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Review Article

Guideline 'Nonspecific Complaints of Arm, Neck and/or Shoulder (CANS)

Harald S Miedema[1,2]* and Anita Feleus[1]

[1]*Research Center Innovations in Care, Rotterdam University of Applied Sciences, Rotterdam, the Netherlands*

[2]*Department of General Practice, Erasmus University Medical Center, Rotterdam, the Netherlands*

***Corresponding Author:** Harald S Miedema, Research Center Innovations in Care, Rotterdam University of Applied Sciences, Rotterdam, the Netherlands.

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Abstract

- Complaints of the arm, neck and/or shoulder (CANS) are an important health problem. In the Netherlands, in any previous year about 33% of all adults reported to have CANS and more than 25% had CANS at the moment of inquiry. In addition, more than 10% of days lost to sickness absence is attributed to CANS.
- End 2012, a multidisciplinary guideline was published with recommendations for the diagnosis, treatment, care, and (work) participation of patients with nonspecific CANS. The purpose of this guideline is to improve the process of care and the multidisciplinary cooperation required, as well as to improve the communication with patients.
- The project started with a revision of the existing CANS model (dating from 2004). During this update, the list of disorders was extended to cover 36 specific diagnostic categories. In addition, a clinical pathway was developed that focuses on optimal timing of diagnostics and treatment, and on the multidisciplinary cooperation.
- The improved diagnostic process means that patients with specific CANS receive faster and better targeted treatment. Also, better understanding of treatment results leads to the choice of more effective treatments for patients with nonspecific CANS, so that more patients receive the most beneficial form of treatment.

Keywords: Guideline; Neck complaints; Shoulder complaints; Upper extremity complaints; Complaints of arm, neck and shoulder (CANS); Non-specific; Diagnosis and treatment

Introduction

Complaints of arm, neck and/or shoulder (CANS) represent a major health problem. In the Netherlands, over one third of adults reported CANS in the previous year and more than a quarter had CANS at the moment of inquiry. In about 25% of these patients the main cause is an acute trauma or systemic disease. More than 10% of days lost to sickness absence is attributed to CANS [1]. The point prevalence of chronic symptoms, i.e., symptoms that persist for more than 3 months, is reported to be 19%. Of these patients, almost 60% reported healthcare use because of CANS in the previous year. In general practice, the incidence of episodes of CANS is estimated at 97 per 1000 registered patients per year [2]. In this group, 77% had complaints in the upper back-neck-shoulder region, 25% in the elbow-forearm region, and 19% in the wrist-hand region. In 42% of these patients the complaints occurred in a combination of these sites.

In the Netherlands, occupational health professionals and staff advisors often used to refer to these complaints as 'repetitive strain injury '(RSI) [3]. However, this term led to confusion because it

suggests an eliciting injury whereas, in most cases, no objectively determined disorder is present. The term also suggests that repetitive load is the causative factor of the injury. Although this may sometimes be true, many times it is not and often a combination of factors can be involved.

End 2004, eleven professional associations of healthcare professionals reached consensus on the terminology and classification of CANS. It was decided to use the term 'CANS' for musculoskeletal complaints of arms, neck and/or shoulders for which there is no underlying acute trauma or systemic disease. This neutral terminology made no statement about possible causes or mechanisms of action. The CANS model was developed based on this consensus. The goal of this model was to establish (whenever possible) a specific diagnosis as quickly as possible.

The CANS model allows to distinguish between 'specific CANS' - the 23 diagnostic categories in the model dating from 2004 - and 'nonspecific CANS'. In general practice, the ratio between specific and nonspecific CANS is estimated at about 3:2. Improved diagnostics may increase the proportion of patients diagnosed with specific CANS, which results in more patients receiving more focused treatment. Moreover, better insight into treatment results leads to the choice for effective treatments in patients with nonspecific CANS; this implies that more patients will receive the most promising form of treatment.

In 2010, the Royal Dutch Society for Physiotherapy (KNGF) published the first guideline for patients with nonspecific CANS. Also, at end 2008, the Royal Dutch Society for Physiotherapy initiated the development of a multidisciplinary guideline for CANS; this was finally authorized in 2012 by the participating professional organizations and is summarized in this article [4]. The rationale for the development of a multidisciplinary guideline was the need for a practical guide to distinguish between patients with specific and nonspecific CANS in order to initiate the best evidence-based treatments, and to optimize the timing of the intervention. In addition, there was a need for better and more timely multidisciplinary collaboration between the various healthcare professionals. Finally, from the patient's perspective, there was a need for better information, better coordination of care with and between the healthcare professionals, and more focused attention on work. The guideline was developed in accordance with the methodology of 'evidence-based guideline development' and is intended for all healthcare and occupational healthcare professionals involved with patients suffering from CANS.

Diagnostics

Because nonspecific CANS is a diagnosis by exclusion, the working group focused on the list of specific diagnostic categories. This led to consensus regarding the need for a review: three diagnostic groups were deleted and 16 diagnostic groups were added. This means that the updated CANS model has a total of 36 diagnostic categories (Table 1).

The guideline categorizes nonspecific CANS as *'work-related or activity-related pain, stiffness, tingling and/or numbness, located at the neck, shoulders, upper back, arms and/or hands and persisting for more than 2 weeks*'. The complaints are not related to a systemic disease or trauma, and specific CANS are excluded as far as possible. Initially, there is a relationship between the symptoms and specific activities or work; however, later on the symptoms can persist without any such relationship. In addition, the complaints can disturb a patient's sleeping pattern. The symptoms generally begin at the dominant side of the body but can also manifest on the contralateral side, but then with a less severe form. A combination of specific and non-specific CANS can also occur.

To determine whether the guideline applies to an individual patient, the healthcare professional must first determine whether there is sufficient compliance with the definition of nonspecific CANS. For this, a previous trauma and/or general and systemic disorder that can cause complaints in the arm, neck and shoulder area, need to be excluded as a possible cause. In the case of a trauma, it is important to realize that residual complaints can persist after a relatively long period of time. The healthcare professional can detect general and systemic disorders based on the so-called 'red flag' symptoms (Table 2).

For the purpose of the diagnosis of specific CANS, an analysis is made of both the physical and diagnostic tests that are included in the Dutch guidelines or are described in systematic reviews on the disorder under investigation. The analysis is limited to the diagnostic categories included in the original CANS model dating from 2004. For the diagnosis of the 16 new diagnostic categories imple-

Specific Disorders of CANS-model If no specific disorder can be diagnosed, the disorder is classified as non-specific	
General disorders	**Disorders of the Elbow region (incl. forearm)**
Congenital disorder in upper extremity *	Bursitis of elbow
Congenital malformation in upper extremity *	Cubital Tunnel syndrome
Local Monarticular Arthritis (non-rheumatoid)	Instability of elbow
in upper extremity joint	Lateral epicondylitis
Local Monarticular Osteoarthritis (Artrosis)	Medial epicondylitis
in upper extremity joint *	Osteochondritis of elbow *
Tumor of bone in upper extremity *	Other compression syndromes of N. Medianus *
Tumor of soft tissue in upper extremity *	Other compression syndromes of N. Radialis *
	Other compression syndromes of N Ulnaris *
	Radial tunnel syndrome
Disorders of the Neck region	**Disorders of the Hand-wrist region**
Cervical Disc Hernia	Avascular Osteonecrosis of hand *
Cervical Facet joint Pain * #	Carpal Tunnel syndrome
Disorders of the Shoulder region (incl. upper arm)	De Quervain's tendinopathy
Biceps tendinopathy	Dupuytren's disease
Frozen shoulder	Guyon canal disease
Instability of shoulder	Hand-Arm-Vibration Syndrome *
Labral lesion of glenoid	Instability of the wrist *
Neuralgic Amyotrophy *	Local Osteoarthritis in hand-joints *
Rotator cuff tear	Other tendinopathies of finger/wrist-extensors *
Subacromial impingement syndrome †	Other tendinopathies of finger/wrist-flexors *
Suprascapular nerve compression	Trigger finger

Table 1: Overview of 36 specific diagnostic categories from the revised CANS model by specific pain region and in general.

source: Guideline 'Nonspecific complaints of arm, neck and/or shoulder' [4].

* New compared to the CANS-model 2004

† includes rotator cuff syndrome and regional tendinopathy or bursitis

Very strict diagnostic criteria.

Possible underlying pathology (ALERT-symptoms)
General malaise
Involuntary weight loss
Unexplained fever
Night sweating
'Non mechanical'-pain (pain that cannot be influenced by posture or movement)
Neuropathic pain
Neurological symptoms (muscle weakness, isolated atrophia, radiculopathy)
Signs of inflammation (swelling, joint pain, limitation of joint movement, redness, warmth)
Malignancy in patient history
Dyspnea, chest pain, exercise induced shoulder or arm pain
Diseases that can be related to ALERT-symptoms
Inflammatory rheumatic disease (e.g., rheumatoid arthritis, ankylosing spondylitis, polymyalgia rheumatica)
Malignancy (e.g., tumor of the pulmonary apex (Pancoast), metastasis, axillary lymphnode pathology)
Coronary or heart disease (e.g., angina pectoris)
Irritation of the thoracic diaphragm (e.g., because of malignancy in liver, gallbladder or lungs)
Thrombosis in upper extremity
Signs of specific diagnoses †
Radicular symptoms (cervical radiculopathy/nerve root pain)
Shoulder pain with reduced range of motion in active as well as passive movements ('frozen shoulder')
Severe shoulder pain with (after some delay) paresis and atrophy of affected arm (neuralgic amyotrophy)
Muscle weakness
Typical neurological symptoms (sensory deficits or muscle weakness)
Local pain combined with swelling and redness
Limitation in flexion (painful) or extension (colliding) of thumb or finger ('trigger finger')
Palmar nodules, especially at 4th or 5th finger, flexion contracture at MCP[1]- or PIP[2]-joint (M. Dupuytren)
Persisting joint pain, increasing with joint loading, age ≥ 45 years, mild morning stiffness and bony thickening, especially at PIP[2]-joints (Bouchard's nodules) or DIP[3]-joints (Heberden's nodules) ('osteoarthritis'/'artrosis')

Table 2: Red-flag symptoms, possibly related diseases and indications for specific diagnostic categories

source: Guideline 'Nonspecific complaints of arm, neck and/or shoulder' [4].

[1] MCP: Metacarpal Phalangeal; [2] PIP: Proximal Interphalangeal; [3] DIP: Distal Interphalangeal

†All 36 specific diagnostic categories are listed in table 1.

mented in the revised CANS model, no recommendations have been made in the guideline.

Regarding the diagnostic value of the physical tests and additional diagnostic testing, only limited scientific evidence is available. In formulating the recommendations, only tests that have been independently investigated in at least two studies are selected. In addition, information is included from recent evidence-based guidelines, from literature reviews, and from a report on complaints of the upper extremity. Also, advice is sought from the various members of the expert working group. Some recommendations are based on consensus within the group, others on a so-called 'case definition' and some recommendations are based on early recognition of a specific condition due to the need for specialist intervention.

Figure 1 presents a list of the recommended physical tests according to the region in which the complaints manifest: a positive test result is indicative of a specific diagnosis. In figure 1, in case of a low level of evidence (level 3-4) the test is printed in italics, whereas tests with a higher level of evidence (level 1-2) are printed in a normal font.

REGION OF COMPLAINTS	PHYSICAL TESTS	DIAGNOSES	OPTIONS FOR ADDITIONAL DIAGNOSTIC INTERVENTIONS
NECK	*Spurling test, neck traction/distraction test, Valsalva manoevre [2], Upper-limb Tension test [1]*	Cervical radiculopathy	MRI (needle EMG, other imaging)
	Relocation test, Anterior release test [2]	Shoulder instability	
		Labral laesion of glenoid	*MRI with arthrography (arthroscopic)*
SHOULDER	*Hawkins-Kennedy test [2,a]; Neer test [2,a]*	Subacromial impingement syndrome	
	Drop arm test [2]	Rotator-cuff tear	Ultrasound, MRI
	Passive range of motion shoulder (exorotation)	Frozen shoulder	
UPPER ARM	*Strength Mm. Supraspinatus and Infraspinatus*	Suprascapular compression	*EMG, MRI*
ELBOW	*Ω dorsal/palmar flexion of the wrist [2]*	Lateral/medial epicondylitis	
	Strength muscles innervated by N. Ulnaris	Cubital tunnel syndrome	
	Ω supination or Ω extension 3d finger	Radial tunnel syndrome	
FOREARM	*Palpation olecranon*	Bursitis around elbow (olecrani)	
	Moving valgus stress test [2]	Medial elbow instability	*MRI with arthrography*

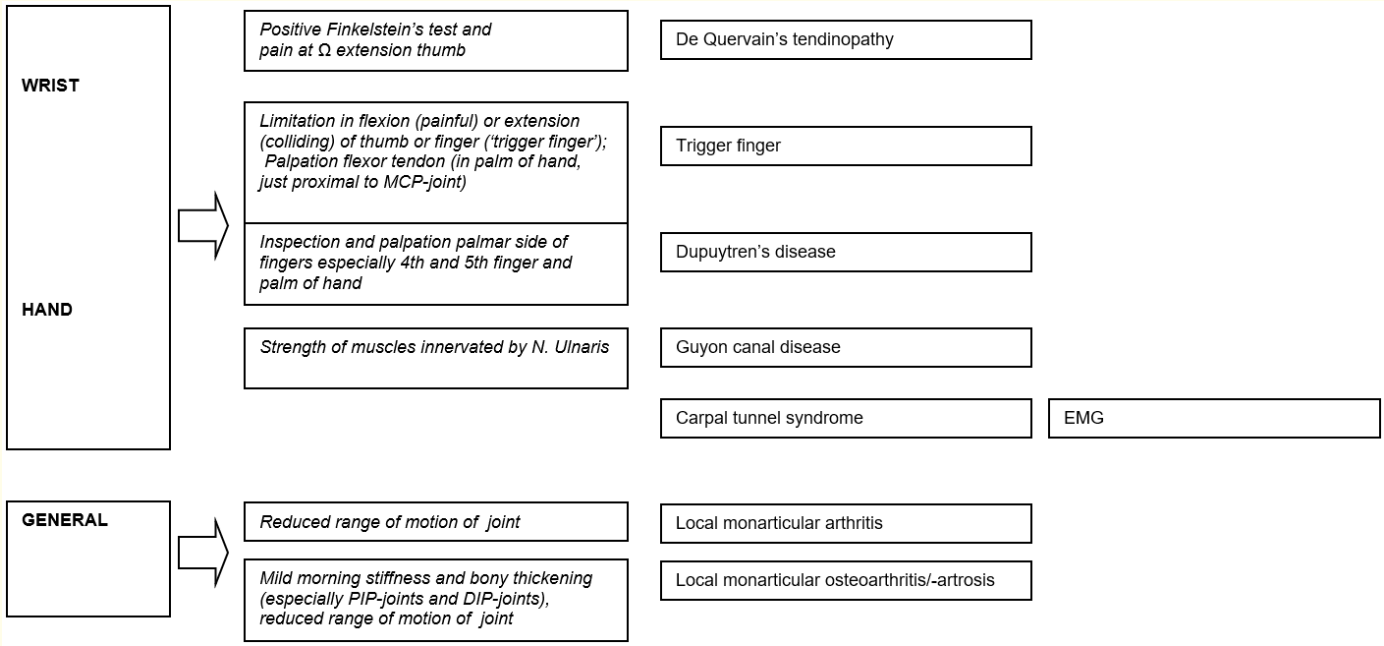

Figure 1: Overview of the recommended physical tests by area of complaints (positive test results provides indication for a specific diagnosis)

source: Guideline 'Nonspecific complaints of arm, neck and/or shoulder' [4].

Normal font typing indicates level 1 or 2 evidence; Italic font typing indicates weak level of evidence (level 3 or 4 and other considerations).

Ω: Movement Against Resistance; MCP: Metacarpophalangeal; PIP: Proximal Interphalangeal; DIP: Distal Interphalangeal

1 Based upon primary care research; 2 Based upon research in referral/specialist setting; a Test positive when typical pain is provoked.

Although many specific diagnoses for CANS cannot be determined or excluded with 100% certainty, this is the aim when using the resources available. However, because of this uncertainty, initially one speaks of a working diagnosis of 'nonspecific CANS'. Over time, this diagnosis can be revised after an additional diagnosis or after consultation with a medical specialist. It is assumed that information from medical history, physical examination and all additional diagnostics are combined.

Clinical pathway and treatment

Once it has been determined that nonspecific CANS is probably the correct diagnosis, a policy is followed as described in the clinical pathway (Figure 2).

The pathway covers the main decision points and the roles of the various healthcare professionals. The intended result is improvement of the coordination, collaboration and information transfer between healthcare providers, and toward the patient. The starting point is demand-driven care, whereby the input from the patient guides the decision-making process and the decisions to be taken, based on mutual agreement.

In the clinical pathway, treatment interventions are identified for which sufficient scientific evidence is available or, failing that, consensus has been reached in the working group about the expected effectiveness of the therapy. The phases in the care process are based on the duration of the symptoms and on regular evaluation of the treatment together with counseling. When a patient

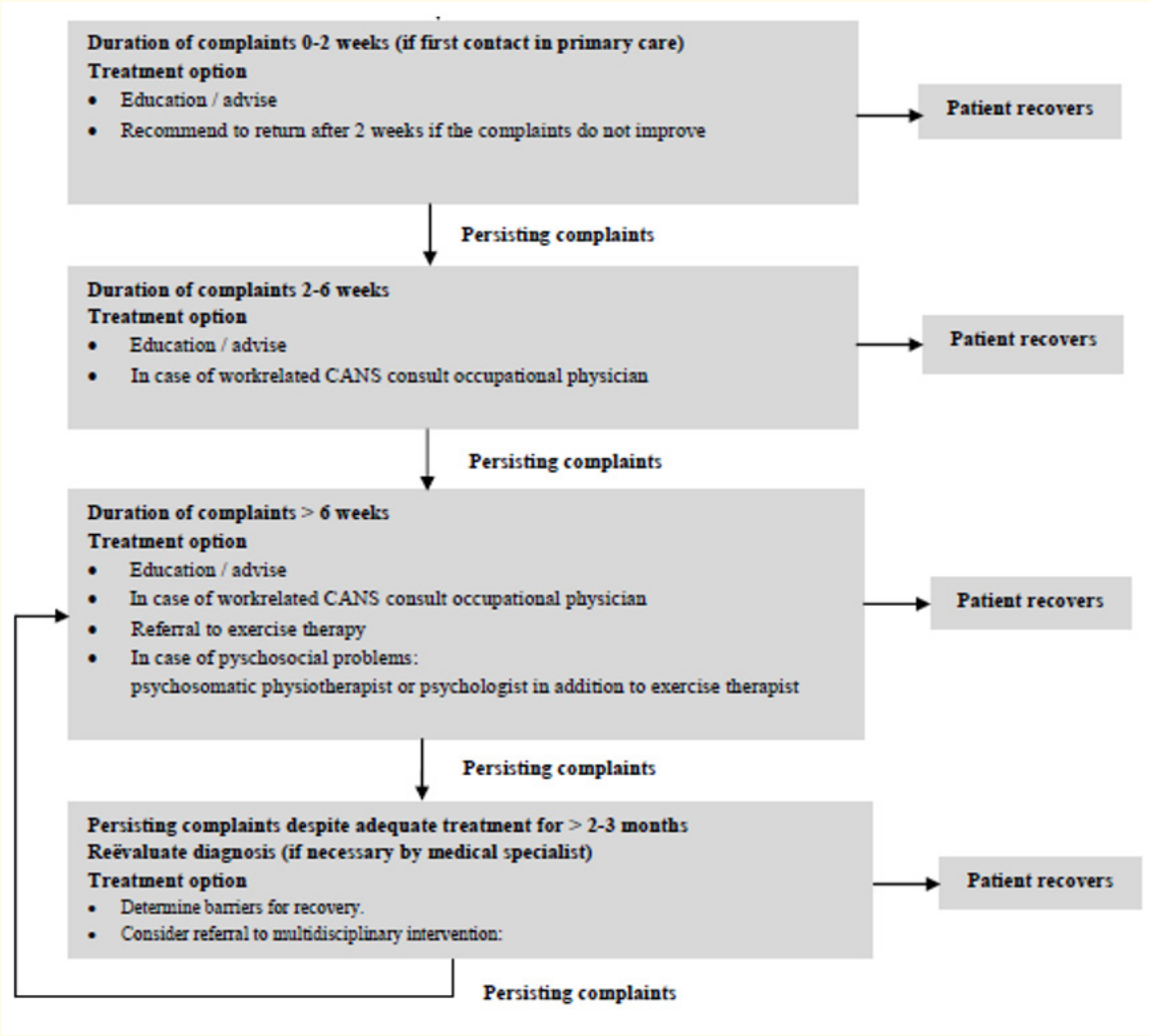

Figure 2: Overview of the treatment according to the clinical pathway for patients with nonspecific CANS.

source: Guideline 'Nonspecific complaints arm, neck and/or shoulder'[4].

seeks help only after the symptoms have persisted for a relatively long time, the care process is applied at a later stage.

In general, patients with CANS initially seek help from a general practitioner, physiotherapist, or exercise therapist. Based on the patient's history and physical examination, when healthcare professionals have established a working diagnosis of nonspecific CANS the patient is screened for factors that might impede their recovery, and for signs of inadequate illness behavior or incorrect perception of the complaints. During the first or second consultation, the caregiver provides information about the course, effective self-care options (including temporary adaptation of activities related to load-bearing) and about the possible presence of causal and prognostic factors.

If a patient is currently employed, the caregiver needs to establish whether the complaints are workrelated. If there is evidence of overload due to the work, the healthcare professional advises to reduce the load and, in case of structural overload, to consult with the supervisor. When overload appears to result from a suboptimal workplace design, the caregiver can ask the patient's employer to start an ergonomics advisory process. To support the recommendations made and the information provided, a patient leaflet is available via the CANS website (only available in Dutch: https://www.rsi-vereniging.nl/images/phocadownload/RichtlijnKANS/Patintenfolder%20aspecifieke%20KANS.pdf)

Duration of complaints: 0-6 weeks

When complaints have persisted for 0-6 weeks, the working group generally recommends (with the exception of the abovementioned advice and information) a period of 'watchful waiting' and natural recovery from the complaints. If the symptoms appear to affect the performance of paid work, the working group recommends consulting the occupational physician. Studies have shown that an ergonomic intervention can reduce both loss of productivity and sickness absence.

Duration of complaints: > 6 weeks

When symptoms persist for longer than 6 weeks, exercise therapy via a physiotherapist or Cesar or Mensendieck therapist, are good evidence-based therapeutic options. There is no consensus regarding which form of exercise is to be preferred. When the symptoms are associated with work, the healthcare professional may be inclined to select a paramedical therapist with complementary skills, such as an occupational physiotherapist or occupational therapist. Similarly, when a history of psychosocial problems has been identified, the choice may be made for a therapist with additional competencies in that field, such as a psychosomatic physiotherapist. At this stage, when the mental factors seem to take precedence, the caregiver may consider referring the patient to a primary care psychologist.

Evaluation and follow-up

As a rule, when symptoms persist for longer than 2-3 weeks after the first consultation, a re-assessment takes place to perform additional diagnostics and to determine factors that might be hampering the recovery process. During a treatment process an evaluation takes place every 4 weeks to assess the patient's recovery. After 2-3 months of adequate treatment, if insufficient recovery is achieved then the diagnosis should be reconsidered, and additional diagnostics aimed at specific complaints might be indicated. In the case of local complaints of, e.g., the shoulder, elbow, wrist or hand joints, a referral to a specialized plastic or orthopedic surgeon seems warranted. In case of more diffuse complaints associated with sensory disorders, a neurological evaluation is a good option. For patients with prolonged neck pain, referral to an anesthesiologist specializing in pain management should be considered.

If symptoms persist in the form of ongoing pain and/or disability or limitations in (work) participation, in the absence of any indication for a specific disorder and in the presence of psychosocial factors that might hinder recovery, a multidisciplinary treatment should be considered. A rehabilitation physician can determine the indication for this type of referral. An increasing number of healthcare institutions have developed treatment programs for this type of multidisciplinary therapy.

Conclusion

This guideline provides recommendations for the diagnosis, treatment, care and (work) participation of patients with nonspecific CANS. The main goals are to improve the care process, including the coordination of and collaboration between the healthcare professionals involved, and to support and improve communication with the patients.

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- N. Doornbos, Physiotherapist/Occupational physiotherapist
- M. Driessen, Expert Free University Medical Center Amsterdam
- L.A.M. Elders, Occupational physician
- R. God, Insurance physician
- D.J. Hofstede, Plastic surgeon
- I.D. Kalinitsch, Psychologist
- T. Kuijpers, Expert Dutch Institute for Quality in Healthcare
- C. Loo, Occupational therapist
- A.M. Oudshoff, Patient representative
- O.J.J.M. Rohof, Anaesthesiologist
- J.B. Staal, Expert IQ Healthcare Radboud University Medical Center
- N. van Alfen, Neurologist/neurophysiologist
- M.D.F. van Eijsden-Besseling, Rehabilitation physician
- M.W. van Tulder, Expert Free University Medical Center Amsterdam
- A.P. Verhagen, Manual therapist
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