Post-Stroke care: the role of general practitioner and neurologist

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2 Abstract

Background: Cerebrovascular diseases, particularly stroke, rank high among the leading causes of death and disability worldwide, including Belgium. Despite the relevance of stroke in Belgian healthcare, there are very few national or regional guidelines available for both general practitioners and neurologists. Furthermore, the course of communication between neurologists and general practitioners (GPs) and satisfaction with their roles in post-stroke care remains underexplored.

Aims: This study aimed to investigate current practices of neurologists and GPs in the follow-up of stroke patients in Belgium.

Methods: A short-term cross-sectional study was conducted, distributing structured questionnaires to GPs and neurologists across Belgium. The questionnaires surveyed demographics, frequency and timing of follow-up of patients after stroke hospitalization, the mode of communication between general practitioners and neurologists, and the follow-up of secondary prevention and sequelae by both general practitioners and neurologists. Data were collected using Qualtrics software and descriptive statistics were used.

Results: 119 physicians answered the questionnaires, including 54 general practitioners (GPs) and 65 neurologists. Half of GPs see patients within the first 2 weeks after stroke hospitalization, 90% within 1 month. Most neurologists see patients at 1-2 months and/or at 3 months after hospitalization. Teleconsultations are rarely used by both groups. Communication about hospitalization is usually by letter via an online platform or regular mail. There are rarely phone contacts between GPs and neurologists. In terms of secondary prevention, neurologists seem to take the lead in monitoring antithrombotic therapy, while GPs are more involved in overseeing medications for hypertension, dyslipidemia, and diabetes. Different secondary prevention guidelines are followed, however, blood pressure < 130/80 mmHg and LDL cholesterol < 55 mg/dl are the most commonly used targets in both groups. Neurologists address topics with less defined endpoints, such as overweight, diet, exercise, and alcohol more than GP's.
Sequels such as incontinence and sexual and relational problems, are least questioned by both groups. GPs and neurologists agree on a sharing responsibility to detect and follow- up of working ability, sleep issues, fatigue and incontinence and on a primary responsibility for the neurologist regarding mobility, cognitive problems, swallowing difficulties, and driving suitability.
Finally, both groups agree that post-stroke care should be better organized in Belgium, by e.g. implementing a mandatory care plan for each patient including specific targets in discharge letters and development of regional networks of multidisciplinary stroke care providers.

Conclusions: There already appears to be good follow-up in many aspects of post-stroke care. Both neurologists and general practitioners seem to prioritize secondary prevention and post-stroke sequelae, and many aspects in this regard are functioning well. The study highlights the need to improve communication between neurologists and GPs in post-stroke care. It suggests that creating a mandatory individualized post-stroke care plan for each patient, along with clear guidelines, could lead to better outcomes. This plan should include information on lifestyle changes, guidance on detecting and managing complications after a stroke, and define the roles of first- and second-line healthcare professionals. By strengthening this collaboration and focusing on comprehensive care, patients are likely to experience better recovery and long-term health.

3 Introduction

3.1 *Overview of Disease Pathogenesis*

Stroke can be divided into two major subtypes: ischemic stroke and hemorrhagic stroke. The former is caused by an acute blockage of an arterial blood vessel due to embolism, thrombosis or stenosis resulting in a focal infarction. (1-3) The latter is caused by a rupture or leakage of an arterial blood vessel. (3)

3.2 *Epidemiology*

In the Belgian Health status report of 2022, cerebrovascular disease is described in the top three causes of death in both men and women. (4) Globally, stroke is the second leading cause of death and a major cause of disability. (2, 5) This makes acute ischemic stroke a very relevant topic within the Belgian healthcare system.

In a report from 2019, the median age for stroke in the Belgian population is set at 75 years old, approximately 50% of stroke patients is female, equalizing the incidence in terms of gender. (6)

3.3 *Current Treatments*

Time is one of the most important factors in the management of acute stroke. After determining the subtype of stroke by imaging, treatment can be installed. In the acute care of a stroke patient, general supportive therapy is a vitally important part of initial care. This includes airway management, blood pressure control and blood glucose regulation. For acute ischemic stroke, treatment can include IV administration of thrombolytic agents (such as Alteplase) and mechanical thrombectomy. (7) Admission at a stroke-unit is beneficial for all stroke patient outcomes. (7)

Following the acute stage, rehabilitation, treatment of complications and secondary prevention are the central treatment modalities. Secondary prevention of stroke include diabetes detection and blood glycemia control, blood pressure control, dyslipidemia treatment and lifestyle recommendations (such as smoking cessation, alcohol reduction, physical activity and dietary recommendations). (8)

3.3.1 Current treatment in Belgium

In the acute phase, patients are generally hospitalized in a stroke unit. For the (sub-) acute care of cerebral infarcts, more specifically care in stroke units created for that purpose, there are KCE (Belgian Health Care Knowledge Center) recommendations in Belgium. (9) Unfortunately, there are no clear Belgian or regional (Flemish, Wallonian) guidelines on chronic stroke care.

Such guidelines do exist in the Netherlands, called "stroke chain care," where emphasis is placed on hospital accessibility, quality and standardization of care, and communication between the various care domains. Those list some minimum and desirable requirements that stroke units and health care umbrella organizations should meet. The minimum requirements for communication with the general practitioner include a weekly multidisciplinary consultation, clear agreements on the transfer of information from the hospital and transmural agreements on the post-stroke care of the patient. (10)

Little research has been done on how follow-up is carried out in Belgium and how communication between the various healthcare umbrella organizations takes place. However, some surveys of general

practitioners have been published. One of these publications concerns a survey about stroke chain care among general practitioners in Limburg, Belgium, by J. De Lepeleire et al. In this survey, it was concluded that general practitioners were generally satisfied with the care and communication, but some points for improvement included the request for more involvement in the patient's discharge policy and a clearer elaboration of the discharge policy in the discharge letter. These surveyed physicians saw themselves primarily exercising a coordinating role for the post-stroke patient. (11)

Thus, there is currently little data on how the chronic care follow-up of stroke patients takes place and how satisfied the caregivers are on this subject. For this reason, this survey was designed to examine 4 pillars: the organization of post-stroke care, communication between neurologist and general practitioner, management of secondary prevention of cardiovascular disease and monitoring/treatment of the most common sequelae after stroke. Among the last 2 pillars, we questioned who takes on what task in secondary prevention and follow-up of chronic sequelae, with the aim of verifying mutual consensus and identifying any gaps.

3.4 *Secondary prevention*

3.4.1 Antithrombotics

Antithrombotics are an important component in secondary prevention as they reduce the risk of stroke recurrence. Current secondary prevention with antithrombotic therapy after ischemic stroke consists mainly of aspirin or a P2Y12 inhibitor in monotherapy. Usually this is continued for life. Additionally, the first 3 to 4 weeks after an acute ischemic stroke, a combination of these agents is often started given the significant reduction in risk of recurrence, however, if this is maintained for longer than 3 months an increased risk for major bleeding is observed. (12, 13) In some cases, such as atrial fibrillation and certain types of cardiomyopathy, anticoagulant therapy is recommended (warfarin or Direct Oral Anticoagulant- DOAC). (13)

A systematic review by Chiarito et. Al. showed that P2Y12 inhibitors such as Clopidogrel in monotherapy offer no advantage over aspirin regarding secondary prevention for stroke. However, there is risk reduction for myocardial infarction, whether this is clinically significant is debatable, considering the high number-needed-to-treat and considering no difference has been shown in overall mortality. (14) Aspirin thus remains one of the most important drug treatments for the prevention of vascular events. (15)

3.4.2 Hypertension

Blood pressure control reduces the risk of stroke recurrence and decreases vascular mortality. A systematic review of the Cochrane database by Zonneveld TP et. al. shows that a significant result was only seen if the initial systolic blood pressure is > 140 mmHg, it also shows that diuretics and ACE inhibitors are the first choice in treatment. (16)

The AHA/ASA stroke guidelines recommend a blood pressure <130/80 mmHg for most patients who suffered a stroke or TIA. (13) Target values vary in the Dutch (NHG) guidelines between 130 and 150 mmHg systolic blood pressure, based on age, patient vulnerability and drug tolerance. (17)

3.4.3 Hyperlipidaemia

According to the Health Guide by Domus medica (A platform for general practitioners providing, amongst others, guidelines), it is recommended that all patients who have experienced a cerebral cardiovascular event be given a statin. (18) Hence, this is also a basic treatment after an acute stroke. The American Heart Association's guide to secondary prevention of stroke also recommends a guide value of LDL-C <70 mg/dl if patients with an ischaemic stroke or TIA have additional atherosclerotic vascular disease (intracranial, carotid, aortic or coronary). This to reduce the risk of recurrence of stroke. (13) NHG guidelines propose the same values, while the most recent European guidelines set a target of <55 mg/dl. (17, 19)

3.4.4 Smoking

Patients diagnosed with conditions where smoking is a significant contributing factor, such as cardiovascular disease or lung disease, are more likely to consider quitting smoking. For instance, research indicates that stroke patients are approximately 7.2 times more likely to quit smoking compared to the average smoker. (20) Therefore, implementing active smoking cessation interventions in stroke patients becomes crucially important and effective.

Moreover, in line with the NHG guideline, stroke serves as a compelling reason to initiate nicotine replacement medication (21). However, for optimal outcomes, it is essential to complement medication with intensive psychological support. (22) This combination approach is known to yield the most favorable results in smoking cessation among stroke patients.

3.4.5 Diabetes

Control of glycaemia is important in the prevention of both micro- and macrovascular complications. Diabetes increases the risk of stroke and it has been shown that patients suffering from diabetes have a worse outcome after stroke than patients without diabetes. (23) Partly for these reasons, screening for diabetes is often already done in the acute care of the stroke patient.

Thus, a logical conclusion would be that stricter glycaemic control in the post-stroke patient is an important treatment goal, but a review by Hewitt et. Al. has instead shown that more aggressive glycaemic control (HbA1c <6 - 6.5%) does not significantly reduce stroke or fatal cardiovascular events than normal control (HbA1c 7-8%). (23) In an analysis of the diagnostic accuracy of HbA1c and fasting glucose, it is concluded that the measurement of HbA1c with a cut-off value of 6.5% is less sensitive compared to fasting glucose. (24, 25) Given that the cost of this first test is also higher, it seems that only fasting glucose measurement is preferable for diagnosing diabetes.

3.5 *Stroke sequelae*

Much research already exists regarding the acute care and aetiology of stroke; the chronic phase is currently less studied. However, Philp et al. did conduct a large study regarding long-term care in stroke patients. In this study, a post-stroke checklist (PSC) was developed covering the main sequelae of stroke (being mobility and spasticity, pain, incontinence, communication, mood, cognition, relationships, general daily living activities and life after stroke, secondary prevention). (26) The questionnaire in this study is based on these 11 pillars.

A recent literature review by SAFE (Stroke Alliance For Europe) also summarizes the key points in the follow-up of post-stroke sequelae, with considerable alignment on the issues raised in the questionnaire used in this study. (27)

3.5.1 Depression and anxiety

Frequent screening for post-stroke depression (PSD) is important in the follow-up of the stroke patient, partly because PSD significantly increases the risk of mortality. (28) Depression can occur even weeks to months after stroke, vigilance is therefore always required. (29) Detecting depression can also contribute to secondary prevention of stroke, given depression, among other things, reduces the likelihood of smoking cessation after stroke. (22)

Approximately 3 out of 20 patients may develop post-stroke anxiety. This is often associated with post-stroke depression. (30) Very little research has been conducted on the treatment of anxiety in the context of stroke. A systematic review has revealed that there is insufficient evidence in the treatment of anxiety after stroke and that further research is needed. (31)

3.5.2 Cognitive dysfunction

Cognitive dysfunction is more common in patients after stroke, with a prevalence of over half of stroke patients having cognitive impairment six months post-stroke. (27) Patients who already showed mild cognitive impairment (MCI) before stroke have a high risk of conversion to dementia post-stroke. If patients did not yet show mild cognitive impairment, stroke is not a risk factor in eventually developing dementia. (32)

Given that MCI is a common diagnosis in the stroke risk population, screening after stroke is therefore an important issue in follow-up.

3.5.3 Sleep disorders

Several studies indicate that nocturnal sleep disturbances are a common issue following a stroke, with a prevalence of 30 to 50%. (27) Additionally, sleep-disordered breathing after a stroke is prevalent and increasing in frequency. (33) These issues are also correlated with depression, poorer functional and cognitive outcomes, as well as recurrent strokes, underscoring the importance of their detection. (34, 35)

3.5.4 Fatigue

One year after stroke, 34 to 75% of patients report continuing fatigue. (27) Fatigue after stroke is very common and has a marked impact on daily life as well as patient survival, it is associated with a higher case-fatality rate. (36) There have been several studies on how to treat this. A combination of (a 12-week long) cognitive therapy and movement therapy seems to yield good results with an improvement of fatigue in 58% of cases (24% improvement when only cognitive therapy was given). (37)

3.5.5 Pain and spasticity

Pain and spasticity are common problems after stroke. The prevalence of spasticity varies widely, from 4 to 42.6%. In both the acute and chronic phases, spasticity can prove to be a problem in post-stroke care. (38) Pain is highly prevalent following a stroke and correlates with poorer functional and cognitive outcomes. (39) Severe pain is also reported after a stroke, with its prevalence being higher two years

post-stroke, emphasizing the importance of chronic stroke monitoring once again. (40) Movement is central to the treatment of spasticity. (27) The treatment of pain after a stroke involves various modalities, including physiotherapy, pharmacological, and surgical approaches. For central post-stroke pain treatment, no good evidence exists. Depending on the cause of the pain (e.g., central pain, shoulder pain due to hemiplegia, or pain caused by spasticity), the treatment often involves a combination of these modalities, tailored to the individual needs of the patient. (41)

3.5.6 Mobility

Improving mobility is often a central goal in the chronic phase of stroke and requires a multidisciplinary approach. The level of activity post-stroke is a crucial factor in maintaining mobility, with fatigue, cognitive issues, and depression also playing significant roles in this regard. (42)

3.5.7 Activities of daily living (ADL)

Considering the prevalence of reduced mobility, cognitive impairment, incontinence, and swallowing difficulties among stroke survivors, it is reasonable to expect that a substantial portion of patients will encounter challenges in performing activities of daily living (ADL) after a stroke.
A systematic review suggests that both physiotherapy, occupational therapy, and multidisciplinary therapy are important in stroke rehabilitation. Patients who receive these therapies showed improvement in ADL and were less likely to experience a decline in ADL function. (43)

3.5.8 Communication problems

Aphasia is a common problem after stroke, with reported prevalence varying between one out of four to one out of two of stroke patients. (27) It is recommended that stroke patients with aphasia undergo speech therapy, ideally initiated within the first 3 months post-stroke. (44) A meta-analysis by Brady et al. found that receiving therapy yields better outcomes compared to not receiving therapy, but also noted a higher dropout rate among patients receiving more intensive speech and language therapy. (45)

3.5.9 Swallowing disorders

Dysphagia is a common issue after stroke, with one of the primary consequences being aspiration pneumonia.(46)
A systematic review indicates that swallowing therapy does not significantly affect the case fatality rate, but it can improve swallowing function and reduce the risk of aspiration pneumonia. (47)

3.5.10 Sexual and relational dysfunction

As with several conditions, sexual dysfunction is often a taboo. There can be a reduction in libido after stroke as well as decreased vaginal lubrication and orgasmic capacity in women or erectile dysfunction in men. Also, stroke patients often have reduced sexual satisfaction. So this impacts both men and women and is therefore important to discuss with the physician. (48)

3.5.11 Incontinence

Incontinence is found to be a significant factor affecting the quality of life in stroke patients. (49)
Despite this, there has been limited research conducted on the causes and treatment of incontinence in stroke patients. However, both in the acute and chronic phases, addressing incontinence after a

stroke can benefit the patient, primarily through management of care, structured assessment, and involvement of specialist advisors. (50)

3.5.12 Fitness to drive

Being able to drive a vehicle is a significant aspect of daily life and contributes to autonomy. Therefore, regaining the ability to drive after experiencing a stroke could be an important goal in patient rehabilitation. Several crucial factors need to be considered, including mobility, vision, and cognitive functions. (51)

3.5.13 Employment

It is important to discuss limitations for possible work reintegration as early as possible. (29) Several factors can influence reintegration to work, both positively (e.g. higher education level, younger age, less severe injury or short duration of hospitalization) and negatively (e.g. more severe injuries, lower education level, female gender,...) (52)

4 Aims of the study

This short term cross-sectional study aims to map the current follow-up practices for stroke patients, with a particular focus on the communication and task allocation between neurologists and general practitioners regarding secondary prevention and follow-up of chronic sequelae after stroke. The objective is to identify the key factors in the stroke follow-up process and to highlight any potential gaps in patient care approaches. The questions in the questionnaire were developed based primarily on information from the Dutch guidelines on post stroke care (29), the post-stroke checklist (26), and in consultation with 3 stroke experts (Sylvie De Raedt, Fenne Vandervorst and Jacques De Keyser), and with 2 general practitioners (Noémie De Rop and Margaux Vanderstraeten).

4.1 *Primary objective*

The primary objective is to understand the current communication between general practitioners (GPs) and neurologists regarding post-stroke care, and to map out their role in secondary prevention as well as in the follow-up and treatment of post-stroke sequelae.

4.2 *Secondary Objectives*

The secondary objectives are to investigate

- Which guidelines both parties follow and what targets they generally set for secondary prevention.
- Who is usually collaborated with and referred to regarding secondary prevention and post-stroke sequelae.
- To get an overview of the general satisfaction of GPs and neurologists with the current post-stroke care policy and how it is communicated between them.

4.3 *Methods*

4.3.1 Study design and subjects

We distributed partially structured questionnaires to both general practitioners and neurologists across Belgium. Participation in the study involved completing the questionnaire once, with no follow-up contact. A copy of the questionnaire (in Dutch) can be found in *annex 1.*

In total, 191 general practitioner organizations and 88 hospitals were contacted through e-mail. The data from the general practitioner associations were collected based on the most recent information available on existing associations in Belgium. Contact information was gathered using data from the Department of Health of the Flemish Government *(department zorg)* and the Flemish Medical Association *(Vlaams Artsensyndicaat vzw).* (53, 54) The individual websites of the general practitioner associations were visited, and contact was then made via the email provided on the website, through the contact form on the website, or using the information listed in the aforementioned lists of general practitioner associations. The data from neurologists was extracted from a list of all Belgian hospitals with emergency medicine departments, available on *Wikipedia.* (55) The neurology departments were individually contacted with a request to distribute the questionnaire to all neurologists within their department. If the contact information for the neurology department was not available on the website, the hospital was contacted by phone to request this information.

At the first invitation, 95 responses were recorded. A reminder e-mail was sent after 2 months, after which a total of 119 responses were recorded of which 54 (45%) responders were general practitioners and 65 (55%) responders were neurologists. 22% of respondents didn't fill out the questionnaire completely.



The questionnaires were administered and collected using the "Qualtrics" program, chosen for its efficient data processing capabilities and user-friendly interface accessible to all participants. To ensure anonymity, the software automatically obscured participants' names and personal information. The only identifiable details included the respondent's profession (GP/neurologist), an approximate age range, and the region/hospital where the healthcare provider is based. This approach was adopted to safeguard participant privacy while still allowing for comprehensive data collection and analysis.

Participants only included physicians, namely general practitioners (in training) and neurologists. Participation was voluntary and participants could stop the questionnaire at any time.

4.3.2 Questionnaire

The questionnaire is included in the attachment. It consisted of four major sections: epidemiology, communication, secondary prevention, and post-stroke sequelae. The first section inquired about general information regarding the general practitioner and neurologist, in order to gain insight into the population and their working methods. The second part of the questionnaire explored the current communication between general practitioners and neurologists (e.g. through letters, telephone,...)

and the frequency in which this happened, both in the acute and chronic phase. The section on secondary prevention asked about blood pressure, dyslipidemia, diabetes and antithrombotics. Through a visual scale, both general practitioners and neurologists were asked whose role they deemed it to monitor and change medication for cholesterol, blood pressure management, diabetes and antithrombotics. The last part of the questionnaire concerned follow-up of stroke sequelae. This included a wide range of topics, being depression and anxiety, cognitive problems, sleep disorders, fatigue, pain and spasticity, mobility, problems with ADL, communication problems, swallowing disorders, sexual and relational problems, incontinence, driving ability and work ability concerns.

4.4 *Statistical analysis*

The data was processed using SPSS statistics, version 29. The responses were compared across 2 large groups, general practitioners and neurologists, and this was visualized with graphs via excel. Descriptive statistics were used to present results.

5 Results

5.1 *Demographics*

A total of 119 physicians responded to the questionnaire. 54 (45%) were general practitioners and 65 (55%) were neurologists. Among general practitioners (GPs), more women responded than men. (56) Among neurologists, gender is approximately evenly distributed. GP responders, on average, were younger than neurologists, and most of the GP responders were GPs in training (69%). Approximately half (52%) of neurologist responders were neurovascular specialists. Most of the neurologist responders (77%) worked in a non-university hospital. Demographic and characteristics can be found in *table 1.*

Figure 1. *Demographic distribution of respondents.*

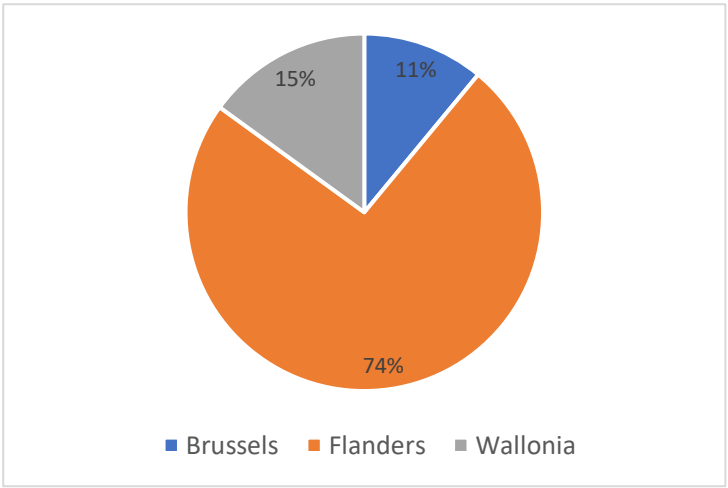


Figure 1 shows the demographic distribution of respondents, revealing that the majority of participants are employed in Flanders.

General practitioners		N (=54)	%
Gender	Male	16	31
	Female	35	67
Age	<30 years old	20	39
	31 – 40 years old	11	21
	41 – 50 years old	7	14
	51 – 60 years old	5	10
	>60 years old	9	17
Degree of education	General practitioner in training	36	69
	General practitioner	16	31
Type of working environment	Solo	13	25
	Duo	9	17
	Group	27	52
	District health centre	2	4

Neurologists		N (=65)	%
Gender	Male	28	45
	Female	33	53
Age	<30 years old	6	10
	31 – 40 years old	30	48
	41 – 50 years old	17	27
	51 – 60 years old	3	5
	>60 years old	6	10
*Specialty **	General neurologist	32	40
	Neurovascular specialist	25	52
	Other	5	8
Type of working environment	University hospital	18	29
	Non-university hospital	48	77

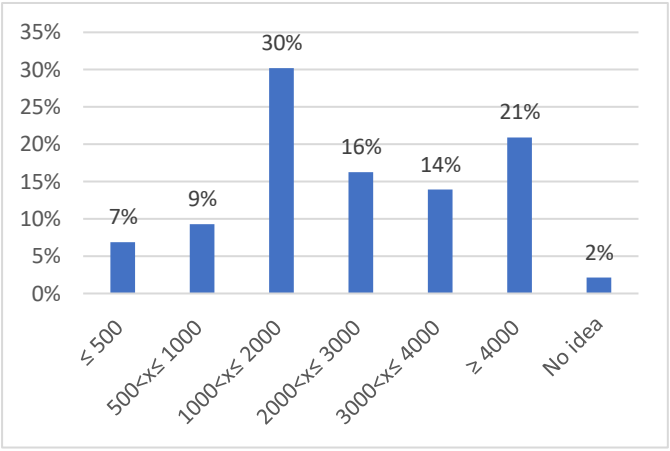
Table 1. Demographics

** 'Other' specialties included cognitive neurology (1), movement disorders (2), electrophysiology (1) and multiple sclerosis (1), mostly combined with general neurology*

5.1.1 General practitioners

The survey of GPs on how large they estimate their patient population produced highly variable answers (see *graph 1* opposite).

Graph 1. *How large do you estimate your patient population?*

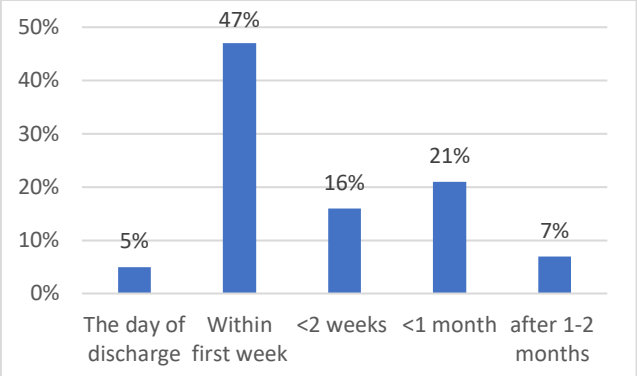


70% of GPs surveyed state that they had <5 new stroke patients in the past year, with 10% having no new stroke patients at all in the past year. The large majority of GPs (89%) see stroke patients at their consultation within the first month after hospitalization, about half of them within a week of discharge. (G*raph 2*)

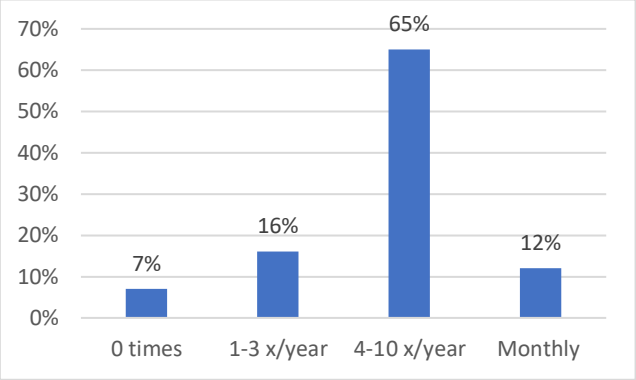
65% of GP's see the patient about 4-10 times a year the year following a stroke. For 23% of surveyed

doctors, it was less than 4 times a year, 12% of doctors see their patient monthly. (*Graph 3*) 77 % of GPs never uses teleconsultations for follow-up of stroke patients, 21% sometimes, and only 2% always. (*Graph 4*)

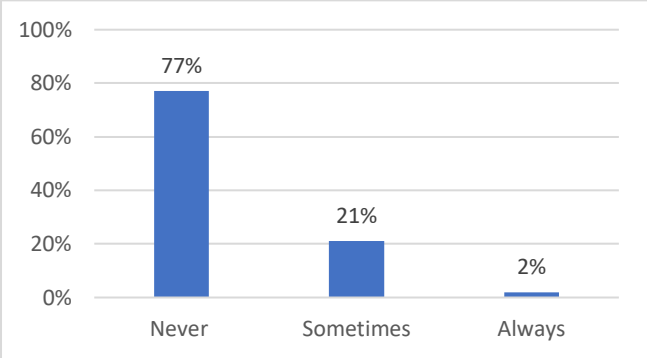
Graph 2. *After how much time do you see a patient for the first time following stroke?*



Graph 3. *How often do you typically see patients in the year following discharge from the hospital/rehabilitation centre?*



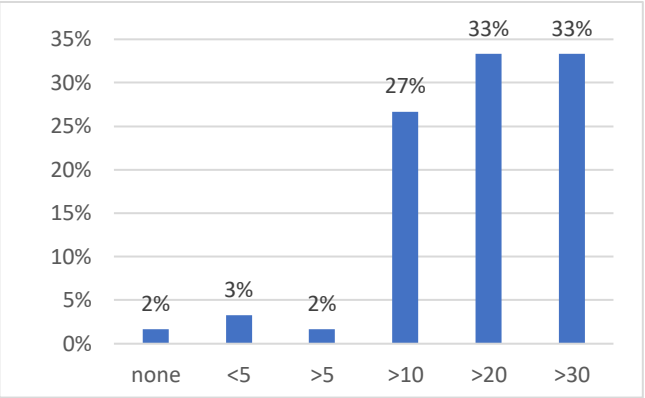
Graph 4. *How often do you use teleconsultations in follow-up of stroke patients?*



5.1.2 Neurologists

93% of the surveyed neurologists has more than 10 hospitalizations for stroke per month in their hospital. A third of the surveyed neurologists even has more than 30 hospitalizations each month. (*Graph 5*)

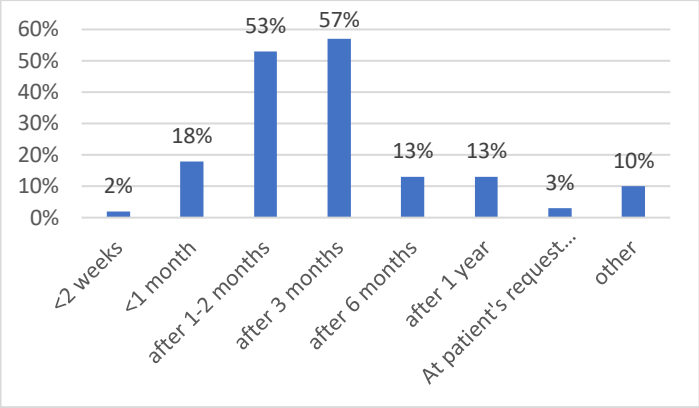
Graph 5. *How many acute strokes are admitted to your hospital each month?*



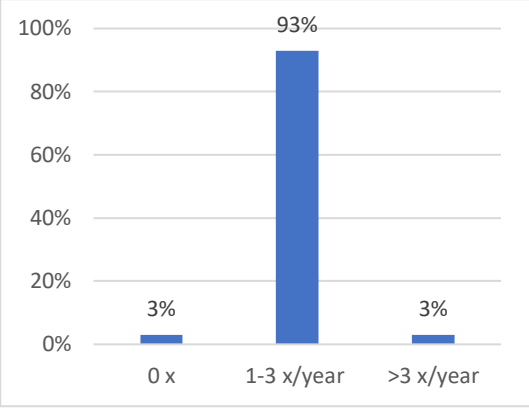
Most neurologists see their stroke patients 1-3 months after their hospitalization. Of the neurologists who see the patient after 1-2 months, one out of three also see them after 3 months. One out of eight neurologists only see the patient again after one year. (*Graph 6*) Following a stroke, the vast majority of neurologists (93%) typically have 1-3 consultations with their patients within the first year. *(Graph 7)*

Half (52%) of the surveyed neurologists never use teleconsultations in the follow-up, almost half (47%) rarely to sometimes and only 2 % use it at all time. *(Graph 8)*

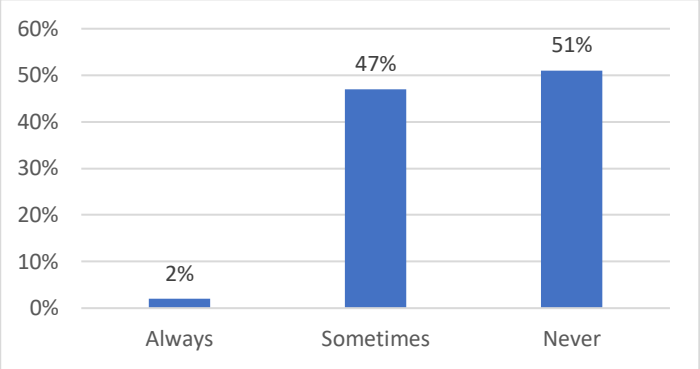
Graph 6. *After how much time do you see the patient again after hospitalization?*



Graph 7. *How often do you typically see patients in the year following discharge from the hospital/rehabilitation center?*

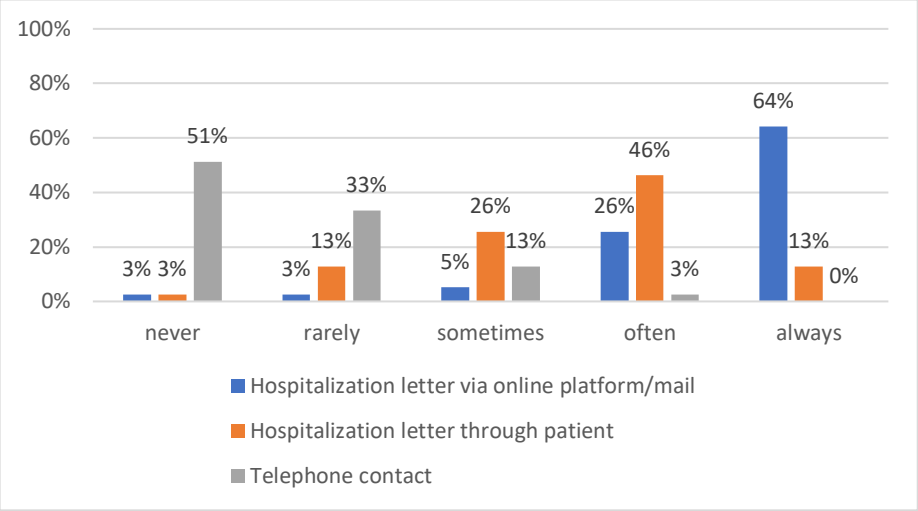


Graph 8. *How often do you use teleconsultations in follow-up of stroke patients?*

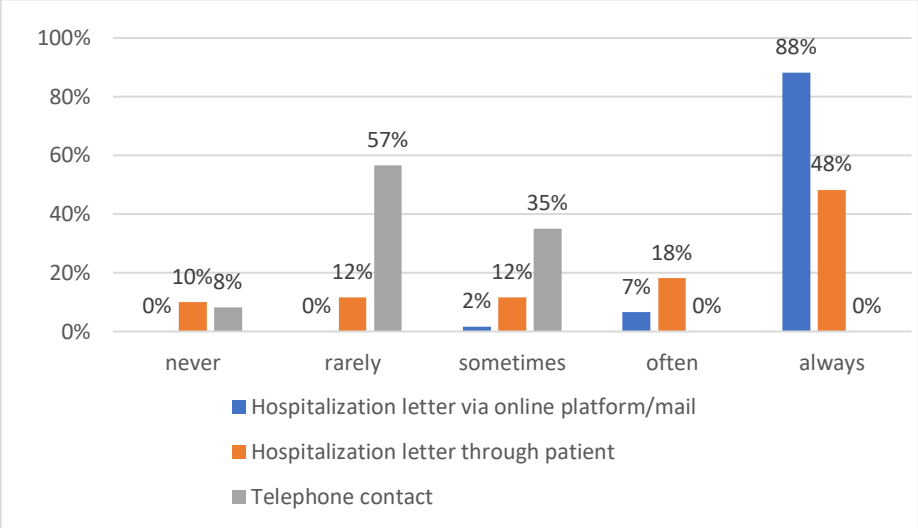


5.2 *Communication*

During hospitalization, communication primarily occurs through an admission letter, which may be transmitted digitally or by traditional mail. However, a small proportion of surveyed GPs (5%) indicated that they never receive an admission letter. Additionally, other modes of communication such as telephone contact, multidisciplinary consultation, and personal email are rarely used during this phase of patient care. (Data not visualized as the focus is on post-stroke care)



Graph 9. Mode of Communication After Hospitalization (General Practitioners' Responses)



Graph 10. Mode of Communication After Hospitalization (Neurologists' Responses)

After hospitalization, the predominant mode of communication, both among GPs and neurologists *(Graph 9 and graph 10 respectively),* is through hospitalization letters, either digitally or via traditional mail. A high percentage of both groups reported to often to always communicate through letters (90% of GPs and 95% of neurologists). Additionally, it is observed that letters are frequently handed over to patients, with a significant proportion of both GPs (46% often and 13% always) and neurologists (18% often and 48% always) indicating this practice. *(Graph 9 and 10)* In contrast, telephone contact emerged as a less utilized form of communication among both neurologists and GPs.

The survey found that the phone numbers of neurologists are least likely to be included in discharge letters, with 67% of neurologists reporting that it never happens and 17% reporting it's rarely included, compared to 36% and 33%, respectively, of GPs. The information from the neurological secretariat appears to be more readily available. Here, 78% of neurologists claim that it is always included in the discharge letter, while 31% of general practitioners (GPs) also see this always included in a letter, with 46% stating it happens often. Furthermore, 93% of neurologists claim that information on requested blood tests is often or always included in discharge letters, while only about half (54%) of GPs report the same. When it comes to the inclusion of follow-up appointment details, all of the neurologists say this information is often or always included, but only slightly more than half (54%) of GPs report the same. These findings indicate a notable difference in the perception of the inclusion of information about follow-up appointments in discharge letters between neurologists and general practitioners. This underscores the importance of enhancing communication practices to ensure consistent and thorough information sharing, thereby improving the continuity and quality of care for stroke patients. *(Table 2)*

	Telephone number neurologist		**Telephone number secretariat**		**Information on requested blood tests**		**Information on follow-up appointments**	
Who?	**GP**	**Neurologist**	**GP**	**Neurologist**	**GP**	**Neurologist**	**GP**	**Neurologist**
Never	36%	67%	3%	10%	0	0	0	0
Rarely	33%	17%	10%	9%	15%	0	13%	0
Sometimes	18%	3%	10%	2%	31%	7%	33%	0
Often	13%	5%	46%	2%	46%	40%	46%	19%
Always	0	3%	31%	78%	8%	53%	8%	81%

Table 2. Subjects included in discharge letter, responses by general practitioners (left) and neurologists (right)

GPs express preference receiving the discharge letters including: **a more specific follow-up plan for the patient, clear targets, information about rehabilitation** (physiotherapy, at home/center), details about the **duration of medication**, and **information about the prognosis**. Neurologists also want to add supplementary information to the discharge letter. This includes the **need and explanation for rehabilitation**, along with a clearer overview of **target values** in the context of secondary prevention.

Both neurologists and GPs expressed a **desire for more accessible communication**. The respondents mainly state that there is often too little communication between the two parties and that the threshold for communicating should be much lower than it is at the moment. Additionally, GPs noted that communication via letters sometimes experiences delays, which can impede the GP's ability to provide adequate care due to a lack of timely information.

According to GPs, discharge letters mostly include targets for cholesterol and smoking cessation, with 60-65% indicating these are often or always included. In contrast, targets for HbA1C, blood pressure, and diet are mentioned less frequently, with about 20-35% noting these. Targets for alcohol, target weight, and exercise are mentioned the least, with only 10-15% of GPs indicating these are often or always included. *(Table 3)*

Neurologists reported that more than 90% of the discharge letters often or always include targets for cholesterol and blood pressure, as well as the importance of smoking cessation. Almost 70% of neurologists mention targets for HbA1C, about half include information on alcohol, diet, and exercise, while less than one-third mention goal weight. *(Table 4)*

GPs	**LDL-C**	**ABP***	**HbA1c**	**Target weight**	**Movement**	**Smoking cessation**	**Diet**	**Alcohol**
Never	5%	3%	5%	15%	26%	0	28%	26%
Rarely	15%	18%	31%	49%	41%	13%	33%	28%
Sometimes	21%	21%	28%	21%	23%	23%	18%	33%
Often	51%	14%	28%	13%	5%	49%	18%	8%
Always	8%	13%	8%	3%	5%	15%	3%	5%

Table 3. How often are target values of following topics included in the discharge letter? (responses by GPs)
* ABP=Arterial Blood pressure

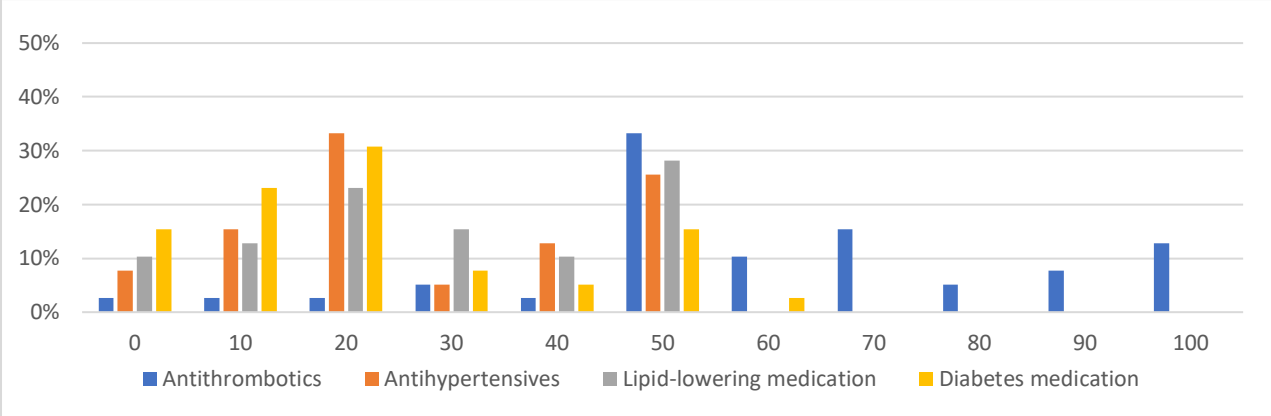
Neurologists	**LDL-C**	**ABP***	**HbA1c**	**Target weight**	**Movement**	**Smoking cessation**	**Diet**	**Alcohol**
Never	3%	3%	7%	21%	10%	0	12%	9%
Rarely	2%	2%	2%	26%	14%	0	19%	14%
Sometimes	3%	3%	22%	24%	26%	3%	21%	21%
Often	19%	17%	22%	17%	17%	31%	24%	35%
Always	72%	74%	47%	12%	33%	66%	24%	21%

Table 4. How often are target values of following topics included in the discharge letter? (responses by neurologists)
* ABP = Arterial blood pressure

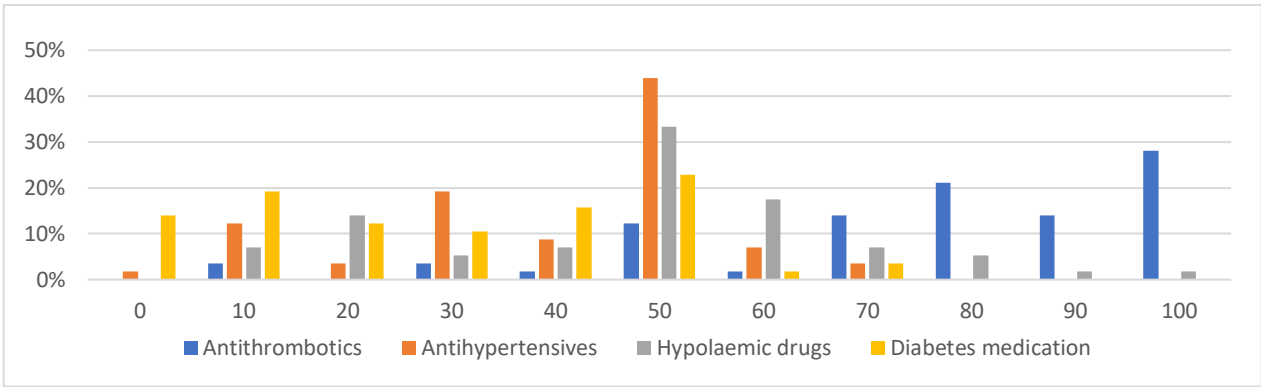
5.3 *Secondary prevention*

When GPs were asked about who they felt was responsible for the follow up of medication in secondary prevention, they predominantly felt responsible for managing antihypertensive medications, lipid-lowering medication, and diabetes medication. However, for antithrombotic medications, the perception was that neurologists had more responsibility. *(Graph 11)* Neurologists were asked the same question, and while the distribution was similar, they showed less clear predominance toward GPs for antihypertensive medications, lipid-lowering medication, and diabetes medication. *(Graph 12)* This indicates that **neurologists** consider the management of these medications as **more evenly divided** between themselves and GPs, whereas **GPs** perceive a clearer **delineation of responsibilities**.

Graph 11. *Whose role do you consider it to be to monitor and adjust subsequent medication? Answered by general practitioners. This was a visual scale representing the perceived division of responsibility for monitoring and adjusting medication in secondary prevention after stroke, ranging from 0 (entirely the responsibility of the general practitioner) to 100 (entirely the responsibility of the neurologist).*

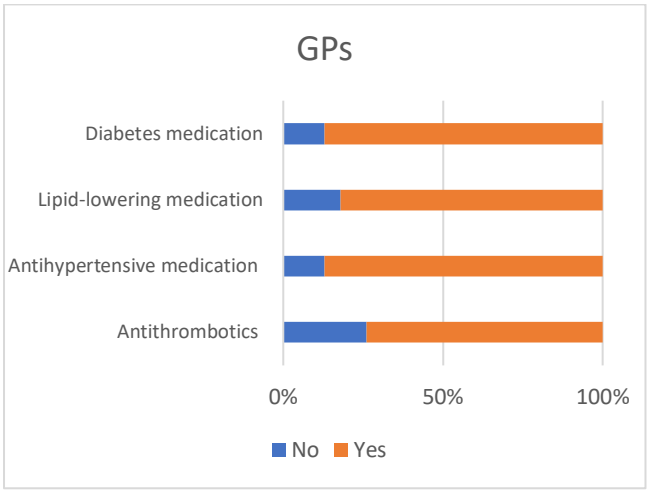


Graph 12. *Whose role do you consider it to be to monitor and adjust subsequent medication? Answered by neurologists. This was a visual scale representing the perceived division of responsibility for monitoring and adjusting medication in secondary prevention after stroke, ranging from 0 (entirely the responsibility of the general practitioner) to 100 (entirely the responsibility of the neurologist.*

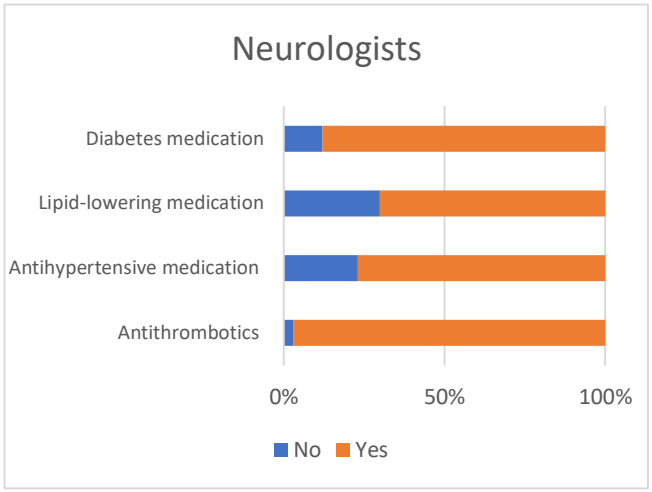


Among general practitioners, there was a high satisfaction rate about their role in secondary prevention medication management, this ranged from 74% for antithrombotic medications to 87% for antihypertensive and diabetes medications. *(Graph 13)* Among neurologists, satisfaction rate varied from 70% for lipid-lowering medications to 97% for antithrombotic medications. *(Graph 14)*

Graph 13. *Are you satisfied with how the division of roles in medication monitoring is adhered to? (answered by GPs)*



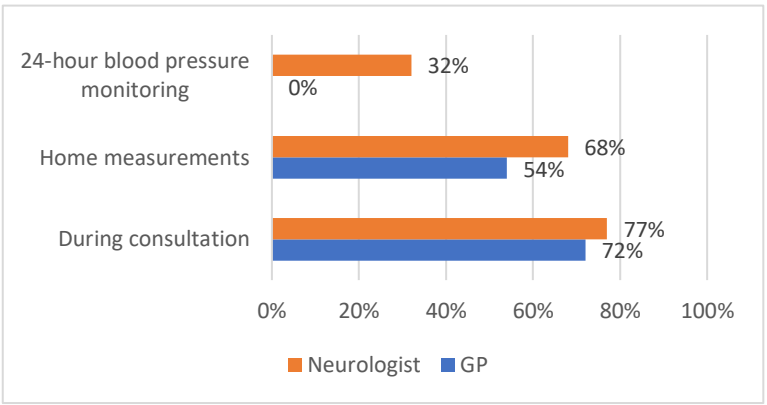
Graph 14. *Are you satisfied with how the division of roles in medication monitoring is adhered to? (answered by neurologists)*



5.3.1 Hypertension

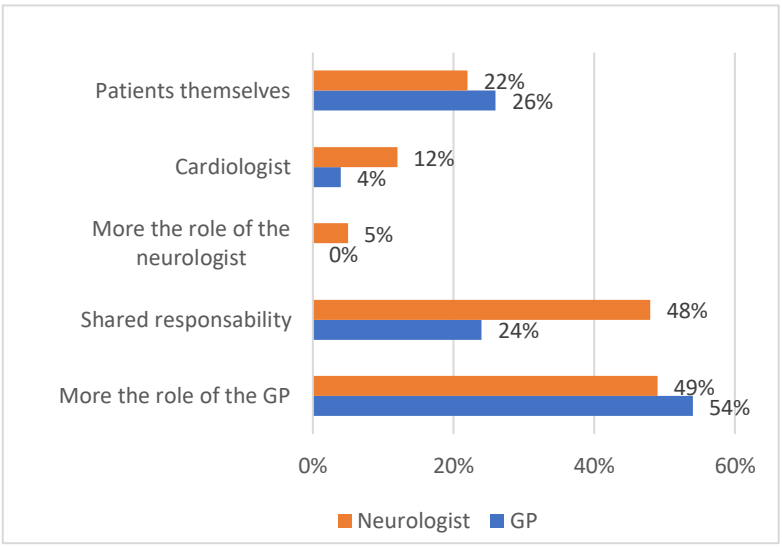
Both neurologists and GPs frequently monitor blood pressure through consultations (77% and 72%, respectively) and through home measurements (68% and 54%, respectively). However, none of the GPs monitor blood pressure of stroke patients through 24-hour blood pressure monitoring, while 1 in 3 (32%) neurologists do so. *(Graph 15)*

Graph 15. *How do you mostly follow-up blood pressure in the stroke patient? Answered by neurologists (orange) and GPs (blue).*



When asked whose responsibility it is to monitor blood pressure, 54% of general practitioners responded that it was their responsibility, 24% indicated it is a shared responsibility. None of the GPs stated that it's solely the responsibility of the neurologist. Additionally, 26% responded that it was the responsibility of the patient themselves. Among neurologists, approximately half of the respondents (49%) also agreed that it is the responsibility of the general practitioner. One neurologist provided insight, noting that the general practitioner is closer to the patient, allowing for more proactive management. 48% of neurologists

Graph 16. *Whose responsibility do you primarily considered it to be follow up and treat hypertension? Answered by neurologists (orange) and GPs (blue).*



viewed this as a shared responsibility, while 5% considered it primarily the responsibility of the neurologist. Similarly, 22% of neurologists, a comparable percentage to that of general practitioners, believed it was the responsibility of the patient themselves. *(Graph 16)*

Target BP	GPs	Neurologists
<120/70 mmHg	21%	4%
<130/80 mmHg	46%	51%
<135/85 mmHg	18%	16%
<140/90 mmHg	10%	25%

Table 5. Target values for blood pressure perceived by general practitioners and neurologists

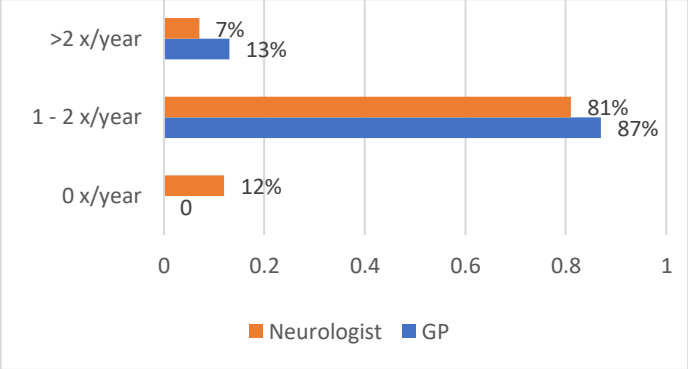
When asked about the general target value for blood pressure after a stroke, there was inter- and intra-responder variability. Among GPs and neurologists, about half answered that the blood pressure target is below 130/80 mmHg. However, about one-fifth of GPs and 4% of neurologists set the target even lower, while 28% of GPs and 41% of neurologists set the target higher. *(Table 5)*

The majority of GPs follow the targets outlined by Domus Medica (26%) and NHG (35%), which are the Belgian and Dutch guidelines, respectively. 20% follow hospital guidelines/care pathways, and another 20% do not follow any specific guideline. Among neurologists, the majority follow the guideline provided by the hospital/care pathway (40%) and the AHA/ASA guidelines (American Heart and Stroke Association) (54%).

5.3.2 Dyslipidemia

The majority of respondents in both GPs and neurologists determine lipid profiles 1-2 times per year, with percentages of 87% and 81%, respectively. It's noteworthy that none of the general practitioners determine lipid profiles less than once per year, while 12% of neurologists do so. *(Graph 17)*

Graph 17. *How often do you determine lipid profiles by blood test in the year following stroke? Answered by neurologists (orange) and GPs (blue)*

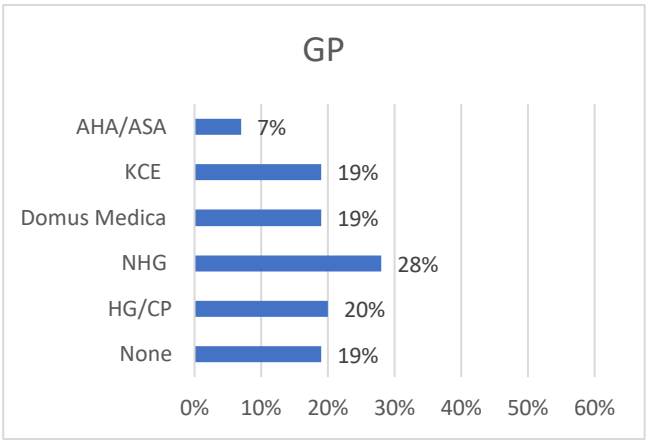


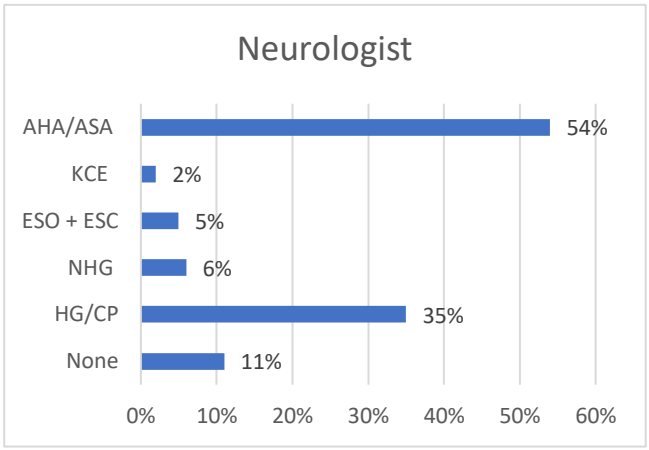
Target LDL	GPs	Neurologists
<115 mg/dl	1 (2,6%)	1 (1,8%)
<100 mg/dl	1 (2,6%)	1 (1,8%)
<70 mg/dl	13 (33,3%)	24 (42,1%
<55 mg/dl	24 (61,5%)	27 (47,4%)

Table 6. Target values for LDL cholesterol perceived by general practitioners and

Most of the respondents in both parties agreed LDL cholesterol targets should be <70 mg/dl or <55 mg/dl. *(Table 6)* While general practitioners give varied responses regarding which guideline they follow, neurologists mainly follow the American guideline and the hospital's guideline/care pathway. *(Graph 18 and 19)*

Graph 18 (Left) and 19 (Right). *Do you follow specific guidelines to manage dyslipidemia? Answered by GPs (left) and neurologists (Right)*
ESO + ESC = European Stroke organization + Essentials of Stroke Care. HG/CP = Hospital guidelines/care pathways.



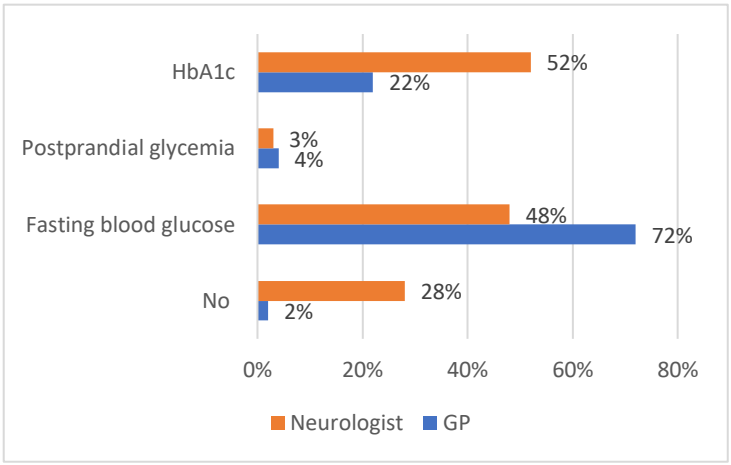


5.3.3 Diabetes

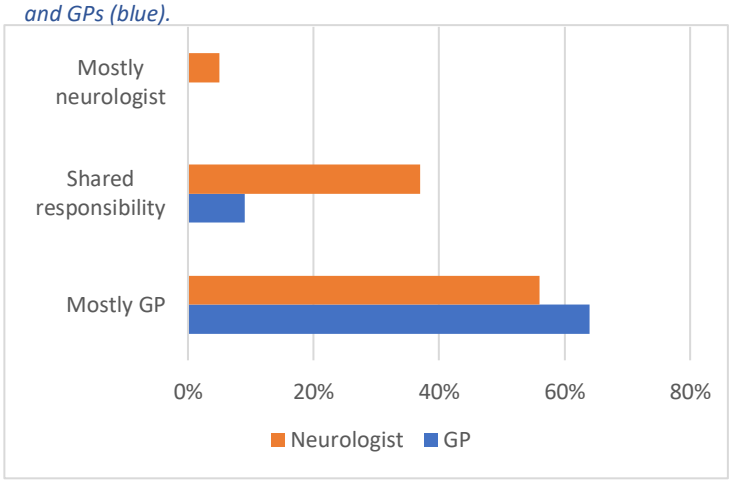
Only 1 general practitioner (2%) did not screen for diabetes in stroke patients during follow-up, whereas 18 neurologists (28%) did not. Among the general practitioners who screen, the majority used fasting blood glucose levels (72%), while about 1 in 5 use HbA1c for screening. In contrast, among neurologists, these percentages were 48% and 52%, respectively, indicating a noticeably higher frequency of using HbA1c for diabetes screening. *(Graph 20)*

The majority of general practitioners consider diabetes screening to be primarily their own responsibility (64%) or a shared responsibility (9%). Similarly, neurologists predominantly view this as the responsibility of the general practitioner (56%) or a shared responsibility (37%). *(Graph 21)*

Graph 20. *What diagnostic tests do you use in diagnosing diabetes after stroke? Answered by neurologists (orange) and GPs (blue).*



Graph 21. *Whose responsibility do you primarily considered it to be to detect diabetes in stroke patients? Answered by neurologists (orange) and GPs (blue).*



5.3.4 Lifestyle

Approximately half of the general practitioners (51%) systematically screen for overweight (via weighing or questioning) in patients with stroke, while 49% do not. Neurologists perform better in this regard, with 82% of respondents systematically screening for overweight. The vast majority of both groups refer patients to a dietician only upon the patient's request and/or when the patient shows clear motivation.

Topic	Yes		No	
Who?	GP	Neurologist	GP	Neurologist
Diet	26 (67%)	49 (86%)	13 (33%)	8 (14%)
Excercise	32 (82%)	55 (97%)	7 (18%)	2 (4%)
Alcohol use	28 (72%)	54 (95%)	11 (28%)	3 (5%)

Table 7. *Representing whether frequent advice is given regarding lifestyle factors in the post-stroke setting*

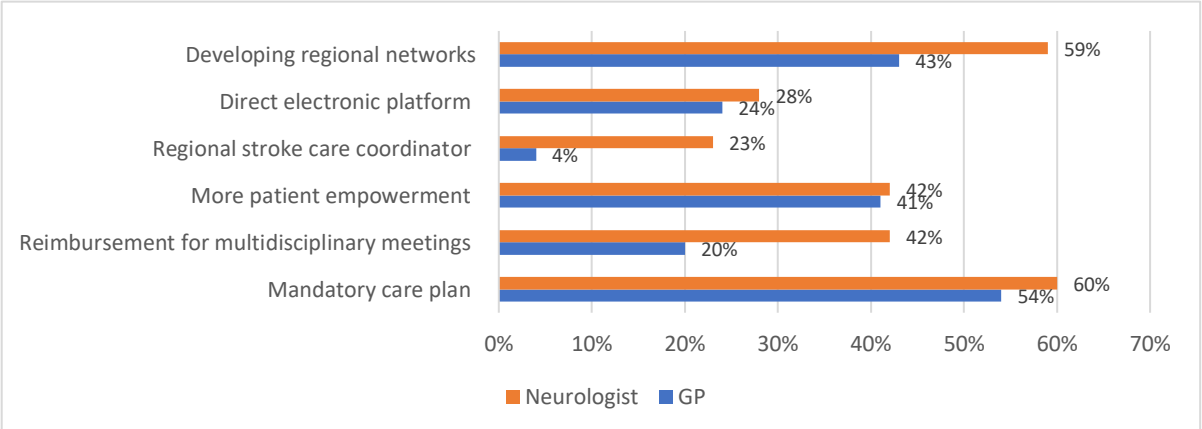
Neurologists generally provide advice on lifestyle factors such as diet, exercise, and alcohol consumption more frequently than general practitioners *(Table 7).*

5.3.5 Current opinion about secondary prevention

In response to the question of whether they would like to change anything regarding the organization or communication surrounding secondary prevention and follow-up, only 4% of general practitioners and 6% of neurologists would like no changes in the current organization of secondary prevention after stroke. The majority (96% and 94% respectively) would like to change something. Several proposals were presented, eliciting positive responses from various physicians. These included *(Graph 22):*

- Implementing a **mandatory care plan** for each patient (specific targets in discharge letters and scheduling follow-up consultations,..) This proposal received support from 54% of general practitioners and 60% of neurologists.
- **Reimbursement for multidisciplinary meetings** including primary care (20% of general practitioners and 42% of neurologists)
- Increased focus on **patient empowerment** (41% and 42%, respectively)
- Presence of a **regional stroke care coordinator** (4% and 23%, respectively)
- **Direct electronic platform** for communication between primary and secondary care (23% and 28%, respectively)
- Development of **regional networks** of multidisciplinary stroke care providers, such as through a website with all contact information (43% and 59%, respectively).

Graph 22. *What would you like to change regarding organization and follow-up in post-stroke secondary prevention? Answered by neurologists (orange) and GPs (blue)*

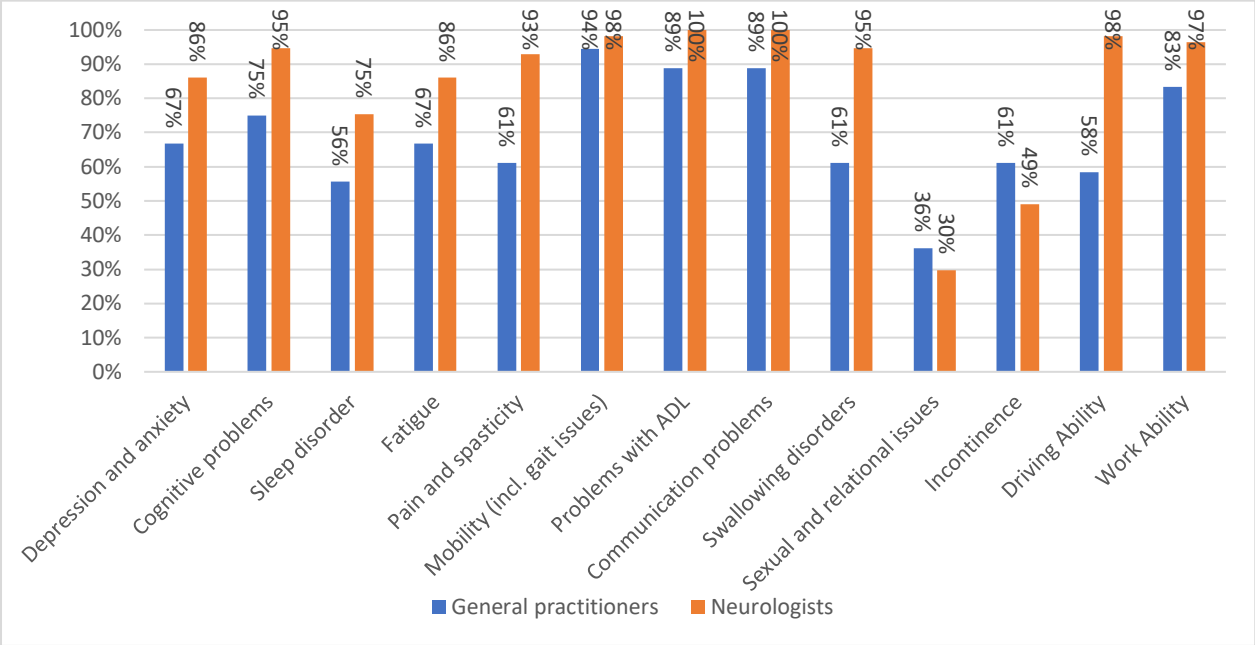


5.4 *Stroke sequelae*

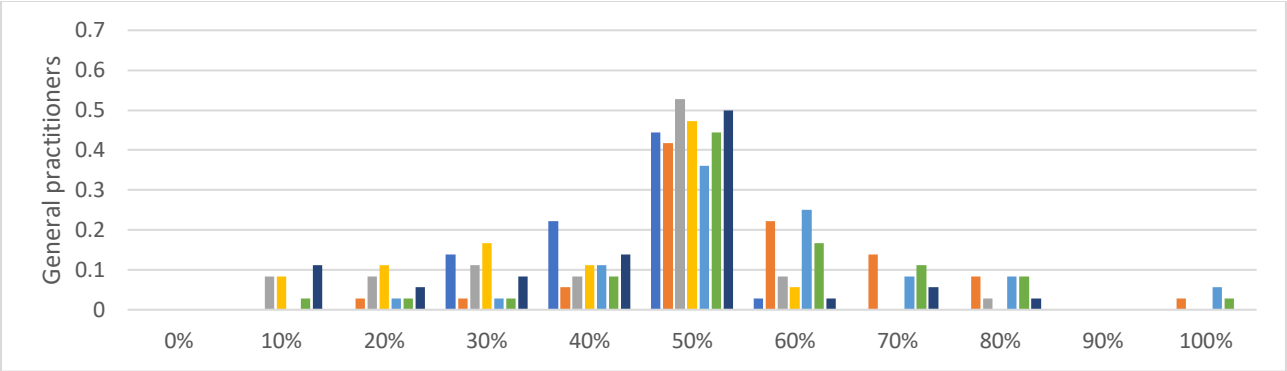
Overall, a lower percentage of general practitioners actively detect the sequelae compared to neurologists. This is most noticeable in sleep disorders (56% of general practitioners vs. 75% of neurologists), pain and spasticity (61% vs. 93%), swallowing problems (61% vs. 95%), and driving ability (58% vs. 98%).

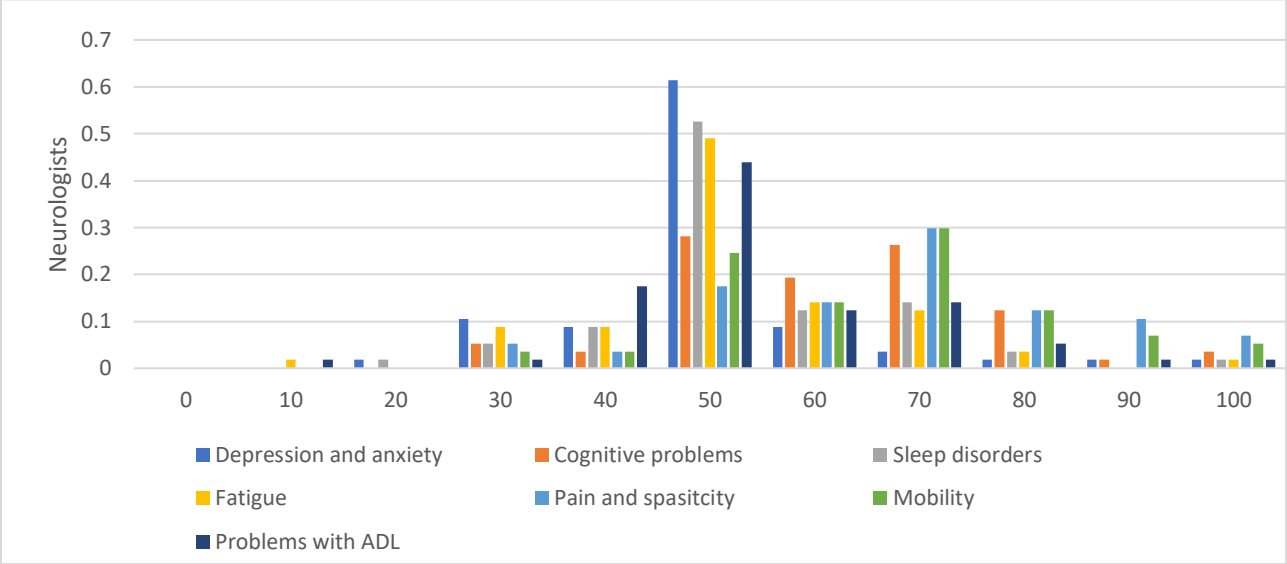
The two sequelae that are least actively detected by both general practitioners and neurologists are sexual and relational problems and incontinence. *(Graph 23)*

Graph 23. *Percentage of general practitioners and neurologists who answered 'yes' to the question of whether they actively detect the above sequelae. Answered by GPs (blue) and neurologists (orange).*



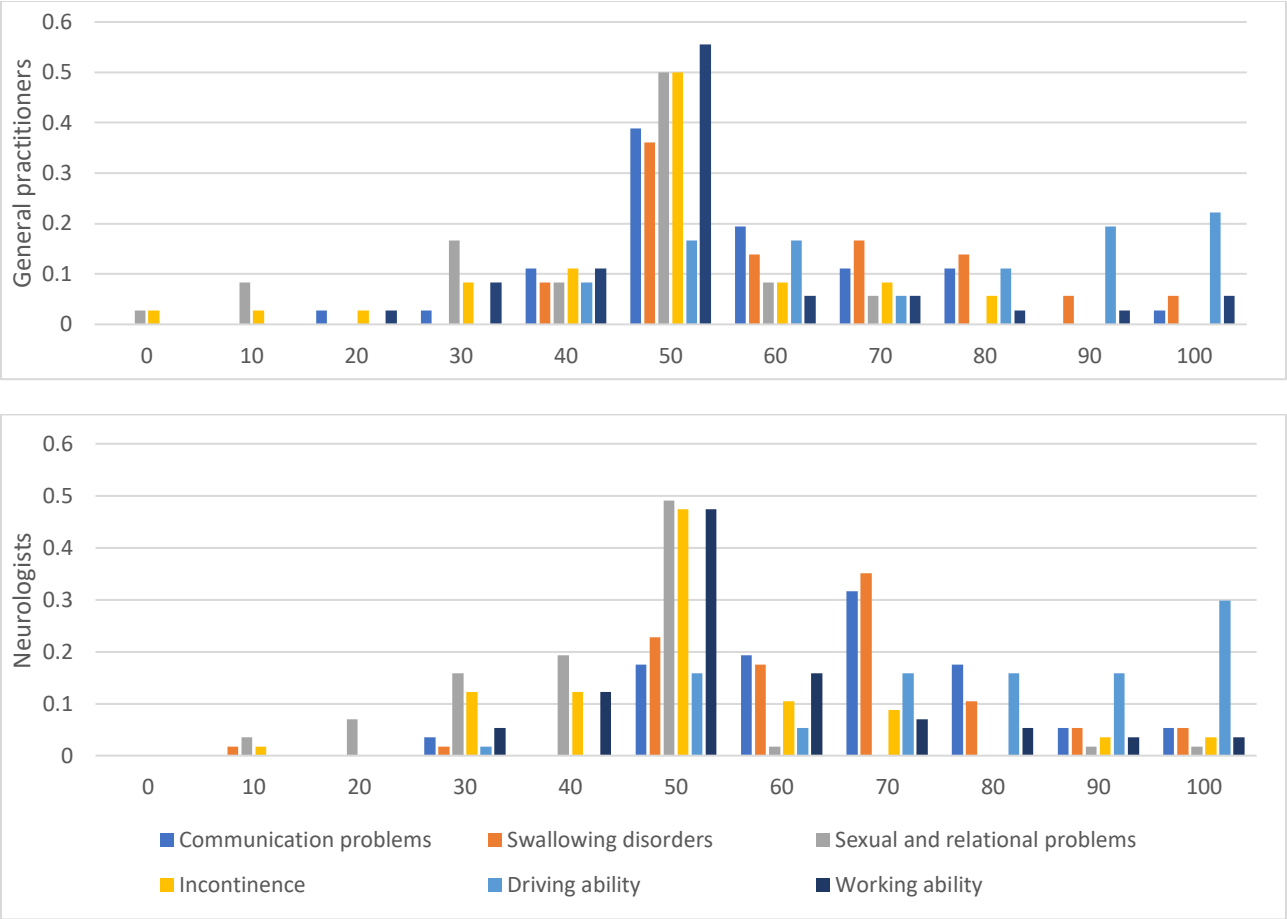
Graph 24 and 25. *Whose role do you consider it to detect and follow-up following post-stroke sequels? Answered by general practitioners (above) and neurologists (below). This was a visual scale representing the perceived division of responsibility for detecting and monitoring sequels after stroke, ranging from 0 (entirely the responsibility of the general practitioner) to 100 (entirely the responsibility of the neurologist).*





When it comes to the detection and management of **mobility issues** and **pain and spasticity**, the responsibility appears to lean more towards neurologists. GPs generally consider the follow-up of **anxiety and depression** to be their own responsibility, while neurologists see it as a shared task. For identifying and treating **cognitive problems**, the responsibility seems to be leaned primarily to neurologists. Detecting **sleep problems** is viewed as a shared responsibility, though both GPs and neurologists tend to see it slightly more as their own task; the same applies to **fatigue**. Finally, for issues related to **activities of daily living (ADL),** GPs consider it slightly more their responsibility, but overall, it's seen as a shared task. *(Graph 24 and 25)*

Graph 26 and 27. *Whose role do you consider it to detect and follow-up following post-stroke sequels? Answered by general practitioners (above) and neurologists (below). This was a visual scale representing the perceived division of responsibility for detecting and monitoring sequels after stroke, ranging from 0 (entirely the responsibility of the general practitioner) to 100 (entirely the responsibility of the neurologist).*



Both general practitioners and neurologists mainly view assessing **driving ability** as the responsibility of the neurologist, while this follow-up for **work ability** is more evenly distributed between both physicians. Additionally, regarding **swallowing problems**, there is a trend towards neurologists for follow-up, observed in both general practitioners and neurologists. While general practitioners perceive the detection of **communication problems** as more of a shared task, neurologists seem to consider it more their responsibility. Both physicians view the detection and follow-up of **incontinence** as a shared responsibility. Finally, neurologists perceive the detection and treatment of **sexual and relational problems** as more within the domain of the general practitioner. *(Graph 26 and 27)*

For each of the above-mentioned sequelae, both general practitioners and neurologists were asked if they refer patients for these sequelae, and if so, to which specialization. Below, each sequel is discussed:

- **Depression and Anxiety:** Approximately one-fifth of both neurologists and general practitioners usually do not refer for these issues. When they do refer, it is mainly to (neuro) psychologists. Half of the neurologists often refer to psychiatrists, whereas only 13% of general practitioners do. Finally, for depression and anxiety, neurologists often refer back to general practitioners, while general practitioners do not frequently refer to neurologists. *(Table 8 and 9)*
- **Cognitive Disorders:** Almost one-third of neurologists do not refer for this. When they do refer, it is very frequently to the (neuro)psychologist. General practitioners refer very often for cognitive problems (6% do not refer), mostly to neurologists (52%) and (neuro)psychologists (20%). *(Table 8 and 9)*
- **Sleep Disorders:** Approximately one-third of both neurologists and general practitioners do not refer for this. Usually, referrals are made to a sleep specialist or to the (neuro)psychologist. 17% of neurologists refer to general practitioners for this, while 9% of general practitioners refer to neurologists. *(Table 8 and 9)*

GP	**(neuro-) psychologist**	**psychiatrist**	**Sleep specialist**	**Neurologist**	**Doesn't refer**
Depression and anxiety	48%	13%	2%	7%	20%
Cognitive problems	20%	2%	0	52%	6%
Sleep disorders	15%	4%	20%	9%	32%

Neurologist	**(neuro-) psychologist**	**psychiatrist**	**Sleep specialist**	**GP**	**Doesn't refer**
Depression and anxiety	52%	52%	2%	31%	20%
Cognitive problems	74%	0	2%	3%	29%
Sleep disorders	9%	2%	42%	17%	35%

Table 8 and 9. *To whom do you refer patients for the following sequelae? Answered by GPs (above) and neurologists (below)*

- **Fatigue:** Almost half of the neurologists and approximately one-third of the general practitioners do not usually refer for this. When referrals are made, they are often to the psychologist and the physiotherapist. Neurologists also refer to general practitioners in a quarter of cases, while general practitioners refer slightly less often to neurologists. *(Table 10 and 11)*
- **Pain and Spasticity:** Neurologists do not refer in more than one-third of cases, and when they do, it is often to the physiotherapist and the occupational therapist. General practitioners usually refer for this issue (5.6% do not refer), mostly to neurologists or physiotherapists. 13% refer to the physical therapist. *(Table 10 and 11)*
- **Mobility:** In cases of mobility problems, referrals are very common, mostly to the physiotherapist. Referrals are also made to the occupational therapist and physical medicine. General practitioners also frequently refer to neurologists for this issue (24%), while the reverse is very rare (1% of neurologists refer to general practitioners). *(Table 10 and 11)*
- **Problems with Activities of Daily Living (ADL):** Referrals are also common for this sequel. Referrals are mostly made to the occupational therapist, to the home nurse, and to the

physiotherapist. Neurologists also frequently refer to general practitioners for this problem (23%), while general practitioners refer less frequently to neurologists (9%). *(Table 10 and 11)*

GP	**Physiotherapist**	**Occ. Therapist***	**Psychologist**	**Physical medicine**	**Home nurse**	**Neurologist**	**Doesn't refer**
Fatigue	13%	4%	15%	4%	4%	11%	33%
Pain and spasticity	33%	4%	2%	13%	2%	43%	6%
Mobility	59%	7%	2%	11%	6%	24%	2%
ADL	32%	28%	2%	4%	39%	9%	2%

Neurologist	**Physiotherapist**	**Occ. Therapist***	**Psychologist**	**Physical medicine**	**Home nurse**	**GP**	**Doesn't refer**
Fatigue	15%	8%	14%	8%	2%	23%	46%
Pain and spasticity	43%	8%	2%	55%	2%	2%	39%
Mobility	66%	20%	2%	45%	3%	2%	17%
ADL	20%	65%	2%	11%	34%	23%	8%

Table 10 and 11. *To whom do you refer patients for the following sequelae? Answered by GPs (above) and neurologists (below)*
** Occ. Therapist = occupational therapist*

- **Communication problems:** Both neurologists and general practitioners often refer patients to speech therapy in case of communication problems (86% and 50% respectively). General practitioners also refer to neurologists in one-third of cases, while neurologists never refer to general practitioners for this issue. Only 5% of neurologists and 4% of general practitioners do not refer for this. *(Table 12 and 13)*
- **Swallowing disorders:** 83% of neurologists and 52% of general practitioners refer patients to the speech therapist for swallowing disorders. 30% of general practitioners refer to neurologists for this. Only 6% of neurologists and 4% of general practitioners do not refer for this. *(Table 12 and 13)*

GP	**Speech therapy**	**Neurologist**	**Home nurse**	**Doesn't refer**
Communication problems	50%	33%	0	4%
Swallowing disorders	52%	30%	4%	4%

Neurologist	**Speech therapy**	**GP**	**Home nurse**	**Doesn't refer**
Communication problems	86%	0	3%	5%
Swallowing disorders	83%	0	6%	6%

Table 12 and 13. *To whom do you refer patients for the following sequelae? Answered by GPs (above) and neurologists (below)*

- **Sexual and relational problems:** 14% of neurologists and 15% of general practitioners do not refer for this issue. When referrals are made, they are mainly to a psychologist a urologist. Neurologists often refer to general practitioners for this (29%), while general practitioners do not frequently refer to neurologists (in 7% of cases). *(Table 14 and 15)*
- **Incontinence:** Few physicians handle this independently, with only 5% of neurologists and 9% of general practitioners not referring for this issue. In the majority of cases, the urologist is involved. Neurologists also refer to general practitioners (15% of cases), and general practitioners sometimes refer to neurologists (in 17% of cases). *(Table 14 and 15)*

GP	**Psychologist**	**Urologist**	**Home nurse**	**Neurologist**	**Doesn't refer**
Sexual and relational problems	32%	26%	2%	7%	15%
Incontinence	2%	57%	6%	17%	9%

Neurologist	**Psychologist**	**Urologist**	**Home nurse**	**GP**	**Doesn't refer**
Sexual and relational problems	49%	40%	0	29%	14%
Incontinence	2%	74%	9%	15%	5%

Table 14 and 15. *To whom do you refer patients for the following sequelae? Answered by GPs (above) and neurologists (below)*

- **Driving ability:** Neurologists address problems with driving ability independently more frequently (17%) than general practitioners (6%). One-third of general practitioners refer to neurologists for this issue, while neurologists rarely refer to general practitioners (3%). External referrals to VIAS/CARA (the institute for driving ability in Belgium) are very common (85% of neurologists and 46% of general practitioners). *(Table 16 and 17)*
- **Work ability:** Approximately one-quarter of neurologists and general practitioners do not refer for work ability issues. One-third of neurologists refer to general practitioners, while one-quarter of general practitioners refer to neurologists for this purpose. There are also frequent referrals to the prevention advisor/occupational physician (62% of neurologists and 28% of general practitioners). *(Table 16 and 17)*

GP	**prevention advisor/occupational physician**	**VIAS/ CARA**	**Neurologist**	**Doesn't refer**
Driving ability	7%	46%	33%	6%
Work ability	28%	2%	28%	24%

Neurologist	**prevention advisor/occupational physician**	**VIAS/ CARA**	**GP**	**Doesn't refer**
Driving ability	11%	85%	3%	17%
Work ability	62%	3%	31%	22%

Table 16 and 17. *To whom do you refer patients for the following sequelae? Answered by GPs (above) and neurologists (below)*

5.5 *Patient associations*

Finally, the participating physicians were asked whether they refer patients to patient associations. None of the general practitioners refer patients to these associations. The reasons for this are primarily because there is no association nearby, they lack knowledge about them, and they have never considered it before. Among the surveyed neurologists, 86% also do not refer patients to patient associations, largely for the same reasons as the general practitioners. However, 14% do refer patients to patient associations.

6 Discussion

6.1 *Organization of follow-up and communication*

In general, we know that during hospitalization the neurologist is the central physician in the treatment However, once the patient is discharged, the GP becomes the healthcare provider who most frequently interacts with the patient. This can also be observed in the study's findings, where almost 9 out of 10 general practitioners see stroke patients again **within the first month** after discharge, with multiple follow-up visits throughout the year. Neurologists also often see patients again **several months** after hospitalization, but the frequency of their follow-up visits appears to be lower, usually around 1-3 times per year, which can be considered logical, given that the general practitioner is often closer to the patient. **Teleconsultations are rarely used**, this might be due the restricted fee per consultation or the preference for in-person visits. We did not inquire about the underlying reasons.

Neurologists generally keep GPs well informed about their patients during hospitalization through admission letters. After discharge, there appears to be smooth communication between GPs and neurologists, although neurologists perceive the frequency of actions such as sending hospitalization letters to be higher than GPs do. There seems to be **limited telephone communication** between GPs and neurologists, a form of contact that could potentially reveal important details for developing a treatment plan when the patient returns home or to a nursing home. GPs often possess crucial information in this regard, and direct communication via phone could facilitate the exchange of such information.

The discrepancies observed in communication, namely neurologists appearing more optimistic in their communication approach compared to general practitioners, could be explained by a selection bias. We were able to reach a relatively larger proportion of neurologists. In 2022, Belgium had 775 active neurologists, meaning we reached about 8,3% of neurologist population, while there were 17.872 GPs, meaning we reached only 0,3%. (58) Furthermore, it's possible that the general practitioners who responded may, on average, be less satisfied with communication than the average Belgian general practitioner.

In Table 2 of the communication section, the components included in the discharge letter are discussed. These findings indicate a notable difference in the perception of the inclusion of information about follow-up appointments in discharge letters between neurologists and general practitioners. This underscores the importance of enhancing communication practices to ensure consistent and thorough information sharing, thereby improving the continuity and quality of care for stroke patients.

Recommendations from a Dutch guideline database suggest the following: Neurologists should promptly send a discharge letter to the healthcare provider taking over the patient's care after discharge from the hospital, and it is advisable to contact this healthcare provider by phone upon discharge. Patients should be seen in an outpatient clinic by a neurologist, although the interval is not specified. The general practitioner (GP) should establish telephone contact with the patient within the first few days after discharge and ensure proper cardiovascular risk management. During the first year of follow-up, the GP should see the patient at least 4 times a year. In the chronic phase, there is a transition from a disease management model to a disability management model, which means shifting the focus from clinic and prognosis in the (sub-)acute phase to learning to live with certain disabilities and increasing autonomy. (44)

It can be argued that overall, the guidelines are generally well followed in Belgium. However, there is room for improvement, particularly in sending **complete and timely discharge letters.** Considering that the guidelines recommend telephone contact, it can be concluded that there is still considerable room for improvement in current stroke care practices in this aspect as well. The average Belgian general practitioner appears to see the stroke patient regularly during the first year post-stroke, and the vast majority of neurologists schedule outpatient follow-up appointments. However, the optimal timing for these appointments, whether in weeks or months post-stroke, is not further specified.

6.2 *Secondary prevention*

In secondary prevention, the follow-up of **antithrombotic therapy** appears to be more the responsibility of **neurologists**, while **other medications** seem to be more in the domain of **general practitioners**. This division of roles seems logical because general practitioners see patients more frequently. Additionally, antithrombotic therapy often follows a standardized protocol, whereas adjustments to antihypertensive, hypolipidemic, and diabetes medications often require ongoing monitoring and clinical assessment. There appears to be no universally followed guideline by either general practitioners or neurologists, and guidelines often vary slightly between different sources.

Hypertension is a parameter that is easily monitored through relatively straightforward and cost-effective methods, primarily office-based measurements and home monitoring. In its follow-up, both parties seem to play a significant role. However, in the opinion of both parties, the responsibility seems to lie slightly more with the general practitioner. There was considerable variability in the guidelines followed for blood pressure monitoring, both between the two groups and within the group of general practitioners and neurologists themselves.

Dyslipidemia is well monitored by both neurologists and general practitioners. However, discrepancies in adhering to the guidelines are observed among both parties. Almost all respondents had a target value below 70 mg/dl, most below 55 mg/dl, with general practitioners appearing slightly stricter in their targets than neurologists, although they largely agreed.

In the screening for **diabetes**, Neurologists seemed to rely more on HbA1c in diabetes screening, although fasting glucose levels appear to be the most recommended parameter for screening, which is what the GPs do. (24, 59)

Neurologists appear to screen more systematically for **overweight** and are also more thorough inquiring about **lifestyle factors** such as diet, exercise, and alcohol consumption compared to general practitioners. This is despite the fact that smoking, exercise, eating habits and weight targets are addressed in the NHG standards for general practitioners. (29)

Overall, neurologists and general practitioners are satisfied with their roles in secondary stroke prevention management, ranging from 70% to 97% , however, there appears to be room for improvement in certain areas. If there were a guideline for post-stroke care that was endorsed by both general practitioners and neurologists, some gaps could be filled, and the overall consensus would likely be even greater.

6.3 *Sequelae*

Neurologists appear to be more proactive in identifying sequela than general practitioners. There seems to be room for improvement in involving general practitioners more effectively in detecting sequela. Two areas, namely, **incontinence and sexual and relational problems**—are relatively **under-detected and treated** by both GPs and neurologists. Incorporating the follow-up of most common sequela into a comprehensive Belgian guideline, and a post-stroke checklist in a mandatory post-stroke care plan, could address these issues effectively.

Monitoring of **mobility, cognitive problems, swallowing difficulties, and issues related to driving** suitability appear to primarily fall under the responsibility of the **neurologist**. For other sequelae, such as **working ability, sleep issues, fatigue and incontinence,** opinions tend towards a **shared responsibility**, although **general practitioners** consider monitoring **anxiety and depression and problems with activities of daily living (ADL) to** be slightly more their own responsibility. Neurologists consider the detection of sexual and relational problems to be more the responsibility of the general practitioner. This could be explained by the fact that the general practitioner often knows the patients' family members, whereas this is not always the case for the neurologist.

The care for stroke patients clearly involves collaboration with other healthcare professionals. There is frequent referral to and collaboration with others to address the mentioned sequels. **Key paramedical players** in the chronic follow-up of stroke patients **include (neuro)psychologists** (for depression and anxiety, cognitive problems, fatigue, and sleep problems), **physiotherapists** (fatigue, pain and spasticity, mobility, problems with activities of daily living), and **speech therapists** for speech and swallowing problems. Neurologists seem to refer more often to hospital-based specialties (e.g., urologists and psychiatrists), which may be explained by their often working in the same hospital and thus facilitating referrals. Finally, neurologists often refer patients back to general practitioners, especially in cases of depression and anxiety, sleep problems, fatigue, problems with activities of daily living, sexual and relational problems, incontinence, and work suitability. The reverse is also common, with general practitioners referring to neurologists, mostly for cognitive problems, fatigue, pain and spasticity, mobility, communication problems, swallowing problems, incontinence, driving suitability, and work suitability. It is notable that there is mutual referral, especially for incontinence, fatigue, and work suitability. This **mutual referral pattern** can be confusing for both the physician and the patient, underscoring once again the need for clear guidelines.

Overall, none of the general practitioners refer patients to **patient associations** primarily due to reasons such as lack of nearby associations, insufficient knowledge about these associations, and because they never considered this. Among the surveyed neurologists, most also do not refer patients for similar reasons.

6.4 *Strengths and limitations*

This questionnaire is intended to map out the follow-up of stroke and optimize it, for which we have only surveyed general practitioners and neurologists. A very important group that should have a say in this are the stroke patients themselves, which might be a subject to focus on in oncoming studies.

Regarding the questionnaires themselves, we received more responses from neurologists than from general practitioners, whereas the distribution of these physicians in Belgium is, of course, reversed. We can also question whether the general practitioners who responded to this questionnaire are more

interested in neurology and stroke than the average general practitioner, given that this was already evident in the invitation to participate in this study. Therefore, one must take into account a selection bias in this regard. We were also unable to track who completed the questionnaires since we couldn't trace personal information. We attempted to minimize this by directly contacting the physicians as straightforwardly as possible. Given that we interviewed physicians across all of Belgium, it's important to consider potential geographical discrepancies. Since there are no fixed guidelines across Belgium and guidelines can vary from hospital to hospital, the results may vary significantly among regions. The responses to the questionnaire were mainly from Flanders, which likely means we have a less accurate understanding of post-stroke care in Brussels and Wallonia.

In this study, the focus was placed on the first year following a stroke. However, a European study conducted over a duration of 5 years by Meyer et al. indicated that after 5 years, the functionality of the patient may be comparable to the status observed 2 months post-stroke. This long-term perspective was not taken into account in the current study. (57)

The questionnaire was lengthy to complete, which resulted in about one out of five respondents not filling it out entirely. However, we decided to include all answers to gather as much data and opinions as possible.

The positive aspects of this study include that it was, to the best of our knowledge, one of the largest surveys regarding post-stroke care in Belgium. We received significant responses from participating physicians to optimize care. This could offer a significant advantage, as the people closest to the patients are also the most likely to identify the major gaps in current care. Many of the neurologists were vascular specialists, greatly increasing their exposure to stroke patients. Finally, the fact that this questionnaire was anonymous removed any potential inhibition for participating physicians to be honest about any shortcomings.

7 Conclusion

The study emphasizes the significance of improving communication between neurologists and general practitioners in post-stroke care. Implementing **mandatory personalized post-stroke care** plans for each patient, along with comprehensive guidelines encompassing lifestyle measures and the identification and monitoring of stroke sequelae, involving the roles of primary and secondary healthcare providers, could enhance patient outcomes. Furthermore, other options could be considered to improve post-stroke care, such as **reimbursement for multidisciplinary meetings** including primary care, increased focus on **patient empowerment**, appointment of **a regional stroke care coordinator**, a **direct electronic platform** for communication between primary and secondary care, and the development of **regional networks of multidisciplinary stroke care providers**. Further studies involving the perspectives of patients and other stroke healthcare professionals, as well as long-term follow-up, are recommended to optimize stroke care in Belgium.

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10 Conflict of interest statement

This study contains no conflicts of interest.

11 References

1. Esenwa CC, Czeisler BM, Mayer SA. Acute ischemic stroke. In: Louis ED, Mayer SA, Rowland LP, editors. Merritt's neurology. 13. 13 ed. Philadelphia: Wolters Kluwer; 2016.
2. Sacco RL, Kasner SE, Broderick JP, Caplan LR, Connors JJ, Culebras A, et al. An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2013;44(7):2064-89.
3. Mohr JP, Albers GW, Amarenco P, Babikian VL, Biller J, Brey RL, et al. American Heart Association Prevention Conference. IV. Prevention and Rehabilitation of Stroke. Etiology of stroke. Stroke. 1997;28(7):1501-6.
4. Renard F, Scohy A, De Pauw R, Jure J, Devleesschauwer B. Health status report 2021 De gezondheidstoestand in België. Depotnummer: D/2020/14.440/08. ed. Brussel, België: Sciensano; 2022. Beschikbaar via http://www.gezondbelgie.be/nl/gezondheidstoestand.
5. Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, et al. Heart Disease and Stroke Statistics-2017 Update: A Report From the American Heart Association. Circulation. 2017;135(10):e146-e603.
6. Meeus P, Dalcq V, Beauport D, Vande Velde M, Hoekx L, Sierens K, et al. Stroke coordination - care plan. Analysis of the distribution and evolution of medical practice in Belgium, in terms of volume and expenditure per insured (analysis and trends by region, province and district): NIHDI – Healthcare Service – Directorate for Research, Development and Quality promotion, Appropriate care unit; 2019.
7. Powers WJ, Rabinstein AA, Ackerson T, Adeoye OM, Bambakidis NC, Becker K, et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. Stroke. 2019;50(12):e344-e418.
8. Ford B, Peela S, Roberts C. Secondary Prevention of Ischemic Stroke: Updated Guidelines From AHA/ASA. Am Fam Physician. 2022;105(1):99-102.
9. Michiels D, Sun Y, Thijs V, Saka Rasit O, Hemelsoet D, Eyssen M, et al. Stroke units: doeltreffendheid en kwaliteitsindicatoren. Synthese. D/2012/10.273/45 ed. Brussel: Federaal kenniscentrum voor de gezondheidszorg (KCE); 2012.
10. Huijsman R, Scholte op Reimer W, Klazinga N, Wijngaarden H, Exel A, Putte-Boon C, et al. Stroke service. Edisse-studie onderbouwt noodzaak van landelijke implementatie. ZonMw; 2002. p. 8-12.
11. De Lepeleire J, Sermeus W, Braems F, Ecker T, Schoenaers M, Vanrompay Y. CVA-Ketenzorg: een exploratie van de visie van huisartsen in een beperkte regio. Tijdschrift voor Geneeskunde; 2018. p. 714-9.
12. Rahman H, Khan SU, Nasir F, Hammad T, Meyer MA, Kaluski E. Optimal Duration of Aspirin Plus Clopidogrel After Ischemic Stroke or Transient Ischemic Attack. Stroke. 2019;50(4):947-53.
13. Kleindorfer DO, Towfighi A, Chaturvedi S, Cockroft KM, Gutierrez J, Lombardi-Hill D, et al. 2021 Guideline for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack: A Guideline From the American Heart Association/American Stroke Association. Stroke. 2021;52(7):e364-e467.
14. Chiarito M, Sanz-Sánchez J, Cannata F, Cao D, Sturla M, Panico C, et al. Monotherapy with a P2Y. Lancet. 2020;395(10235):1487-95.

15. Collaboration AT. Collaborative meta-analysis of randomised trials of antiplatelet therapy for prevention of death, myocardial infarction, and stroke in high risk patients. BMJ. 2002;324(7329):71-86.
16. Zonneveld TP, Richard E, Vergouwen MD, Nederkoorn PJ, de Haan R, Roos YB, et al. Blood pressure-lowering treatment for preventing recurrent stroke, major vascular events, and dementia in patients with a history of stroke or transient ischaemic attack. Cochrane Database Syst Rev. 2018;7:CD007858.
17. Nederlands Huisartsengenootschap. Behandelrichtlijn: cardiovasculair risicomanagement. 2019.
18. Gezondheidsgids, Aerts L, Baeten R, Govaerts F, Bartholomeeusen E, Boonen S, et al. Gezondheidsgids 2019. Handleiding voor preventie in de huisartsenpraktijk.: Domus Medica vzw; 2019 [Available from: www.ggids.be.
19. Members ATF, (CPG) ECfPG, Societies ENC. 2019 ESC/EAS guidelines for the management of dyslipidaemias: Lipid modification to reduce cardiovascular risk. Atherosclerosis. 2019;290:140-205.
20. Twardella D, Loew M, Rothenbacher D, Stegmaier C, Ziegler H, Brenner H. The diagnosis of a smoking-related disease is a prominent trigger for smoking cessation in a retrospective cohort study. J Clin Epidemiol. 2006;59(1):82-9.
21. Chavannes N, Drenthen T, Wind L, Van Avendonk M, Van den Donk M, Verduijn M. NHG-behandelrichtlijn: Stoppen met roken. Nederlands Huisartsen Genootschap; 2017.
22. Noubiap JJ, Fitzgerald JL, Gallagher C, Thomas G, Middeldorp ME, Sanders P. Rates, Predictors, and Impact of Smoking Cessation after Stroke or Transient Ischemic Attack: A Systematic Review and Meta-Analysis. J Stroke Cerebrovasc Dis. 2021;30(10):106012.
23. Hewitt J, Castilla Guerra L, Fernández-Moreno MeC, Sierra C. Diabetes and stroke prevention: a review. Stroke Res Treat. 2012;2012:673187.
24. Cavagnolli G, Comerlato J, Comerlato C, Renz PB, Gross JL, Camargo JL. HbA(1c) measurement for the diagnosis of diabetes: is it enough? Diabet Med. 2011;28(1):31-5.
25. Van der Schueren B, Mathieu C. Is HbA1c betrouwbaar voor de diagnose van type 2 diabetes? : Minerva; 2011. p. 80-1.
26. Philp I, Brainin M, Walker MF, Ward AB, Gillard P, Shields AL, et al. Development of a poststroke checklist to standardize follow-up care for stroke survivors. J Stroke Cerebrovasc Dis. 2013;22(7):e173-80.
27. Legg L, Stevens E. A life saved is a life worth living: The unmet needs of stroke survivors in Europe: A scoping review of the literature on life after stroke. In: London Ksc, editor.: The Stroke Alliance for Europe (SAFE); 2023.
28. Cai W, Mueller C, Li YJ, Shen WD, Stewart R. Post stroke depression and risk of stroke recurrence and mortality: A systematic review and meta-analysis. Ageing Res Rev. 2019;50:102-9.
29. Dolmans L, Hegeman L, Tjon-A-Tsien MRS, Van den Donk M, Van Noortwijk-Bonga HGC, Verburg-Oorthuizen AFE, et al. Beroerte. Nederlands Huisartsen Genootschap; 2022.
30. Li W, Xiao WM, Chen YK, Qu JF, Liu YL, Fang XW, et al. Anxiety in Patients With Acute Ischemic Stroke: Risk Factors and Effects on Functional Status. Front Psychiatry. 2019;10:257.
31. Knapp P, Campbell Burton CA, Holmes J, Murray J, Gillespie D, Lightbody CE, et al. Interventions for treating anxiety after stroke. Cochrane Database Syst Rev. 2017;5(5):CD008860.

32. Gamaldo A, Moghekar A, Kilada S, Resnick SM, Zonderman AB, O'Brien R. Effect of a clinical stroke on the risk of dementia in a prospective cohort. Neurology. 2006;67(8):1363-9.
33. Schütz SG, Lisabeth LD, Gibbs R, Shi X, Chervin RD, Kwicklis M, et al. Ten-Year Trends in Sleep-Disordered Breathing After Ischemic Stroke: 2010 to 2019 Data From the BASIC Project. J Am Heart Assoc. 2022;11(4):e024169.
34. Lisabeth LD, Sánchez BN, Lim D, Chervin RD, Case E, Morgenstern LB, et al. Sleep-disordered breathing and poststroke outcomes. Ann Neurol. 2019;86(2):241-50.
35. Suh M, Choi-Kwon S, Kim JS. Sleep Disturbances at 3 Months after Cerebral Infarction. Eur Neurol. 2016;75(1-2):75-81.
36. Glader EL, Stegmayr B, Asplund K. Poststroke fatigue: a 2-year follow-up study of stroke patients in Sweden. Stroke. 2002;33(5):1327-33.
37. Zedlitz AM, Rietveld TC, Geurts AC, Fasotti L. Cognitive and graded activity training can alleviate persistent fatigue after stroke: a randomized, controlled trial. Stroke. 2012;43(4):1046-51.
38. Sommerfeld DK, Gripenstedt U, Welmer AK. Spasticity after stroke: an overview of prevalence, test instruments, and treatments. Am J Phys Med Rehabil. 2012;91(9):814-20.
39. O'Donnell MJ, Diener HC, Sacco RL, Panju AA, Vinisko R, Yusuf S, et al. Chronic pain syndromes after ischemic stroke: PRoFESS trial. Stroke. 2013;44(5):1238-43.
40. Ali M, Tibble H, Brady MC, Quinn TJ, Sunnerhagen KS, Venketasubramanian N, et al. Prevalence, Trajectory, and Predictors of Poststroke Pain: Retrospective Analysis of Pooled Clinical Trial Data Set. Stroke. 2023;54(12):3107-16.
41. Treister AK, Hatch MN, Cramer SC, Chang EY. Demystifying Poststroke Pain: From Etiology to Treatment. PM R. 2017;9(1):63-75.
42. van de Port IG, Kwakkel G, van Wijk I, Lindeman E. Susceptibility to deterioration of mobility long-term after stroke: a prospective cohort study. Stroke. 2006;37(1):167-71.
43. Legg L, Langhorne P, Trialists OS. Rehabilitation therapy services for stroke patients living at home: systematic review of randomised trials. Lancet. 2004;363(9406):352-6.
44. Herseninfarct en hersenbloeding [Internet]. Federatie Medisch Specialisten. 2021 [cited 31/03/2024]. Available from: https://richtlijnendatabase.nl/richtlijn/herseninfarct_en_hersenbloeding/startpagina_herseninfarct_-bloeding.html.
45. Brady MC, Kelly H, Godwin J, Enderby P. Speech and language therapy for aphasia following stroke. Cochrane Database Syst Rev. 2012(5):CD000425.
46. Dziewas R, Stögbauer F, Lüdemann P. Risk factors for pneumonia in patients with acute stroke. Stroke. 2003;34(8):e105; author reply e.
47. Bath PM, Lee HS, Everton LF. Swallowing therapy for dysphagia in acute and subacute stroke. Cochrane Database Syst Rev. 2018;10(10):CD000323.
48. Korpelainen JT, Nieminen P, Myllylä VV. Sexual functioning among stroke patients and their spouses. Stroke. 1999;30(4):715-9.
49. Haacke C, Althaus A, Spottke A, Siebert U, Back T, Dodel R. Long-term outcome after stroke: evaluating health-related quality of life using utility measurements. Stroke. 2006;37(1):193-8.
50. Thomas LH, Cross S, Barrett J, French B, Leathley M, Sutton CJ, et al. Treatment of urinary incontinence after stroke in adults. Cochrane Database Syst Rev. 2008;2008(1):CD004462.
51. Platz T. Clinical Pathways in Stroke Rehabilitation: Evidence-based Clinical Practice Recommendations. 2021.

52. Coronel, Instituut, voor, Arbeid, en, Gezondheid. Niet-Aangeboren Hersenletsel (NAH) en Arbeidsparticipatie. Multidisciplinaire Richtlijn voor Beoordelen, Behandelen en Begeleiden 2012.
53. Departement zorg. Huisartsenkringen: Vlaamse overheid; 2023 [Available from: https://www.zorg-en-gezondheid.be/per-domein/eerste-lijn/huisartsenkringen.
54. Vlaams Artsensyndicaat vzw. Erkende huisartsenkringen Antwerpen [Available from: https://www.vlaamsartsensyndicaat.be/erkende-huisartsenkringen.
55. Wikipedia. Lijst van Belgische ziekenhuizen 2024 [Available from: https://nl.wikipedia.org/wiki/Lijst_van_Belgische_ziekenhuizen.
56. Ordies S. Vrouwen in de geneeskunde: de huidige epidemiologie in België per specialisme. Tijdschr Geneesk; 2022. p. 449 - 53.
57. Meyer S, Verheyden G, Brinkmann N, Dejaeger E, De Weerdt W, Feys H, et al. Functional and motor outcome 5 years after stroke is equivalent to outcome at 2 months: follow-up of the collaborative evaluation of rehabilitation in stroke across Europe. Stroke. 2015;46(6):1613-9.
58. Rijksinstituut voor ziekte- en invaliditeitsverzekering. Aantal individuele zorgverleners in 2022 2022 [Available from: https://www.riziv.fgov.be/nl/statistieken/statistieken-geneeskundige-verzorging/statistieken-2022/aantal-individuele-zorgverleners-in-2022.
59. Mathieu C. Is HbA1c betrouwbaar voor de diagnose van typeII diabetes? : Minerva. Tijdschrift voor Evidence-Based Medicine; 2011. p. 80-1.

12 Annex 1. Questionnaire (Dutch)

Q2.1 Bent u huisarts of neuroloog (of bent u in opleiding hiervoor)?

- Huisarts
- Neuroloog

Q2.2 Wat is uw leeftijd?

- Minder dan 30 jaar
- 31 - 40 jaar
- 41 - 50 jaar
- 51 - 60 jaar
- Ouder dan 60 jaar

Q2.3 Wat is uw geslacht?

- Man
- Vrouw
- Andere/Zeg ik liever niet

Q2.4 U bent:

- Huisarts
- Huisarts in Opleiding (HAIO)

Q2.5 Welke specialiteit beoefent u?

- Neurovasculair specialist
- Algemeen neuroloog
- Andere subspecialisatie namelijk:

Q2.6 In welke soort praktijk werkt u?

- Solo
- Duo
- Groepspraktijk (vul aantal artsen in praktijk hieronder aan aub)
- Wijkgezondheidscentrum (vul aantal artsen in praktijk hieronder aan aub)
- Andere

Q2.7 Waar werkt u voornamelijk? (Meerdere antwoorden mogelijk)

- In een universitair ziekenhuis
- In een niet-universitair ziekenhuis

Q2.8 In welke regio(s) werkt u voornamelijk? (Meerdere antwoorden mogelijk)

- Brussel
- Vlaanderen
- Wallonië

Q2.9 Hoeveel jaren klinische ervaring heeft u (assistentenjaren inbegrepen)?

- 0 - 5 jaar
- 6 - 10 jaar
- 11 - 20 jaar
- 21 - 30 jaar
- 31 - 40 jaar
- 40 + jaar

Q3.1 Hoe groot schat u uw patiëntenpopulatie?

Q3.2 Hoeveel patiënten in uw praktijk hebben het voorbije jaar een CVA (ischemie en hemorragie, geen TIA) doorgemaakt (igv groepspraktijk: enkel de door u gevolgde patiënten, niet door collega's)?

- Geen
- <5
- >5

Q3.3 Hoe frequent ziet u patiënten gemiddeld het jaar volgend op een CVA na ontslag uit het ziekenhuis/revalidatiecentrum?

- 0 keer
- 1 - 3 keer per jaar
- 4 - 10 keer per jaar
- Maandelijks
- Meer dan maandelijks

Q3.4 Na gemiddeld hoeveel tijd ziet u voor de eerste keer (thuis of in het rusthuis) een patiënt terug na de hospitalisatie volgend op een CVA?

- De dag van het ontslag
- Binnen de eerste week
- < 2 weken
- < 1 maand
- Na 1-2 maanden
- Na 3 maanden
- Na 6 maanden
- Na 1 jaar
- Op vraag patiënt/ WZC en indicatie
- Andere:

Q3.5 Hoeveel acute CVA's (ischemie en hemorragie, geen TIA) worden er maandelijks gemiddeld opgenomen in uw ziekenhuis?

- Geen
- < 5
- > 5
- > 10
- > 20
- > 30

Q3.6 Wanneer ziet u de patiënt gewoonlijk terug ter opvolging na CVA? (meerdere opties mogelijk)

- <2 weken
- < 1 maand
- Na 1-2 maanden
- na 3 maanden
- na 6 maanden
- na 1 jaar
- Op vraag van patiënt/woonzorgcentrum of op indicatie
- Andere:

Q3.7 Maakt u gebruik van teleconsultaties ter opvolging van CVA patiënten?

- Altijd
- Soms
- Zelden
- Nooit

Q3.8 Hoe frequent worden patiënten gemiddeld opgevolgd het eerste jaar:

- 0 keer
- 1-3 keer
- > 3 keer

Q4.1 Hoe wordt er tijdens de hospitalisatie gecommuniceerd met de neuroloog (wat wordt in de regel uitgevoerd) Nooit – Zelden – Soms – Vaak – Altijd

- Opnamebrief of – vermelding via careconnect/ander platform of via post
- Telefonisch contact
- MDO (multidisciplinair overleg)
- Persoonlijke e-mail

Q4.2 Hoe wordt er meteen na de hospitalisatie gecommuniceerd met de neuroloog (wat wordt in de regel uitgevoerd) Nooit – Zelden – Soms – Vaak – Altijd

- Hospitalisatiebrief van de neuroloog via online platform of via post
- Hospitalisatiebrief van de neuroloog via patiënt
- Telefonisch contact
- Persoonlijke e-mail

Q4.3 Vindt u volgende onderdelen terug in een ontslagbrief? Nooit – Zelden – Soms – Vaak – Altijd

- Telefoonnummer neuroloog
- Telefoonnummer medisch secretariaat
- Informatie rond gevraagde bloednames (planning volgende bloedname, parameters te bepalen)
- Informatie rond vervolgafspraken

Q4.4 Worden volgende targets/doelen vermeld in de ontslagbrief die verder door u dienen opgevolgd te worden? Nooit – Zelden – Soms – Vaak – Altijd

- Cholesterol
- Bloeddruk
- HbA1c
- Streefgewicht
- Target beweging
- Rookstop
- Informatie rond dieet
- Aanbevelingen alcoholgebruik

Q4.5 Zijn er zaken die u graag frequenter zou willen terugvinden in een ontslagbrief?

Q4.6 Hoe communiceert de neuroloog met u het jaar volgend op een CVA? Nooit – Zelden – Soms – Vaak – Altijd

- Consultatiebrieven via de patiënt
- Consultatiebrief via online platform of via post
- Via e-mail (of ander rechtstreeks online contact)
- Telefonisch

Q4.7 Heeft u opmerkingen omtrent de communicatie?

Q4.8 Hoe wordt er tijdens de hospitalisatie gecommuniceerd met de huisarts (wat wordt in de regel uitgevoerd) Nooit – Zelden – Soms – Vaak – Altijd

- Opnamebrief of opnamevermelding via online platform via post
- Telefonisch contact
- MDO (Multi-Disciplinair Overleg)
- Via e-mail (of ander rechtstreeks online contact)
- Huisarts wordt niet gecontacteerd

Q4.9 Hoe wordt er meteen na de hospitalisatie gecommuniceerd met de huisarts (wat wordt in de regel uitgevoerd) Nooit – Zelden – Soms – Vaak – Altijd

- Hospitalisatiebrief via online platform of via post
- Hospitalisatiebrief via patiënt
- Telefonisch contact
- Via e-mail (of ander rechtstreeks online contact)
- Wordt niet gecontacteerd

Q4.10 Hoe frequent worden volgende onderdelen toegevoegd aan een ontslagbrief? Nooit – Zelden – Soms – Vaak – Altijd

- Rechtstreeks telefoonnummer neuroloog
- Telefoonnummer medisch secretariaat
- Informatie rond gevraagde bloednames (planning volgende bloedname, parameters te bepalen)
- Informatie rond vervolgafspraken

Q4.11 Hoe vaak worden volgende targets/doelen vermeld in de ontslagbrief? (doelen op te volgen door de huisarts) Nooit – Zelden – Soms – Vaak – Altijd

Cholesterol

- Bloeddruk
- HbA1c
- Streefgewicht
- Target beweging
- Rookstop
- Informatie rond dieet
- Aanbevelingen rond alcoholgebruik

Q4.12 Zijn er zaken die u graag frequenter zou willen toevoegen aan een ontslagbrief?

Q4.13 Hoe communiceert de huisarts met u het jaar of langer volgend op een CVA? Nooit – Zelden – Soms – Vaak – Altijd

- Verwijsbrieven via de patiënt
- Verwijsbrieven via online platform
- Via e-mail (of ander rechtstreeks online contact)
- Telefonisch

Q4.14 Heeft u opmerkingen omtrent de communicatie?

Q5.1 De belangrijkste en meest besproken secundaire preventie post-CVA betreft antithrombotica, hypertensie, dyslipidemie, roken en diabetes. De volgende vragen zullen gaan over wat uw medicamenteuze stappen zijn, hoe u dit opvolgt en wiens rol u dit voornamelijk vindt.

Q5.2 Wiens rol vindt u het om volgende medicatie te bewaken en te wijzigen na een doorgemaakt CVA (dus na ontslag uit het ziekenhuis): (Aan te duiden van 0 tot 100 waarbij 0 = volledig taak van de huisarts, 50 = gedeelde taak, 100 = volledig taak van de neuroloog)

- Antitrombotica
- Antihypertensiva
- Hypolipemiërende medicatie
- Diabetesmedicatie

Q5.3 Bent u tevreden over hoe deze rolverdeling nageleefd wordt? Ja - Nee

- Antitrombotica
- Antihypertensiva
- Hypolipemiërende medicatie
- Diabetesmedicatie

Q5.4 Hoe volgt u uw CVA patiënten op in het kader van bloeddrukcontrole? (meerdere antwoorden mogelijk)

- Tijdens consult
- Via thuismetingen
- Via 24-uurs-bloeddrukmetingen
- Andere:

Q5.5 Wiens taak vindt u dit? (Meerdere antwoorden mogelijk)

- Eerder huisarts
- Gedeelde taak
- Eerder neuroloog
- Cardioloog
- Patient zelf
- Andere:

Q5.6 Wat is voor u de algemene bloeddruk target na een CVA?

- < 120/70 mmHg
- < 130/80 mmHg
- < 135/85 mmHg
- < 140/90 mmHg
- Andere:

Q5.7 Volgt u hiervoor specifieke richtlijnen? Zo ja, welke? (Meerdere antwoorden mogelijk)

- Nee
- Ziekenhuisrichtlijnen/ zorgpad
- NHG (Nederlands Huisartsengenootschap)
- Domus Medica
- KCE (Federaal kenniscentrum voor de gezondheidszorg)
- AHA/ASA (American Heart Association/American Stroke Association)
- International Society of Hypertension Global Hypertension Practice Guidelines
- Andere:

Q5.8 Hoe vaak controleert u in geval van dyslipidemie het lipidenbilan bij uw patient?

- 1
- 1-2 keer per jaar
- > 2 keer per jaar

Q5.9 Wat is volgens u het algemene streefdoel voor de LDL-cholesterol na een CVA?

- < 115 mg/dl
- < 100 mg/dl
- < 70 mg/dl
- < 55 mg/dl
- Andere:

Q5.10 Volgt u voor de opvolging van dyslipidemie specifieke richtlijnen? Zo ja, dewelke? (Meerdere antwoorden mogelijk)

- Nee
- Ziekenhuisrichtlijnen/ zorgpad
- NHG (Nederlands Huisartsengenootschap)
- Domus Medica
- KCE (Federaal Kenniscentrum voor de gezondheidszorg)
- AHA/ASA (American Heart Association/American Stroke Association)
- Andere:

Q5.11 Voert u zelf diagnostische tests voor diabetes uit het eerste jaar na een CVA? (Graag aanduiden welke test(s) u vraagt)

- Nee
- Nuchtere glycemie
- Postprandiale glycemie
- HbA1C

Q5.12 Vindt u dit de taak van de huisarts of de neuroloog?

- Eerder huisarts
- Gedeelde taak
- Eerder neuroloog
- Andere:

Q5.13 Screent u systematisch CVA patiënten naar overgewicht? (Wegen, bevragen,...)

- Nee
- Ja
- Soms: wat zijn voor u de criteria om te verwijzen?

Q5.14 Geeft u tijdens de opvolgconsultaties frequent advies rond: Ja – Nee

- Dieet
- Beweging
- Alcoholgebruik

Q5.15 Zou u graag iets veranderen omtrent de organisatie of de communicatie rondom secundaire preventie en opvolging? (Meerdere antwoorden mogelijk)

- Verplicht zorgplan bij elke patient (bv oplijsten specifieke targets in de ontslagbrief, plannen van opvolgconsultaties,..)
- Terugbetaling multidisciplinair overleg incl. eerstelijnszorg
- Meer aandacht voor patient empowerment
- Aanwezigheid van een regionale CVA zorgcoördinator
- Directer elektronisch platform voor communicatie tussen eerste en tweede lijn
- Uitbouw van regionale netwerken van multidisciplinaire beroerte zorgverleners (incl. lijst thuisverpleegkundigen, logopedisten, kinesisten gespecialiseerd in CVA) bv via website met alle contact informatie
- Andere
- Nee

Q5.16 Heeft u nog andere suggesties om secundaire preventie na CVA te verbeteren?

Q6.1 Depressie en vermoeidheid, maar ook werkgelegenheid en aanhoudende neurologische problemen zijn frequente fenomenen na een CVA. Het volgende deel zal gaan over hoe u deze problemen aanpakt, en of u dit meer toebedeelt aan de neuroloog of de huisarts.

Q6.2 Spoort u tijdens de opvolgconsultaties zelf actief volgende sequelen op? Ja – Nee

- Depressie en angst
- Cognitieve problemen
- Slaapstoornissen
- Vermoeidheid
- Pijn en spasticiteit
- Mobiliteit (o.a. gangproblemen)
- Problemen met ADL (wassen, eten, kleden, wc bezoek)
- Communicatieproblemen (afasie, dysarthrie,..)
- Slikstoornissen
- Seksuele en relationele problemen
- Incontinentie
- Rijgeschiktheid
- Problemen met arbeidsgeschiktheid

Q6.3 Wiens taak vindt u het opsporen en opvolgen van deze sequelen? (Aan te duiden van 0 tot 100 waarbij 0 = volledig taak van de huisarts, 50 = gedeelde taak, 100 = volledig taak van de neuroloog)

- Depressie en angst
- Cognitieve problemen
- Slaapstoornissen
- Vermoeidheid
- Pijn en spasticiteit
- Mobiliteit (o.a. gangproblemen)
- Problemen met ADL (wassen, eten, kleden, wc bezoek)
- Communicatieproblemen (afasie, dysarthrie,..)
- Slikstoornissen
- Seksuele en relationele problemen
- Incontinentie
- Rijgeschiktheid
- Problemen met arbeidsgeschiktheid

Q6.4 and 6.5 Verwijst u door voor volgende sequelen? Zo ja, naar wie? (meerdere opties mogelijk) (Neuro-)psycholoog – Psychiater – Slaapspecialist – Huisarts – Neuroloog -Ik verwijs hiervoor meestal niet door omdat ik dit zelf behandel/andere reden

- Depressie en angst
- Cognitieve stoornissen
- Slaapstoornissen

Q6.6 and 6.7 Verwijst u door voor volgende sequelen? Zo ja, naar wie? (meerdere opties mogelijk) Kinesist-Ergotherapeut – Psycholoog - Fysische geneeskunde – Thuisverpleging – Huisarts – Neuroloog - Ik verwijs hiervoor meestal niet door omdat ik dit zelf behandel/andere reden

- Vermoeidheid
- Pijn en spasticiteit
- Mobiliteit (bv. gangproblemen)
- Problemen met ADL (wassen, eten, kleden, WC-bezoek)

Q6.8 and 6.9 Verwijst u door voor volgende sequelen? Zo ja, naar wie? (meerdere opties mogelijk) Logopedie – Huisarts – Neuroloog – Thuisverpleging - Ik verwijs hiervoor meestal niet door omdat ik dit zelf behandel/andere reden

Communicatiestoornissen (afasie, dysartrhie)
Slikstoornissen

Q6.10 and 6.11 Verwijst u door voor volgende sequelen? Zo ja, naar wie? (meerdere opties mogelijk) Psycholoog – Uroloog – Thuisverpleging – Huisarts – Neuroloog - Ik verwijs hiervoor meestal niet door omdat ik dit zelf behandel/andere reden:

Seksuele en relationele problemen
Incontinentie

Q6.12 and 6.13 Verwijst u door voor volgende sequelen? Zo ja, naar wie? (meerdere opties mogelijk) Preventie-adviseur/arbeidsgeneeskunde - VIAS/CARA – Huisarts – Neuroloog - Ik verwijs hiervoor meestal niet door omdat ik dit zelf behandel/andere reden:

Rijgeschiktheid
Arbeidsgeschiktheid

Q6.14 Stuurt u patiënten door naar een patiëntenvereniging?

Ja (naar welke?)
Nee
Geen vereniging in de buurt
Ik vind dit niet nuttig
Andere:

Q7.1 Heeft u nog opmerkingen?

13 Annex 2. Ethics Committee Approval

Universitair Ziekenhuis Brussel

VRIJE UNIVERSITEIT BRUSSEL

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MARGAUX VANDERSTRAETEN VAKGROEP HUISARTSENGENEESKUNDE EN CHRONISCHE ZORG EN NEUROLOGIE

Brussels, 2022-12-14

EC number: EC- 2022- 280

LEADING ETHICS COMMITTEE - SINGLE OPINION

Concerning :
Stroke aftercare: the role of general practitioner and neurologist.

BUN: 1432022000206

The Medical Ethics Committee of UZ Brussel/VUB reviewed the documents (see annex EC document list) concerning the above mentioned project from the ethical, legal and medical science points of view and in accordance with the Belgian Law of 7 May 2004 concerning experiments on the human person, Chapter VIII – Article 11 – § 4 : items 1 till 11

The Ethics Committee decided, during its meeting on 2022-12-14, that there are no objections to the study in its present form.

Please remark that the Green Light Procedure has to be completed before the study can be performed at UZ Brussel.

This approval is valid for the duration of the trial. The Committee wishes to obtain an annual trial status. Results of the trial should be transmitted to the Committee at the end of the trial (publication or summary if there is no publication planned). The Committee reminds the investigator of his/her personal responsibility for this project. The Committee does not take any responsibility for its favourable advice of the project. The Ethics Committee is organised and operates according to ICH-GCP and its applicable laws and regulations. The list of members is enclosed.

Kind regards,

Chairman
Vice-Chairman

Cc: FAGG, R&D department