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Comparing guidelines to daily practice when screening older patients for the risk of functional decline in hospitals: outcomes of a functional resonance analysis method (FRAM) study

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Objectives: Dutch hospitals are required to screen older patients for functional decline using 4 indicators: malnutrition, delirium, physical impairment, and falls, to recognize frail older patients promptly. The Functional Resonance Analysis Method was employed to deepen the understanding of work according to the protocols (work-as-imagined [WAI]) in contrast to the realities of daily practice (work-as-done [WAD]).

Methods: Data have been collected from 3 hospitals (2 tertiary and 1 general) and 4 different wards: an internal medicine ward, surgical ward, neurology ward, and a trauma geriatric ward. WAI models were based on national guidelines and hospital protocols. Data on WAD were collected through semistructured interviews with involved nurses (n = 30).

Results: Hospital protocols were more extensive than national guidelines for all screening indicators. Additional activities mainly comprised specific preventive interventions or follow-up assessments after adequate measurements. Key barriers identified to work according to protocols included time constraints, ambiguity regarding task ownership, nurses' perceived limitations in applying their clinical expertise due to time constraints, insufficient understanding of freedom-restricted interventions, and the inadequacy of the Delirium Observation Scale Score in patients with neurological and cognitive problems. Performance variability stemmed from timing issues, frequently attributable to time constraints.

Conclusions: The most common reasons for deviating from the protocol are related to time constraints, lack of knowledge, and/or patient-related factors. Also, collaboration among relevant disciplines appears important to ensure good health outcomes. Future research endeavors could shed a light on the follow-up procedures of the screening process and roles of other disciplines, such as physiotherapists.

Background

The number of older patients in the Netherlands is rising, while they are more likely to experience adverse events (AEs) during hospital admissions and are at greater risk of developing complications causing (irreversible) functional decline.¹⁻⁴ Results of an AEs study showed that patients 70 years and older were more like to experience preventable AEs if they had a high comorbidity (Charlson score >5).⁴ One of the patient safety initiatives to reduce the risk of functional decline among older patients was the implementation of the Safety Management System (VMS) program in Dutch hospitals, starting from 2009.³ Throughout this program, the VMS screening instrument for older patients was introduced. This instrument aims to identify patients 70 years or older with an increased risk of functional decline by assessing 4 indicators associated with functional decline (i.e., malnutrition, delirium, physical impairment, and falls) (Appendix A, <http://links.lww.com/JPS/A639>).^{3,5-7} Risk assessment on the 4 indicators malnutrition, delirium, physical impairment, and falls must take place within 24 hours after the patient is admitted.

There is an ongoing debate on whether the implementation of patient safety initiatives could further decrease preventable AEs among older patients. Studies show that, over the years, preventable AEs among older patients have not further decreased.⁸⁻¹¹ With regard to the compliance with the VMS indicators, the most recent study showed that 74% of all admitted patients 70 years and older were screened for all 4 indicators.¹² Even though this is an improvement compared to 2012 (47%), there is still a proportion of older patients where an increased risk of functional decline may not be recognized in time during hospitalization.^{9,13} On one hand, further initiatives aimed at improving compliance with the VMS could assist in increasing the percentage. On the other hand, it is also intriguing and perhaps more meaningful to understand why there are still patients 70 years and older who are not being fully screened with the VMS. This raises the question if focusing on the implementation of guidelines and protocols is still sufficient to further improve patient safety.¹⁴

Previous patient safety research mainly focused on compliance with guidelines and protocols, i.e., the Safety-I approach defining patient safety as the “absence of unwanted outcomes by human or system failures.”¹⁵ Protocols describe how care processes should take place to ensure patient safety, but in reality, daily practice can be quite different.^{14,16} Nurses have to deal with unexpected challenges, e.g., changing conditions and resource constraints, and still have to achieve good outcomes.¹⁷ In most cases, their daily practice is successful because they adapt their performance.^{16,18,19} The increasing interest in the Safety-II perspective arises from a desire to comprehend why processes typically succeed, while also acknowledging the inherent unpredictability of the healthcare environment, requiring adaptation from healthcare professionals.^{16,20,21} Gaining insights into how processes function in real-world settings, as opposed to adhering strictly to guidelines and protocols, could reveal where nurses deliberately or accidentally deviate from protocols. Such understanding can be valuable when implementing improvement interventions.

Our aim is to study how the screening process of older patients for an increased risk of functional decline is done in practice by using the FRAM analysis. In the Netherlands, similar FRAM analyses have been conducted.^{22,23} Second, we aim to reveal potential differences between work-as-imagined (WAI) and work-as-done (WAD) to understand where performance variability occurs. These insights could help to improve identification of frail older patients. The Functional Resonance Analysis Method (FRAM) originates from the Safety-II perspective and can be used to model these workflows.^{14,19,20,24}

Methods

We used the FRAM to map the screening process of older patients in 4 different types of hospital wards in the Netherlands. We aimed to include 10 wards from different hospitals.²⁵ Each ward designated a contact person (e.g., nurse of department head) to facilitate the study. The COVID-19 pandemic necessitated several adjustments to conduct the study. Firstly, we were able to include 4 wards. Secondly, direct observations were not feasible; therefore, interviews were conducted online or by phone to discuss the screening process and the choices nurses made

Setting

Internal medicine wards, surgical wards, geriatric wards, and other related wards from Dutch hospitals were invited to participate in the study. We selected these wards due to their high admission rates of older patients. Hospitals were deemed ineligible to participate if they were undergoing changes such as mergers or implementing electronic health records during the data collection period.²⁵

Design

Our study protocol provides an extensive description of the design of the overall study²⁵; in this article, we focus on the construction and comparison of the FRAM models. FRAM models, i.e., WAI and WAD, were constructed by one researcher based on the analysis of national guidelines and hospital protocols and interviews with participating nurses by following 3 steps¹⁹:

- 1) The ideal model of how to screen older patients for an increased risk of functional decline as described in national guidelines (WAI) was visualized.
- 2) Hospital protocols (WAI) were analyzed to visualize the interpretation hospitals gave to national guidelines.
- 3) WAD has been drawn up per ward based on the semistructured interviews with involved nurses to understand how the risk screening of frail older patients is performed in daily practice (WAD).^{25,26}

WAD models were presented and explained during online presentations for each participating ward, facilitating the initiation of an open dialogue and to encourage reflection on daily practice (WAD) and the appropriateness of WAI.¹⁷

The Functional Resonance Analysis Method

FRAM is a method that has been frequently used to model daily practice.^{27,28} FRAM allows us to move beyond individual events and comprehend activities as they are envisioned (WAI) or as they occur (WAD).²⁸ FRAM uses functions (purposeful activity in a system, which can be human, organizational, or technical) to model all activities within selected processes.^{15,19,26-28} These functions are visualized in hexagons and are based on 6 aspects^{26,27}:

1. *Input*: what starts or changes the function
2. *Output*: outcome of the function
3. *Precondition*: conditions that need to be fulfilled to perform the function
4. *Resources*: what the function needs or consumes
5. *Time*: aspects of time that affect the function
6. *Control*: factors that influence or adjust the function

The output of a function (e.g., activity) can be connected to another function (e.g., activity) and 1 of its 6 aspects as mentioned above.²⁸ Functions can be divided into foreground or background

functions. Background functions have only input(s) or output(s) and can be assumed to be constant (i.e., they do not vary) when analyzing processes. Foreground functions are the main activities and have our focus. Variability in the main activities may have consequences for the outcome of the activity or the care process.^{26,29} Figure 1 shows an example of a foreground and background function.

[Figure 1]

Data Collection

According to the literature, interviews, focus groups, observations, document analyses, and incident reports are commonly used to construct FRAM models.²⁹ To develop overarching models of WAI to visualize the screening process for older patients, we collected national guidelines and hospital protocols provided by the contact persons of participating wards. We performed semistructured interviews based on the 6 FRAM aspects to construct the WAD models, which is one of the most used methods to map daily practice.^{30,31} We interviewed for each participating ward at least 7 nurses involved in the screening process to construct WAD models (Table 1). Nurses (including trainees) involved in the risk screening of older patients were recruited based on their availability by the contact persons of the wards. Participation was voluntary, and information has been processed anonymously. All interviews were audio recorded with professional equipment and subsequently transcribed. During the interviews, we asked participants if we could send them a summary and first draft of the WAD model based on the interviews (i.e., member check) by email.²⁵ We have chosen to focus solely on the nursing process surrounding the screening of older patients, because they are responsible for conducting the VMS screening and they must promptly identify frail older patients to involve other disciplines.

[Table 1]

Data Analysis

Based on the hospital protocols and transcripts, every single step taken in the screening process has been translated into a function, including related FRAM aspects. A first draft of the WAD per ward was made on paper after nurses were interviewed. Transcripts were used to complete the WAD models. All FRAM models have been visualized by using the program FRAM Model Visualiser Pro.³²

Ethics

The study has been assessed by the Medical Ethics Committee of the VU University Medical Center Amsterdam. They have declared that the study is not subjected to Medical Scientific Research with Human Subjects Act (WMO) (number 2019.571).

Results

Participants

In total, 3 Dutch hospitals took part in the study, including 2 tertiary hospitals and 1 general hospital, with a total of 4 hospital wards: an internal medicine ward, a surgical ward, a neurology ward, and a trauma geriatric ward. All participating nurses (n = 30) were interviewed between May 2020 and November 2020 (Table 1). Most interviewed nurses were female (84%) (Table 1), and median years of nursing experience was 2,5 years.

WAI Model Based on National Guidelines and Hospital Protocols

Hospitals translate national guidelines into their own protocols to describe the activities that are considered to be necessary to achieve certain results.¹⁹ Comparing disparities between guidelines

and protocols offers insight into how hospitals have interpreted and applied national guidelines to suit their hospital's context.

Tables 2, 3, 4, and 5 outline the WAI models derived from both national guidelines and hospital protocols for the screening indicators malnutrition, delirium, physical impairment, and falls. According to the national guidelines, the WAI for malnutrition consists of 9 foreground activities, 7 foreground activities for delirium, 4 foreground activities for physical impairment, and 6 foreground activities when screening for the risk of falls (see Fig. 2 for an example of a WAI model).^{5-7,12}

Compared to national guidelines, hospital protocols were more detailed. To construct a general WAI model for the hospital protocols, we included the most common foreground activities. We identified 5 additional activities for malnutrition, 1 for delirium, 5 for physical impairment, and 1 for falls. Most additional activities relate to the use of specific preventive interventions (e.g., the use of freedom restricting interventions to reduce fall incidents). Other extra activities include reassessments after appropriate measurements are taken or consulting involved disciplines. Several activities outlined in the guidelines were not included in the hospital protocols. For example, the activity "the doctor drafts and starts a nutritional treatment plan" for the indicator malnutrition is only described in one protocol. None of the hospital protocols included the reevaluation of fall risk as a part of their protocol. Additionally, the age limit at which patients should be screened for the fall risk ranged between 18 and 65 years between hospitals. National guidelines advice to screen patients for the risk of falls from the age of 65 year, in contrast to the other 3 screening indicators where an age limit of 70 years and older is advised.

WAD Models Compared to WAI Models

Tables 2, 3, 4, and 5 show the foreground activities predominantly identified in the WAD models of participating wards. These activities are used to construct an overarching WAD model. Differences between WAD models and WAI models were noted.

To assess the risk for malnutrition (Table 2), performance variability was identified when monitoring the patient's intake. In some wards, monitoring a patient's intake is standard procedure, whereas in others, it is only done if there is a suspected deficiency or at the dietitians request.

If a patient has an increased risk to develop a delirium (Table 3), 3 wards have the possibility to consult a geriatrician, geriatric nurse, or psychiatrist in case of increased fall risk caused by symptoms of a delirium. Most wards deploy freedom restricting interventions if patients show symptoms of confusion or delirium to reduce the fall risk. However, in most cases, the specific freedom-restricting interventions and their appropriate deployment were not described in hospital protocols. Two wards reported evaluating these interventions daily, only one ward indicated reporting patients falls (Table 4).

Most wards used the indicator physical impairment (Table 5) to estimate the patient's care needs during hospitalization, rather than to consciously improve patient mobility by (re)activating the patient. From the WAI perspective, patients undergo screening for physical impairment to ascertain the level of support required to enhance their self-reliance. Two wards have the possibility to consult a transfer nurse in case patients are discharged.

Facilitators and Barriers

Several facilitators were identified in screening older patients for the risk of functional decline. Firstly, the 4 VMS indicators are integrated into the electronic patient file and part of the patient's anamnesis. In most wards, the electronic patient file automatically alerts the nurse to consult other disciplines if any of the indicators showed an increased risk.

We also encountered several barriers. In cases where the screening was not fully conducted within 24 hours after admission, this was almost always due to lack of time. Nurses often felt they have insufficient time to integrate their own clinical expertise when deciding how to respond to in

particular situations: for instance, when patients exhibit signs of functional decline beyond the initial 24-hours window after admission. Additionally, nurses mentioned that they did not always know what happened to certain outcomes of activities by other disciplines, leading to a lack of awareness regarding the importance of certain tasks. Furthermore, most of the participating wards expressed that the Delirium Observation Scale Score (DOSS) score, used to identify the risk for a delirium, may not be entirely reliable for patients with neurological or cognitive problems.

Freedom-restricted interventions were deployed to reduce/prevent the risk of falls at almost all wards. However, there appeared to be lack of clarity regarding how and when to deploy them. These interventions were not consistently evaluated after 24 hours, partly because the physician did not make the order in the electronic patient file, resulting in the absence of an observation list in the nursing file. Consequently, nurses are unaware when and which interventions should be observed.

In most cases, patients are not weighted upon admission to assess the degree of malnutrition, primarily due to time constraints and/or of resource limitations. Additionally, it is often unclear who is responsible for monitoring the patient's intake: the nurse or the nutrition assistant.

[\[Table 2\]](#), [\[Table 3\]](#), [\[Table 4\]](#)

Discussion

We aimed to identify differences between national guidelines, hospital protocols (WAI), and daily practice (WAD) to understand where variability arises when screening older patients for an increased risk of functional decline. Discrepancy between WAI and WAD may arise due to practical challenges and time constraints (e.g., key persons being unavailable at critical points in the process or protocols fail to delineate specific activities to address resource restraints).¹⁷

Protocols from the 3 participating hospitals regarding the VMS indicators (malnutrition, delirium, physical impairment, and falls) were more comprehensive compared to national guidelines. Hospital protocols described which and when a certain discipline should be consulted or perform an activity. This aligns with the observation that, although guidelines provide some direction, protocols often detail all necessary actions to attain specific health outcomes.¹⁹ Some activities were not included in the hospitals: for example, the specific freedom-restricting interventions and their appropriate deployment.

We examined all 4 indicators separately in 4 different settings, although the indicators are collectively considered as a screening set (i.e., VMS screening instrument). Most barriers we found applied to all 4 indicators. Time constraints emerged as the primary reason for activities to be delayed or omitted. Postponing tasks raises the risk of overlooking them entirely. The lack of time may be attributed to rising workload and staffing shortages. When nurses perceive a lack of time, they may feel they unable to conduct thorough assessments, resulting in performance variability. The efficiency-thoroughness trade-off (ETTO) principle explains how nurses have to make choices between being effective and being thorough when completing a task, due to lack of resources (i.e., time, materials, information, tools, energy, staff).^{14,33,34} According to the ETTO principle, it is almost impossible to achieve both efficiency and thoroughness when resources are short. Trade-offs between efficiency and thoroughness have to be made to overcome barriers and to fulfil tasks, causing performance variability.³³ Deviations from the protocol may indeed reduce resources needed, such as time and workload, but they can also impact the care process of other involved disciplines, as certain outcomes may be necessary for subsequent decisions in the care process. Workload may increase if preventive measurements are not taken (in time) when risks develop which require additional care. In our study, performance variability was mostly caused because of time constraints. In other words, nurses must compromise on thoroughness to work more efficiently due to time constraints. We identified variability in several activities, such as how and when nurses monitored the patient's intake to assess the risk for malnutrition, or when to deploy freedom

restricting interventions to reduce the risk for falls. Most variability stems from individual assessment, such as the nurse's decision to monitor patient's intake if inadequate intake is suspected.

This study examined the implementation of the screening process for identifying the risk of functional decline among older patients admitted to 4 different types of hospital wards. Our findings offer insights in a deeper understanding of work according to the protocols (WAI) in contrast to the realities of daily practice (WAD). Also, it allows us to understand where variations in daily practice occur. Solutions to further improve patient safety for older patients may already exist but may have been overlooked in a strictly Safety-I approach with a focus primarily on compliance.¹⁷ By adopting a Safety-II approach as well, we also gain a better understanding of why deviations from the protocol occur, rather than just recognizing that deviations are taking place.²⁸ This knowledge gives nurses the possibility to discuss the (un)desirability of the variation regarding patient safety.

[Table 5]

Study Strengths and Limitations

This study shows how the screening process of older patients for an increased risk of functional decline is done in daily practice by using the FRAM analysis. The participation of various types of hospital wards adds strength to the examination of performance variability in daily practice (WAD).

This study took place during the COVID-19 pandemic, resulting in fewer hospitals and wards being able to participate. Due to the pandemic, we were unable to conduct face-to-face interviews and observations. Observation proves to be a valuable technique for constructing a FRAM model, as it allows for a deeper understanding of complex systems and their processes.²⁹ Although interviews are considered as a powerful tool to construct WAD models,^{30,31,35} we could discuss whether the models should be regarded as work-as-disclosed, as we may have missed to observe activities. Secondly, FRAM was used to provide visual insights into the actual execution of processes. However, nurses noted that the FRAM models can be challenging for laymen to grasp. Nonetheless, identifying potential barriers and facilitators from the FRAM models can yield insights into health care, which can inform quality improvement initiatives.

Thirdly, our interviews exclusively focused on nurses' perspectives on screening older patients for the risk of functional decline. Activities performed by other disciplines related to this process were not considered.

Conclusions

FRAM proves to be a valuable tool for assessing and comprehending daily practice.^{15,17} In this study, our objective was to gain a deeper understanding on how older hospitalized patients are screened for an increased risk of functional decline in daily practice compared to guidelines and protocols. We used the FRAM to identify differences between daily practice (WAD) and how the screening process is described in guidelines and protocols (WAI). Several differences emerged upon comparison between WAI and WAD. Notably, hospital protocols for all 4 indicators associated with functional decline (malnutrition, delirium, physical impairment, and falls) were more comprehensive. Most additional activities described in these protocols relate to the use of specific preventive interventions or include follow-up assessments after initial measurements. Performance variability was primarily linked to timing, particularly when activities were carried out, such as monitoring the patient's intake or when to deploy freedom-restricted interventions to prevent/reduce the risk of falls.

From these findings, achieving absolute compliance with protocols may be ambitious or even undesirable, given the constantly changing work conditions and resource constraints that nurses encounter.¹⁴ Also, nurses need to be able to apply their own critical expertise to perform their work

and achieve the best possible health outcomes in any circumstance. In practice, some activities outlined in WAI were skipped while new activities are introduced. In most cases, these deviations from the protocol occur to overcome encountered barriers (e.g., lack of time, resource constraints) or lack of knowledge. Nurses were not always aware of what happened to certain outcomes of activities by other disciplines, which sometimes led to the omission of certain activities. Future research could offer further insights into the follow-up of the VMS screening of older patients and the involvement of other disciplines in this process.

[Figure 2]

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Tables and figures

Figure 1 Example of a foreground (visualized in a hexagon) and background function.

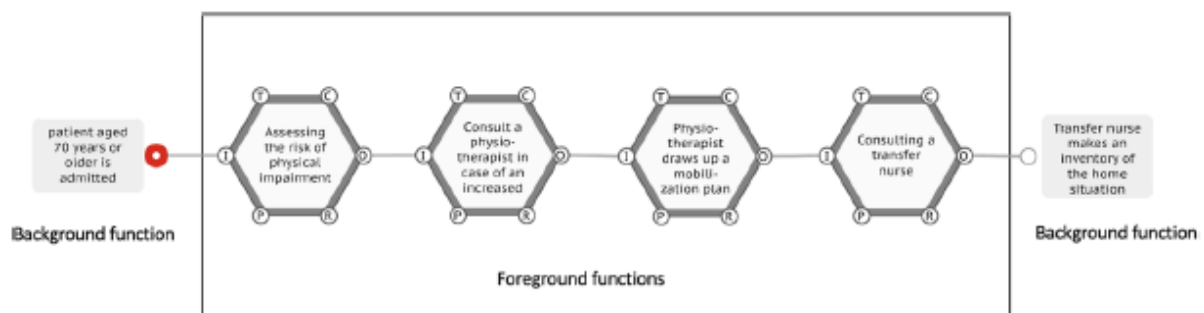


Table 1 Characteristics of the Interviewed Nurses

Nurses total, n (%)	30 (100)
Internal medicine, n (%)	7 (23.3)
Surgical ward, n (%)	8 (26.7)
Neurology ward, n (%)	7 (23,3)
Trauma geriatric ward, n (%)	8 (26.7)
Female, n (%)	25 (84)
Male, n (%)	5 (6)
Years of work experience as a nurse	
Mean	6 (IQR, 4)
Median (y)	2.5

Table 2 WAI for the Screening indicator Malnutrition Based on National Guidelines and Hospitals Protocols Compared With WAD

Malnutrition		Differences Compared to National Guidelines		Differences Between Hospital Protocols and WAD	
WAI ^{national}		WAI ^{hospital}		WAD	
Foreground Activities	Description of Activity	Foreground Activities	Differences Compared to National Guidelines	Foreground Activities	Differences Between Hospital Protocols and WAD
1 Assessing the risk on malnutrition	By using either the MUST or SNAQ within 24 h after admission	Assessing the risk on malnutrition	Wards 2 and 3 need to use the MUST to assess the risk of malnutrition; wards 1 and 4 need to use the SNAQ.	Assessing the risk on malnutrition	No difference with WAI ^{hospital}
2 Engaging a nutrition assistant in case of moderate or severe malnutrition	The nutrition assistant aims to improve the nutritional intake.	Engaging a nutrition assistant in case of moderate or severe malnutrition	No difference with WAI ^{national}	Engaging a nutrition assistant in case of moderate or severe malnutrition	In all wards, the role of the nutrition assistant is appointed to bring and collect the food.
3 Optimizing nutritional intake	In case of moderate/severe malnutrition (MUST score of ≥ 1 or SNAQ score of ≥ 2), the patient is offered an energy and protein-enriched diet.	Optimizing nutritional intake	No difference with WAI ^{national}	Not mentioned	—
4 Consulting a dietician in case of severe malnutrition	In case of severe malnutrition (MUST score of ≥ 2 or SNAQ score of ≥ 3), the dietician is consulted within 24 h after admission to further assess the nutritional status of the patient.	Consulting a dietician in case of severe malnutrition	No difference with WAI ^{national}	Consulting a dietician in case of severe malnutrition	All wards consult a dietician in case of a severe malnutrition.
5 Dietitian (re)assesses nutritional status	The dietician starts a nutritional treatment plan within 48 h after admission.	Dietitian (re)assesses nutritional status	No difference with WAI ^{national}	Dietitian (re)assesses nutritional status	Not mentioned
6 Dietitian starts a nutritional treatment plan	The dietician starts a nutritional treatment plan within 48 h after admission.	Dietitian starts a nutritional treatment plan	At ward 1, the nutritional treatment plan of the dietician starts after the doctor has drawn up a nutritional plan (activity 8) (in case of severe malnutrition).	Dietitian starts a nutritional treatment plan	No difference with WAI ^{hospital}
7 Consulting a doctor in case of severe malnutrition	In case of severe malnutrition (MUST score of ≥ 2 or SNAQ score of ≥ 3), the doctor must be informed.	Consulting a doctor in case of severe malnutrition	The role of the doctor is not described in the protocol for ward 4.	Not mentioned	—

Table 2 continued

8	Doctor drafts and starts a nutritional treatment plan	The doctor estimates the current nutritional status of the patient and the expected (nutritional) problems in the treatment of the patient.	Doctor drafts and starts a nutritional treatment plan	This activity is only described in the protocol for ward 1. In wards 2 and 3, the doctor only needs to be informed about the nutritional status of the patient.	Not mentioned	—
9	Monitoring nutritional status	The nursing staff monitors the patient's nutritional intake and (re)evaluate the nutritional status by using either the MUST or the SNAQ.	Monitoring the patient's intake by a hydration and nutrition list [*] nutritional status [*]	This additional activity was identified in the protocols for 3 wards. The moment at which the patient's intake should be monitored differs per ward. Ward 1 needs to monitor the intake of every admitted patient, whereas wards 2, 3, and 4 only monitor the patient's intake in case of moderate (SNAQ score ≥2) severe malnutrition (MUST score ≥2).	Monitoring the patient's intake by a hydration and nutrition list/ nutritional status	Wards 1 and 4 standard monitor the patients intake. Ward 3 monitors the patient's intake if nurses suspect a deficiency and for the dietitian to reassess the nutritional status.
10			Reassessing the risk of malnutrition	Two wards (1 and 4) reassess the risk on malnutrition by weighing patients weekly. Wards 2 and 3 need to rescreen patients for the risk on malnutrition by using the MUST.	Reassessing the risk of malnutrition	Wards 2, 3, and 4 weigh patients weekly; however, this may be skipped in case of lack of time. Ward 2 also reassesses the risk of malnutrition by using the MUST. Only in ward 3
11			Doctor takes notice of the reassessment [*]	The doctor is informed of the reassessment for the risk of malnutrition in wards 1 and 4.	Doctor takes notice of the reassessment	Only in ward 3 the dietitian evaluates the patient's intake.
12			Dietitian evaluates the protein intake [*]	In wards 2 and 3, the dietitian should evaluate the protein intake after starting the nutritional treatment plan.	Dietitian evaluates the protein intake	In ward 2, the dietitian is consulted in case of any swallowing problems.
13			Consult a speech therapist in case of swallowing problems [*]	In case of swallowing problems, the speech therapist needs to be consulted in ward 4.	Consult a dietitian in case of swallowing problems [†]	Not mentioned
14			Consult an occupational therapist in the event of an impending pressure ulcer [*]	In case of impending pressure ulcers, an occupational therapist needs to be consulted in ward 4.	Not mentioned	—

[†]W/a means there are no differences between both WAls and WAD models.

^{*}Additional activities identified in the hospital protocols compared to the national guidelines.

[†]Additional activities identified in the WAD model compared to WAl.

Table 3 WAI for the Screening indicator Delirium Based on National Guidelines and Hospitals Protocols Compared With WAD

Delirium						
WAI ^{functional}			WAI ^{hospital}			
Foreground Activities	Description of Activity	Foreground Activities	Differences Compared to National Guidelines	Foreground Activities	Differences Between Hospital Protocols and WAD	
1	Assessing the risk of developing delirium during hospitalization	The risk of delirium is assessed by using a questionnaire.	Assessing the risk of delirium during hospitalization	No difference with WAI ^{hospital}	Assessing the risk of delirium during hospitalization	No difference with WAI ^{hospital}
2	Determining provoking symptoms of delirium using the DOSS	If 1 of the 3 questions is answered positive, the risk of delirium is further assessed by using the DOSS 3 times a day for 3 d. The doctor is informed in case of increased DOSS score (≥ 3).	Determining provoking symptoms of delirium using the DOSS	No difference with WAI ^{hospital}	Determining provoking symptoms of delirium using the DOSS	No difference with WAI ^{hospital}
3	Deploying preventive interventions to reduce the risk of developing a delirium	The nursing staff deploys preventive measurements aimed at cognitive impairment, the environment, support of relatives and freedom restricting interventions.	Deploying preventive interventions to reduce the risk of developing a delirium	No difference with WAI ^{hospital}	Deploying preventive interventions to reduce the risk of developing a delirium	Wards 1 and 2 deploy preventive interventions even before provoking risks of delirium were determined. Ward 3 does not seem to use preventive interventions, except for freedom restricting interventions to reduce the fall risk.
4	Consulting a doctor in case of an increased risk	If the DOSS score remains elevated (≥ 3 points), the nurse will contact the doctor.	Consulting a doctor in case of an increased risk	The hospital-specific protocol does not describe consulting a doctor as an activity to assess the risk of developing a delirium during hospitalization for ward 4.	Consulting a doctor in case of an increased risk	All wards consult a doctor in case of an increased risk. Wards 1, 2, and 4 specifically consult the geriatrician/geriatric nurse (consultation team older patients) or psychiatrist, depending on the patient's age.
5	Doctors identifies medical risk factors	The doctor assesses which medical risk factors, such as infections, medication, dehydration, blood pressure, pain treatment and nutritional status can determine the degree of risk for developing a delirium.	Doctors identifies medical risk factors.	The role of the doctor is not described in the protocol for ward 4.	Not mentioned	—

Table 3 continued

6	Doctors describes preventive drug interventions	If necessary, the doctor can prescribe (sedative) medication or make adjustments to the patient's current medication.	The doctor deploys preventive drug and/or non-drug interventions.	After the doctor has identified all medical risk factors, s/he has to take preventive measurements in ward 1, 2, and 3.	Doctors describe preventive drug interventions	No difference with WAI ^{hospital}
7	Doctors deploys non-drug interventions	Non-drug interventions, such as ensuring sufficient hydration, nutrition and discontinuing any triggering medication, can limit/prevent the risk of developing a delirium.			Not mentioned	—
8			Assessing the risk of functional decline*	After preventive interventions are deployed, the fall risk and the risk of physical impairment has to be (re) assessed in ward 4.	Assessing the risk of falls during hospitalization*	Ward 3 (re)assesses the risk of falls.
9			Consulting relevant disciplines [†]	In case of increased fall risk or functional decline, relevant disciplines (e.g., physical and/or occupational therapist) has to be consulted in ward 4.	Deploying freedom restricting interventions to reduce the risk of falls [‡]	All wards deploy freedom restricting interventions in case of an increased fall risk.
10					Evaluating freedom restricting interventions [‡]	Wards 3 and 4 evaluate the need of freedom restricting interventions daily.
11					Extending the DOSS questionnaire to determine the provoking risks of developing a delirium in case of an increased score [‡]	Wards 3 and 4 extend the use of the DOSS if the DOSS score remains elevated after 3 d.

n/a means there are no differences between both WAIs and WAD models.

*Part of other VMS indicators.

[†]Additional activities identified in the hospital protocols compared to the national guidelines.

[‡]Additional activities identified in the WAD model compared to WAI.

Table 4 WAI for the Screening indicator Physical Impairment Based on National Guidelines and Hospitals Protocols Compared With WAD

Physical Impairment					
WAI ^{functional}			WAD ^{hospital}		
Foreground Activities	Description of Activity	Foreground Activities	Differences Compared to National Guidelines	Foreground Activities	Differences Between Hospital Protocols and WAD
1 Assessing the risk of physical impairment during hospitalization	There is an increased risk if 2 or more questions of the Katz-ADL6 index are answered positive.	Assessing the risk of physical impairment during hospitalization	No difference with WAI ^{functional}	Assessing the risk of physical impairment during hospitalization	No difference with WAI ^{functional}
2 Consult a physiotherapist and/or occupational therapist in case of an increased risk	The physiotherapist and/or occupational therapist is consulted in case of an increased risk (Katz-ADL6 score ≥ 2).	Consult a physiotherapist and/or occupational therapist in case of an increased risk	No difference with WAI ^{functional}	Consult a physiotherapist and/or occupational therapist in case of an increased risk	At ward 4, the physiotherapist is always consulted. None of the wards consulted the occupational therapist.
3 Physiotherapist draws up a mobilization plan	A treatment plan to mobilize the patient is drawn up based on the physical limitations of the patient.	Physiotherapist draws up a mobilization plan	No difference with WAI ^{functional}	Physiotherapist draws up a mobilization plan	Ward 3 draws up the mobilization plan after surgery.
4 (Re)activating the patient	The physiotherapist and/or occupational therapist start the treatment with the aim of (re)activating the patient.	(Re)activating the patient	No difference with WAI ^{functional}	Identifying the patient's care needs*	Two wards ^{1,2} also use the instrument to estimate the patient's care needs in terms of ADL.
5		The physiotherapist inventories the patient's home situation ³	In ward 4, the physiotherapist must also map the patient's home situation.	Not mentioned	—
6		Deploying preventive interventions to reduce the risk of falls ⁴	After the risk of physical impairment is assessed, the nursing staff have to deploy preventive interventions to reduce the risk of falls in wards 2, 3, and 4.	Deploying preventive interventions to reduce the risk of falls	Only at ward 2
7		Consulting a transfer nurse ⁵	In ward 4, a transfer nurse has to be consulted.	Consulting a transfer nurse	The transfer nurse is always consulted in ward 3. In ward 4, a transfer nurse can be consulted.
		Inform the doctor in case of any agitation in the patient ⁶	The nursing staff have to inform the doctor in case of any agitation in the patient in wards 2 and 3.	Consulting a geriatric nurse*	In ward 4, a geriatric nurse can be consulted.

Table 4 continued

8	Doctors prescribe medication and/or starts adequate pain relief ^f	In case of any agitation, the doctor can prescribe medication or start pain relief in wards 2 and 3.	Writing a transfer report if the patients receive home care*	In ward 4, a transfer report is written if the patient is discharged and receives home care.
9			Deploying freedom restricting interventions to reduce the risk of falls*	Ward 3 deploys freedom restricting interventions if necessary to reduce the risk of falls.
10			Evaluating freedom restricting interventions*	Ward 3 must evaluate the need of freedom restricting interventions daily.

n/a means there are no differences between both WAIs and WAD models.
 *Additional activities identified in the WAD model compared to WAL.
^fAdditional activities identified in the hospital protocols compared to the national guidelines.

Table 5 WAI for the Screening indicator Falls Based on National Guidelines and Hospitals Protocols Compared With WAD

Falls		WAI ^{hospital}		WAD	
WAI ^{national}	Description of Activity	Foreground Activities	Differences Compared to National Guidelines	Foreground Activities	Differences Between Hospital Protocols and WAD
1	Assessing the risk of falls during hospitalization Patients aged ≥65 y are asked whether s/he has fallen in the past 6 mo. There is an increased risk of the patients answers this question positive.	Assessing the risk of falls during hospitalization	No difference with WAI ^{national}	Assessing the risk of falls during hospitalization	In case of no increased risk, the risk of falls is daily (re)assessed in ward 1.
2	Identifying all fall risks factors in case of an increased risk Underlying factors that can cause the risk of falling are determined in case of increased risk.	Identifying all fall risks factors in case of an increased risk	Identifying the underlying fall risk factors is not included in the protocol of ward 4.	Not mentioned	—
3	Deploying preventive interventions to reduce risk of falls Preventive measurements to reduce/prevent the risk of fallen are taken.	Deploying preventive interventions to reduce risk of falls	Ward 1 has not included the use of preventive interventions in their protocol. The moment in which preventive interventions need to be taken differ: wards 2 and 3 after all underlying fall risk are determined; ward 1 immediately in case of an increased risk.	Deploying preventive interventions to reduce risk of falls	No difference with WAI ^{hospital}
4	Consult a physiotherapist and/or occupational therapist in case of an increased risk In case of an increased fall risk, fall risk factors also have to be determined by the physiotherapist and/or occupational therapist.	Consult a physiotherapist and/or occupational therapist in case of an increased risk	No difference with WAI ^{national}	Consult a physiotherapist and/or occupational therapist in case of an increased risk	At ward 1, the physiotherapist consults the occupational therapist if needed.
5	Deploying multidisciplinary interventions Multidisciplinary interventions can also be used to limit the risk of falling. For example, by considering the patient's medication, interventions focused on mobility or freedom restricting interventions.	Deploying multidisciplinary interventions	No difference with WAI ^{national}	Physiotherapist draws up a mobilization plan*	
6	(Re)evaluating the risk of falls during hospitalization After surgery or if high-risk medication is started, the fall risk must be reassessed.	Not mentioned	Reevaluation the risk of falls is not described as an activity in any of the hospital protocols.	Deploying freedom restricting interventions to reduce the risk of falls*	In wards 2, 3, and 4 freedom restricting interventions are deployed to reduce the risk of falls.

Table 5 continued

7	Determining provoking symptoms of delirium using the DOSS in case of cognitive impairment ^f	Wards 2 and 3 also determine the risk of developing a delirium (again) in patients with cognitive impairment.	Evaluating freedom restricting interventions*	Wards 3 and 4 have to evaluate the need of freedom restricting interventions daily.
8	Deploying freedom restricting interventions to reduce the risk of falls in case of cognitive impairment ^g	In case of an increased fall risk caused by cognitive impairment or confusion, freedom restricting interventions can be deployed in wards 2 and 3 according to the protocol.	Consulting a geriatrician*	Ward 3 has the possibility to consult a geriatrician.
9			Report a fall*	Ward 2 must report if a patient falls during hospitalization.

n/a means there are no differences between both WAIs and WAD models.
^aAdditional activities identified in the WAD model compared to WAL.
^fPart of other VMS indicators.
^gAdditional activities identified in the hospital protocols compared to the national guidelines.

Figure 2 FRAM WAI model based on national guidelines for the indicator delirium.

