the NIV and NWH guidelines". On this basis, the parties involved in developing quality indicators for specialist medical care can amend the quality indicators for osteoporosis.

2. The article advocates more use of DEXA measurements. "Diagnosis: in current practice osteoporosis is often not diagnosed (promptly)." "By tripling the number of DEXA scans (from 25% to 75%) we expect that three times as many people will be treated as a result of a DEXA scan". This requires enormous scaling up. Hospitals may have to purchase a second DEXA or establish longer operating hours, recruit additional staff, etc. I would like to see this included in wording addressed to executive boards.

See comments by the NVZ and our response.

NVR

We have read the report, and our criticisms/ observations fall into three parts. In addition, there are a number of suggestions regarding wording.

1. The analysis of the problem, chapters 1 to 4 inclusive. There is much appreciation for the thorough analysis of the problem: in this respect, a number of core problems emerge clearly:

- Underdiagnosis of osteoporosis: only 26% of people in the Netherlands over the age of 50 have a DEXA scan after a fracture, whereas reduced bone density is found in 40% of over-50s with a fracture who are given a DEXA. (p. 13 and p. 14). Furthermore, it is stated that the number of DEXAs in this category is falling, in an aging population! (p. 15); thus, the growing problem is recognised even less. Screening for osteoporosis does not seem to fall within treatment of the fracture, since it is stated that investigation for osteoporosis is not conducted via A&E, but has to be picked up only at a later stage by mostly non-surgical disciplines (internal medicine doctors, rheumatologists, geriatricians) (p. 15). This is vulnerable to and dependent on diagnosis recording and interdisciplinary cooperation, for which dedicated staff are essential. It is rightly stated that there is an enormous knowledge gap among all healthcare professionals, including hospital management (p. 16): education of all healthcare professionals is essential. Only 27% of individuals aged 50 and over with a fracture undergo a spinal column diagnosis (usually a VFA) (p. 19); in line with this, it is an excellent suggestion for the VFA to have a separate procedure code (p. 20).
- undertreatment of osteoporosis: there is undertreatment of patients who require bone-sparing medication: for example, among patients who are taking glucocorticoids, only 43% were given bone-sparing medication, a (too) low percentage which is, moreover, somewhat distorted by the percentage of bone-sparing medication with rheumatologists: 66%. The new GIOP position from the NVR should be given more attention, although coordination with the new interdisciplinary guideline for fracture prevention, which is currently being developed, is essential. Not only is there undertreatment, even more worrying is the fall in the number of people who take bone-sparing medication after a fracture (p. 25). These are only a few important central points: we appreciate the description of the analysis of the problem, why so few people get a DEXA after a fracture, why adherence is so poor: it is multifactorial, and the analysis is clear and considered.

We are pleased that the NVR appreciates our analysis of the problem.

2) The fracture prevention pathway (diagram): The improvement actions of the care pathway are explained from page 45. A number of improvement actions have been drawn up concerning the use of glucocorticoids and osteoporosis, but these improvement actions are not in accordance with the new position of the NVR (GIOP 2020), or are to be implemented as coordinator. These sticking points are set out below:

2a. The following improvement point is given on p. 48: Request a DEXA for men aged < 70 and premenopausal women who start taking glucocorticoids at a dose of 7.5-15 mg prednisone equivalent per day and who are expected to be using them for longer than 3 months (in accordance with recommendations in the current osteoporosis guideline). Looking at the current recommendation in the NVR GIOP position, this does not correspond. For example, this should be amended to: Treat and carry out an examination (if necessary in accordance with the current guideline) for osteoporosis not only in postmenopausal women but also in premenopausal women and men (aged < 70) who start taking glucocorticoids, where they are expected to be using them for longer than 3 months.

We have based the improvement actions regarding glucocorticoids and osteoporosis on the current multidisciplinary guideline on osteoporosis, since this has been authorised by several parties and was the basis for the analyses in this study. As soon as the new GIOP position is coordinated with the new multidisciplinary guideline being developed, the improvement actions can be adapted where necessary. This can be discussed with the parties in the implementation phase. We have added the following note as a general point in the improvement actions: "The wording of improvement actions is based on the current guidelines. If these are amended, we shall reformulate the improvement actions in accordance with the applicable guidelines."

2b. The following improvement point is given on p. 50: Ensure an electronic reminder about bone-sparing medication where glucocorticoids are prescribed. This seems to be a simple exercise, but the practice is different, as there is too much diversity in the EPDs, with variation in the so-called standard content. This makes the general roll-out of an electronic reminder not so easy and even not readily possible for rheumatology to take responsibility for this.

We are aware that the introduction of an electronic reminder in the different prescribing systems in hospitals is not a simple matter. For the NVR we see their responsibility as mainly to guide the content and to raise awareness within its professional group, so that these healthcare professionals can play a role in their own hospitals. Other parties can be involved for the technical development of EPDs. Further on in its response, the NVR writes about the added value which these intelligent e-health tools can have in the fracture prevention pathway: "From the point of view of rheumatology, there is the desire to have implementation of intelligent ICT tools in the EPD (for example, pop-ups/automatic referral to fracture outpatient clinic, including contact with osteoporosis nurse/convenient creation of fracture lists) to simplify the care process and improve diagnosis." This proposal can be discussed further and developed in the implementation phase. We believe that the improvement action 'Ensure an electronic reminder about bone-sparing medication where glucocorticoids are prescribed' is consistent with this.

2c. A diagram of a fracture prevention pathway is shown on p. 54. Below, some observations on this:

2c1. The diagram shows the surgical specialist as responsible for requesting a laboratory examination. As a result of this, the surgical specialist is also made responsible for interpretation and, where necessary, must initiate treatment. This seems to us to be the work of diagnostic doctors, such as internal medicine endocrinologists, geriatricians and rheumatologists. Another question is whether the surgical specialist is expecting this development.

Requesting and interpreting a laboratory analysis is the task of the fracture prevention team; a multidisciplinary team which includes a diagnostic and a surgical specialist. That fracture prevention team can decide to have the laboratory analysis requested by a diagnostic or a surgical specialist. As with the DEXA scan, the laboratory analysis can be requested in the name of the diagnostic specialist.

2c2. It is not clear who is the primary practitioner; a large part of the process seems possible without a doctor, the fracture nurse or PA seems to have a major role. Is this current pathway implemented entirely without any intervention by a medical specialist? For us, this seems to be unacceptable for various reasons; firstly because osteoporosis care is often customised, in which expertise from an osteoporosis expert combined with the patient's wishes are included in the decision-making regarding treatment. Secondly, (most) nurses currently lack the necessary "holistic" view and knowledge which is often required in the treatment of osteoporosis. There would have to be enormous investment in education here.

The specialist nurse, physician assistant (PA) and fracture nurse are experts in the field of osteoporosis and have had specific training for this. This healthcare provider works in the multidisciplinary fracture prevention team under the direction of a medical specialist. We have clarified the fracture prevention pathway in this respect.

2c3. In addition, it seems that the efficiently operating fracture clinics with internal medicine doctors, geriatricians or rheumatologists specialising in osteoporosis are barely mentioned or not at all; are they disappearing? Are they being thrown away with the bath water? Clearly that is undesirable and unacceptable for the rheumatologists who have been working for many years to provide osteoporosis care in the fracture clinics. In the osteoporosis working group there have been a number of examples from throughout the country in which the traumatologist's lack of knowledge in the field of osteoporosis was one of the reasons for no longer including osteoporosis care under the responsibility of the traumatologist. In addition to this, there are currently not enough or even no osteoporosis nurses or PAs/SNs available from the surgical disciplines.

Thus, this working method is not feasible and will result in care simply deteriorating instead of improving. This is an incorrect solution as a result of an incorrect interpretation. The fact that the surgical disciplines provide no follow-up treatment for fracture patients through osteoporosis screening is not the fault of the specialists in osteoporosis, since they only come into play when the first move has been made by the surgical specialist.

The heart of the care pathway is the multidisciplinary fracture prevention team in which diagnostic and surgical specialists work together and which is responsible for overall fracture prevention secondary care. Hospitals already working in this way can naturally continue to do so. During the implementation phase, efficiently operating fracture clinics can share their experiences and best practices with hospitals which do not yet have a good structure for fracture prevention care.

2c4. One adjustment to the diagram might be to include a reference to fracture (prevention) outpatient clinics where a doctor specialising in osteoporosis (internal medicine doctor/rheumatologist/geriatrician/surgeon) is responsible at local level. This can be surgical but, certainly, also non-surgical, with an important role reserved for a dedicated fracture nurse (fracture nurse/osteoporosis nurse/SN or PA). Only consulting internal medicine doctors/geriatricians/rheumatologists after secondary osteoporosis has been established is too late and will probably lead to more undertreatment, and thus potentially to further fractures.

In the diagram we have clarified the role and tasks of the fracture prevention team. The proposed method corresponds largely to the NVR proposal, because the intention is that patients should be referred from A&E to the fracture prevention team. Only the request for a DEXA/VFA (and, if necessary a lab analysis) takes place directly in A&E. Internal medicine doctors, geriatricians or rheumatologists are consulted only after secondary osteoporosis has been established. A diagnostic specialist does form part of the fracture prevention team. The note concerning referral to an internal medicine doctor/rheumatologist in the third column of the diagram related to continuation of care in secondary care for patients with secondary osteoporosis. To clarify, we have amended the wording in the model here (see also our comments in 2c7).

2c5. In addition, other intelligent e-health tools could have an added value in this diagram. There is the desire on the part of rheumatology for the implementation of intelligent ICT tools in the EPD (for example, pop-ups/automatic referral to fracture outpatient clinic including contact with osteoporosis nurse/convenient creation of fracture lists) to simplify the care process and improve diagnosis. EPD suppliers would have to produce standard content for this so that it could be achieved.

Intelligent ICT tools can certainly have added value. Improvement action 5.1.3.3 states: "Make it easier to request a DEXA scan through an electronic facility in the EPD". We have added the NVR as an interested party. As stated earlier, this proposal can be discussed further and developed in the implementation phase. We believe that the improvement action 'Ensure an electronic reminder about bone-sparing medication where glucocorticoids are prescribed' is consistent with this.

2c6. The follow-up pathway after 3 months, as presented on page 54: We welcome the plan that further check-ups could take place at the GP practice. A consideration is the continuity of care at the GP practice, where sufficient attention could be paid to the importance of the treatment and adherence.

Our focus is on continuity in primary care. We expect adherence to improve with the improvement actions agreed.

2c7. In rheumatology, we believe that secondary care treatment for the more complex patient (long-term treatment, many comorbidities, history of several bone-strengthening drugs and the patient with secondary osteoporosis) must be provided by an osteoporosis expert, such as an internal medicine endocrinologist, geriatrician or rheumatologist.

More complex patients should in fact receive secondary care treatment. In the diagram of the fracture prevention pathway we have therefore changed the wording about referral to: If secondary osteoporosis, or if necessary in connection with choice of pharmacological therapy: continue care by diagnostic medical specialist."

Starting points for improving osteoporosis care

In the most recent national guideline, Osteoporosis and Fracture Prevention (from 2011), a clear decision was made in favour of a 4-stage diagnosis for all over-50s after a fracture, consisting of: - DEXA - VFA – fall risk evaluation – Investigation for secondary osteoporosis. Since then, a new guideline commission has been set up under the direction of Prof. van den Bergh; the first impression is that no major changes are forthcoming in the 4-stage diagnosis for over-50s with a recent fracture. With hindsight, implementation of the 4-stage diagnosis is suboptimal, in spite of an expanded programme, with national and regional lectures, manuals for professionals and for patients (!). Particularly outside the secondary care "non surgical" fracture clinics, introduction of the 4-stage diagnosis has been inadequate in terms of quality; in the secondary care "internal medicine" clinics (under the direction of internal medicine doctors, rheumatologists or geriatricians) the quality is often much better (probably because many specialists and fracture nurses have been well trained, by IWO/Osteoporosele, Werkgroep Osteoporose NVR and Botgroep Endocrinologie, among others), but the amount of training for fracture nurses is inadequate. Insufficiently clear choices in the guideline and corresponding lack of sufficient funding by health costs insurers play a part in this.

2c8. International Developments. The International Osteoporosis Foundation, an association of professionals and patients, has developed Capture the Fracture, see attached figure. This structure of a Fracture Liaison Service corresponds to that of the



secondary-care fracture clinics, with an integrated approach of diagnosis and therapy for the fracture patient. Internationally, there are regional teams, with a surgical specialist, a non-surgical specialist and a general practitioner. It is essential to have a local champion, who directs and coordinates the care; that is usually the internal medicine endocrinologist, but often also a rheumatologist or geriatrician, see attached figure. This criticism is perhaps familiar to the authors of the room for improvement report, such criticism was also made of the previous version. Although the diagram seems to have been adjusted slightly, the problem remains the same: it is not clear who the primary practitioner is, a large part of the process seems possible without a doctor, a major role seems to be reserved for the fracture nurse or PA. As far as we are aware, there is no good international example for this lack of clear direction. It is clear that we favour the international line of the IOF with a local lead from the fracture clinic, usually an internal medicine endocrinologist, geriatrician or rheumatologist. Of course, that

must not be a "local lead" working in isolation, but someone who directs the other parties and in this way encourages interdisciplinary cooperation.

We can agree to this proposal. The fracture prevention team fits in well with the international development of Fracture Liaison Services. The fracture prevention team consists of a combination of diagnostic and surgical specialists with a PA, SN or fracture prevention nurse. The doctor in the A&E department requests the diagnosis and refers patients to the fracture prevention team. After being put on medication, patients go to the general practitioner for check-ups. In primary care GPs and pharmacists work together to improve adherence. If necessary, patients remain in secondary care or they are referred back to it. Locally, it is possible to choose a local champion or appoint a local lead.

3) The improvement actions

In contrast to the high quality of the analysis of the problem of underdiagnosis and undertreatment, we have a critical note to add regarding the improvement actions. Strictly speaking these are not illogical plans in themselves, but in general there is no evidence of efficacy (sometimes there is even evidence of lack of efficacy). There are several reasons for thinking that the plans are not effective. A few examples: - clarify the fracture prevention pathway for people aged 50+ with a fracture, so that it is comprehensible for all interested medical specialisms and fracture patients. A nice sentence, but what action does it lead to? – make recommendations about bone-sparing medication in guidelines for treatment with glucocorticoids: Is that the problem? – telephone patients in case of no-show after DEXA? Sounds logical, what is it expected to deliver? A fine Utrecht study by Kok et al. did not show any effect as a result of intervention by pharmacists among these patients. – Generally: encourage adherence. A very short statement, after an earlier analysis of the problem. – Contact the patient if they do not collect bone-sparing medication. Is it so simple? Is the problem of adherence to be resolved in this way? – Aim for periodic check-ups with the GP: do GPs have the time or interest for this? And: not only general practitioners with an interest in osteoporosis, but all? In short, many suggestions are made, but in general the suggestions are sensible in theory, but in practice have proven problematic over the last 10-20 years. Many ideas prove ineffective in practice. Furthermore, for many suggestions the NVR is not mentioned as an interested/responsible party.

The structural improvement of care for patients with osteoporosis is complex and so we understand the concerns of the NVR. The improvement actions will not be sufficient individually, but we anticipate that, together, they can lead to the desired improvement. We have already been able to formulate some improvement actions in more specific terms than others. It is important that the parties jointly develop the improvement actions in more detail during the implementation phase. If the NVR wants to be involved in more improvement actions, that is of course possible.

4. Observations regarding text

4.1 Title: p. 1: Osteoporosis is not the only risk factor for fractures, and most people with a fracture do not have osteoporosis.

Proposed addition: and people with an increased risk of fractures, as stated at the top of page 24.

For Zinnige Zorg projects, we work on the basis of the care areas as listed in the ICD-10, hence the title Osteoporosis.

4.2 Page 10: description of the disease: this is very DEXA oriented. Proposal: by way of an introduction, state that there are many clinical risk factors, independent of the DEXA result. Indeed, many fractures occur in patients with non-osteoporotic values from the DEXA scan. Furthermore, there should perhaps be an addition to the effect that there is a greatly increased risk of fractures in the initial period after a fracture. Currently this is not stressed enough, but it is clinically relevant.

Here too the description of osteoporosis relates to the fact that we follow the ICD-10. We have added the following sentence to the relevant paragraph: "Particularly in the initial period after a fracture, patients have a greatly increased risk of a new fracture."

4.3 Page 10 under diagnosis: no consideration is given here to other risk factors (medication such as corticosteroids and comorbidity which is a risk for osteoporosis, such as rheumatoid arthritis, diabetes, other endocrine conditions, coeliac disease, etc.). This must be detailed.

We have supplemented the sentences with "Then the patient undergoes a laboratory analysis. This is necessary to identify additional (secondary) causes of bone loss and to adjust the treatment to this.", with: "In addition, other diseases are examined, as is the use of medicines which may increase the risk of a reduction in bone density".

4.4 Page 11 under monitoring and page 12 figure 1.1: the treatment duration for teriparatide is maximum 2 years (and not in any case 5 years as with bisphosphonates).

The treatment duration for teriparatide is in fact a maximum of two years. However, the wording of the introduction and the figure relate to the treatment of the large majority of patients and in it we do not name the specific drugs. Only 1% of people who go on to use bone-sparing medication start with teriparatide; see section 5.3.6.

4.5 Page 13: the wording "Furthermore, however, too few people with an increased risk of fractures as a result of using glucocorticoids are offered a bone density measurement" is not complete, because there are several risk factors for increased fracture risk. This could be amended to: Furthermore, however, too few people with an increased risk of fractures, such as chronic users of glucocorticoids, are offered a bone density measurement.

There are indeed several risk factors for an increased fracture risk. However, these risk factors cannot always be clearly inferred from the claims data. That applies to long-term use of glucocorticoids; we have been able to use GIP data for this and have been able to combine these with DIS data relating to bone density measurements. Thus, our analyses relate only to users of glucocorticoids. Hence, we can draw conclusions only in relation to these patients.

4.6 Overall text: bone-sparing medication is perhaps not entirely correct terminology. An alternative could be bone-strengthening medication.

We have adopted the term bone-sparing medication from the NHG standard.

To summarise

1. The analysis of underdiagnosis and undertreatment is very welcome.
2. Fracture prevention pathway (diagram): The improvement actions of the care pathway are clarified from page 45 onwards. A number of improvement actions have been drawn up concerning glucocorticoid use and osteoporosis; however, these improvement actions are not in accordance with the new position of the NVR (GIOP 2020), or have to be implemented as coordinator. Page 54 shows a diagram of a fracture prevention pathway. It is not clear who the primary practitioner is, a large part of the process seems to be possible without a doctor, a major role seems to be reserved for the fracture nurse or PA. The efficiently operating fracture clinics with internal medicine doctors, geriatricians or rheumatologists specialising in osteoporosis are barely mentioned, if at all, are they disappearing? Among the surgical disciplines there is insufficient knowledge in the field of fracture prevention and currently there are not enough or even no osteoporosis nurses or PAs/SNs. Therefore, this working method is not practicable and will simply result in care deteriorating rather than improving. This is clearly undesirable and unacceptable for rheumatologists, who have been involved in osteoporosis care in the fracture clinics for many years.
3. The improvement actions: in general, these plans are not, in themselves, illogical, but in general there is no evidence of efficacy (sometimes there is even evidence of lack of efficacy). There are enough reasons for thinking that the plans are not desirable or feasible in practice. In short, the problem is not being tackled and strengthened in a structural way; rather logical (makeshift) measures of unproven efficacy are being used.
4. In fact, the thorough analysis is followed by a weakening of the second-care structure as a result of making little/no use of the knowledge and experience of specialists such as internal medicine doctors/endocrinologists, geriatricians, rheumatologists. On the other hand there is an increase in the role of fracture nurses and PAs: this would be very welcome if complementary, but it is another story when it is 'instead of'.
5. The NVR Osteoporosis working group does not believe that osteoporosis care in the Netherlands is strengthened in this way and is concerned about a further decline in the quality of care.
6. PS: Previous correspondence set out a 5-step plan for what optimal care could look like: traumatology, fracture clinic under direction of local lead, GP, primary and secondary care cooperation and setting up of local centres).

NVT

The board of the Nederlandse Vereniging voor Traumachirurgie [Dutch Association for Trauma Surgery] has assessed the draft of the Zinnige Zorg Room for Improvement Report – Osteoporosis and has come up with the following questions and observations. We shall deal with these in the questions asked by you. Are you satisfied with the proposed improvements to the osteoporosis care pathway? The NVT board welcomes the proposed improvements for the osteoporosis care pathway, and we would like to make the following comments:

1. The draft report refers several times to osteoporosis experts without specifying this further. Could you indicate in an annex who the osteoporosis experts were and on behalf of which organisation there were involved in this pathway?

The osteoporosis experts are the stakeholders who sat around the table with us in the in-depth analysis phase: representatives of the NIV, NVT, NOV, NVR, NVvR, NVKG, V&VN, Osteoporose Vereniging, KNMP, NHG and KNGF, as stated in Annex B. In the introduction, the following is added in the piece about osteoporosis: "healthcare professionals who are members of the relevant scientific associations and representatives of the patients association".

2. In table 2.1 "Percentage of patients aged ≥50 with a fracture in 2016, who had or did not have a DEXA scan in the year before or the year after that fracture" it is shown that a DEXA scan was carried out in only 26.3% of patients. What cannot be seen from the table is the number of patients who refused screening, the number of patients who had already been diagnosed with osteoporosis or osteopenia and the number of patients who had already had a DEXA in the preceding 5 years. If you were to include these figures in the table, then the number of patients who qualify for a DEXA is lower and the percentage for underdiagnosed patients will also be different. Could you also include information relating to these patient groups in the report? The same observation applies to figure 3.1.

As regards the 26% who have undergone a DEXA scan: we decided to include all patients with a fracture, in accordance with the 2011 multidisciplinary guideline. People who had already had a DEXA scan more than one year before the fracture and who suffered a new fracture qualify for a new DEXA scan. Studies from 2014-2019 show that approximately half of the patients who are invited do not respond to the notice, as explained in the report.^[22,21,23] These data cannot be deduced from the claims data.

3. Figure 5.1 “Fracture prevention care pathway”, in the top section, left-hand box, states who is responsible for initiating the fracture prevention pathway in A&E. As the (trauma) surgeon out of the surgical specialists requested most DEXA scans and is often the lead in initiating such a fracture prevention pathway, we should like to propose that this should be shown in that figure by amending the wording under the heading “Who” as follows: (trauma or orthopaedic) surgeon/ A&E doctor.

We have included (trauma or orthopaedic) surgeon/A&E doctor under the heading 'who' in the fracture prevention care pathway.

4. Figure 5.1 “Fracture prevention care pathway” in the top section, under the left-hand box under the heading “option”, states who is responsible for initiating the fracture prevention pathway for older patients who are admitted with a hip or pelvic fracture. A large proportion of these patients are treated by the trauma surgeon. Therefore, we propose amending the text in the following way: ... treatment is initiated by the (trauma or orthopaedic) surgeon/ clinical geriatrician.

We have amended the text as proposed: "... treatment is initiated by the (trauma or orthopaedic) surgeon/clinical geriatrician."

5. Are you satisfied with improvement actions which have been agreed with your organisation? The board of the NVT is satisfied with the proposed improvement actions on the understanding that there should perhaps be a more prominent role for the NVT with regard to the coordinating role in the following improvement actions: - 5.1.1.1 - 5.1.2.2 - 5.1.3.2 - 5.1.3.8 - 5.1.5.1-3.

We appreciate that the NVT wants to take the lead in these improvement actions. In 5.1.1.1 "clarify the care pathway" the NIV is named as coordinator because the NIV guideline is listed under 'product'. However, it is a good idea also to clarify the care pathway via media which reach (trauma) surgeons. We shall add the NVT here. We shall also do this in 5.1.2.2 and 5.1.3.2, improvement actions concerning diagnosis. Improvement actions 5.1.3.8-5.1.5.1-3 concern treatment of osteoporosis. As the diagnostic doctor supervises this in most hospitals, we regarded it as more applicable to leave coordination with the NIV on this point. However, the NVT is given as an interested party for this improvement action.

6. Are you satisfied with the impact analysis; are the assumptions valid and/or are there still omissions? The impact analysis seems to give a negative result as this improvement pathway leads to 17.5 million euros in additional costs a year, while the savings for health care as a result of preventing about 1,400 fractures delivers just 13.5 million euros a year. Admittedly it is noted that the improvement actions will lead to a substantial fall in the disease burden, but this is not calculated. We believe that this figure may be substantial, and as a result the balance could be tipped towards a more favourable financial impact. Is it possible to express the fall in the disease burden in euros?

As a healthcare institution, we at the Zorginstituut are reluctant to convert the disease burden prevented into euros, since this is not money which benefits health care or society. Furthermore, there is some debate about the reference value for a QALY. However, if the disease burden prevented as a result of implementing the improvement actions were to be expressed in euros, the balance would be tipped towards a favourable impact: On average, in the first year after a fracture there is a loss of 0.35 quality-adjusted life-years (QALYs) for people aged 50 or older.^{154,155} Hernlund (2013) valued the QALY as twice the gross domestic product (2xGDP) per head of population. In 2010 for the situation in the Netherlands, that amounted to about 70,000 euros.¹⁵⁶ In the Netherlands it is more usual to value a QALY for a mild condition (lost QALYs 0.1-0.4) as 20,000 euros.¹⁴⁵ If 1,400 fractures can be prevented by implementation of the improvement actions in this project, this can deliver (1,400x0.35=) 485 QALYs. If the calculation is based on 70,000 euros/QALY, that involves 34 million euros. If the calculation is based on 20,000 euros/QALY, the saved QALYs would involve 9.7 million euros. We have not included this text in section 5.3 for the aforementioned reasons.

NVvR

The NVvR does not have any additional comments on the report and agrees with the version presented.

We are pleased that the NVvR agrees with this room for improvement report.

NVZ

1. This Zinnige Zorg pathway has involved good work with respect to awareness and the provision of information. It is also assumed that the number of DEXA scans will be tripled as a result of amending information and guidelines, among other things. As a result, the costs amount to about 10 million annually (does this include medication?), the savings are higher at 13.5 million. However, the savings are not always direct savings for the hospital, but social savings.

The stated 10.4 million euros are for diagnosis and hospital consultations, excluding medication. The 13.5 million savings are exclusively care-related; it relates to costs for hospital care, rehabilitation and nursing home care and care at home. In addition to this 13.5 million, there are further savings for society as a result of higher productivity, among other things. The total savings may thus amount to 20 million euros.

2. On p. 45 it is said that, NVZ will draw attention to the fracture prevention pathway in a letter to the Executive Board and Care Sales. In our opinion, this is not the correct route; that should happen via a generic implementation process via the Care Evaluation & Appropriate Use programme. In addition, it is particularly important to communicate to professionals via the scientific associations; they have the communication routes for this.

The Zorginstituut will play a linking and facilitating role in the implementation phase, so that the interested parties can implement the improvement actions. Because it was set up recently, the Care Evaluation and Appropriate Use programme (ZE&GG) is not yet involved in this project. Responsibility for implementation rests with the parties in the field. Their members will have to bring about change in hospitals. We expect NVZ to be able to strengthen this movement by focussing attention on the importance of the improvement actions regarding the care pathway (in fact: compliance with the existing guidelines) among hospital boards. We have retained the improvement action (in a slightly amended form), but we have added to the interested parties: NIV, NOV, NVR and NVT.

3. The NVZ cannot guarantee that hospitals will be rapidly able to carry out so many more DEXA scans. Also, it is important to evaluate whether this might lead to overdiagnosis.

The stated figures are targets. We understand that it is not possible in the short term for hospitals to carry out so many more DEXA scans. We do not expect a rapid increase, but a gradual rise. Each year we shall evaluate what percentage of patients has had a DEXA scan. In this way we can also pick out whether there may possibly be overdiagnosis.

4. On p. 47 there is the recommendation to add a quality indicator. We wish to point out that agreements must be reached nationally on this in the consultations for the Transparency Calendar. The improvement action should say ‘discuss the addition of a quality indicator...’. The NVZ sees added value in an outcome indicator rather than a process indicator.

Our colleagues who are concerned with the transparency calendar have already indicated the possibility of including the proposed quality indicator in the discussion with the interested parties (including the Patiëntenfederatie [Patients Federation]). Outcome indicators are increasingly preferred nowadays. However, because of the problems concerning diagnosis of osteoporosis, the proposed process indicator seems more applicable to us.

5. We notice that there is a focus on better information for (potential) patients; we also think that this is very important. On the other hand, not much is written about diet and exercise, in other words, what can be done preventively (before any fractures) to maintain bone density. Perhaps there is still a chance here.

Diet and exercise are indeed important for maintaining bone density. Therefore, lifestyle advice is part of the treatment, as we describe in chapter 1. There is also an improvement action for this: "Also, give all fracture patients 50+ advice on diet and exercise, and in addition draw attention to the Osteoporose Vereniging for more information, assistance and peer-to-peer support". However, primary prevention of fractures is not concerned here: the improvement report focuses on people aged 50+ with a fracture.

Osteoporose Vereniging

We agree with the content of the document. However, we still have concerns and objections.

1. The improvement report contains few or no points which were not already in the 2011 guideline. How are we to ensure that these will now be followed? The document includes nothing on this. Cash flows to provide motivation and guidance may be part of the solution.

We anticipate that compliance with the guidelines will improve as a result of the improvement actions and the fracture prevention care pathway agreed jointly. In the next phase we shall continue to discuss the progress on implementation with the parties, as described in Annex E.

2. Problem of osteoporosis care in general terms. Lack of urgency, among (most) care providers and also among patients. These are, in part, related. If the care provider is not convinced, then he/she will not transmit this to the patient. The basis of this problem is poor and incomplete information for each individual, meaning that there is no knowledge of the real problem, hence the absence of a feeling of urgency. We know how this should be, but we cannot convey this without an active role on the system.

Increasing knowledge and awareness among both care providers and patients is an important objective of the improvement report. Therefore, we have included use of the Osteoporose Vereniging information set '50+ and a fracture' by every A&E/plaster room in the improvement actions. It is also agreed that care providers will draw patients' attention to the Osteoporose Vereniging for more information, assistance and peer-to-peer support. Finally, there is an action on improving websites with patient information; these will also include a reference to the Osteoporose Vereniging website.

The 3 questions from the document:

1. Are you satisfied with the proposed improvements to the osteoporosis care pathway? Answer: Yes, but how are we going to ensure that it will happen?
2. Are you satisfied with improvement actions which have been agreed with your organisation? Answer: Yes, but we can and want to do much more, provided that....
3. Are you satisfied with the impact analysis; are the assumptions valid and/or are there still omissions? Answer: Yes, confirmation of all signs that we have seen over the last 10 years. It is sad to see that few of the commitments of the 2011 guideline have been achieved.
On to the next steps!

V&VN VS

Here is the response to the consultation questions by Peter van den Berg, representative on behalf of the V&VN VS for this project: "I think that we as specialist nurses (SN) have been able to make our mark prominently and have been able to position nurses and SNs advantageously in the improvement process. On the details I would like to see rather more references to V&VN, but broadly speaking I think that this comprises a good plan in which nurses and SNs come out well." Based on the response by Peter van den Berg, the departmental boards of V&VN VS and V&VN approve the report.

We have added the V&VN as an interested party in nine improvement actions (under 5.1.1, 5.1.3, 5.1.5, 5.1.6 and 5.1.8).

ZN

After consultation, I am able to say that ZN can approve this document.
We are pleased that ZN approves this room for improvement report.

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