RIKSSTROKE
The Swedish Stroke Register

Brief summary of data for the full year 2016

TIA

Number of recordings and coverage

- During 2016 there were **8 021 registered TIA's** at 68 out of 72 hospitals. Compared to 2015 there were one additional hospital registering TIA in 2016.
- From the number of registered TIA's in Riksstroke, the **total number** of patients with TIA in Sweden 2016 can be approximated to 10 000.

Demographics, risk factors, type of care and length of stay

- Slightly more men than women were registered. The **mean age** was 74 years (72 among men and 75 among women), about one year younger than patients with stroke.
- 63 % of the patients with TIA had **high blood pressure**, 20 % **atrial fibrillation**, 17 % **diabetes** and 11 % were **smokers**.
- 96 % of all the patients that was registered were hospitalized. The **median length of stay** was three days.
- Out of the TIA patients that was registered, 45 % arrived at the hospital within three hours and 54 % **arrived in an ambulance**.

Diagnostics

- Practically all patients had a **CT scan examination**, while 12 % had an **MRI scan**. The most common vascular examination method was **ultra-sonography** (56 %), followed by **CT angiography** (23 %) and **MR angiography** (2 %). There was an increasing trend for the use of CT angiography.
- Of all the patients, 68 % had a long-term follow-up of **ECG examination** to detect irregular heartbeat, which is an increase with 4 % compared to 2015. A further 6 % had a planned examination after discharge. There was a considerable variation regarding usage among the hospitals.

Secondary prevention

- Eighty-five per cent of TIA-patients, all ages, with atrial fibrillation were prescribed **oral anticoagulants** at discharge. This is a continuous increase compared to previous years, especially among the elderly patients. The proportion of patients that received the treatment varied geographically. A distinct increase of treatment with the new oral anticoagulants was seen, 61 %.
- **Antihypertensive medicine** was prescribed for 72 % of the patients (unchanged compared to 2015) and 80 % with statins, which is an increase with 3 %. There was still a considerable regional variation in usage.

- Most of the smokers (79 %) received **advice about smoking cessation** and 63 % of those with a driver's license received **advice about their driving**. Information about smoking cessation or driving was missing for every forth to fifth TIA patient.
- Almost all TIA-patients, 92 %, had a planned **follow-up visit** at hospital or in primary care.

STROKE

Number of registrations and coverage

- During 2016 there were **21 797 stroke events** registered in Riksstroke, which is 1032 stroke events less compared to 2015. The slightly declining trend during the past years continues. The marginally declined **coverage**, (89 % in 2016 compared to 90 % in 2015), can only account for a small part (approximately a fifth) of the declining stroke events. There was also a further slight decline in recurrent strokes.

Demography, risk factors, type of care and length of stay

- **Mean age** and the distribution in terms of gender was unchanged compared to previous years. Slightly more men than women had a stroke and the mean age was 75 years old (73 years for men and 78 years among women).
- Eighty-four per cent were **fully conscious at arrival**. The registration of severity with NIHSS has increased, but only marginally, to 53 %. There was a considerable variation of NIHsSS registrations among the hospitals.
- Sixty-two per cent of the stroke patients had **high blood pressure**, 29 % **atrial fibrillation**, 21 % **diabetes** and 15 % were **smokers**.
- Thirteen per cent of all stroke events were **intracerebral hemorrhages**. Among these, the proportion related to anticoagulant treatment has gradually increased during the past few years (in line with an increased usage of the treatment overall) and is now 21 %.
- A third of the stroke patients arrived at hospital within three hours from onset. This proportion has not increased compared to the previous years.
- The proportion of acute stroke patients receiving **care at a stroke unit** at some point during their hospital stay was continuously high, 90 %. The variation between the hospitals decreases markedly.
- Still many of the stroke patients, 22 %, receives treatment at an observation- or other care unit than a stroke unit during the first critical day.
- The **median length of stay** at hospital was 8 days. There was still a considerable variation in length of stay between the hospitals; a partial explanation could be various usage of **early supported discharge with stroke rehabilitation at home**.

Diagnostics

- Use of computer tomography for **diagnostic imaging** was at a satisfactory level at all hospitals.
- The average usage of **MRI** examinations of the brain was 24 % with large variations between the hospitals.
- For patients with ischemic stroke, **ultra-sonography** was the most common method for vascular examination (38 %), followed by **CT-angiography** (31 %) and **MR-angiography** (3 %). There was a trend for increasing usage of CT-angiography.
- The proportion of patients with ischemic stroke examined with long-term **ECG** with a purpose to discover atrial fibrillation was 67 %, but varied between the hospitals.

- **Swallowing ability** was assessed in 87 % of the stroke patients.

Reperfusion therapy (to restore the blood flow with thrombolysis and thrombectomy)

- The proportion of patients who received **reperfusion therapy** continued to increase and was 14 % in 2016 (all ages). A third of the treated patients were 80 years or older.
- The differences in the proportion of patients who received **thrombolysis** between the hospitals declined, but the treatment still seems under-used at several of the hospitals.
- The increasing frequency of thrombolysis have been reached without an increasing rate of intracranial bleeding with clinical deterioration.
- The time from arrival at hospital to the start of thrombolysis treatment has not been further reduced compared to 2015. There are still large variations between the hospitals.
- The number of **thrombectomies** (mechanical removal of a clot in arteries in the brain using a catheter) has increased in 2016 compared to previous year, which is related to the new strong evidence for the treatment. 499 treatments were carried out in 2016 (compared to 390 treatments in 2015), of which the majority were carried out in three regions: Stockholm, Västra Götaland and Södra Sjukvårdsregionen. The implementation was very low in the other hospital regions.

Physical therapy and occupational therapy

- Of those who were in need of **physical therapy and/or occupational therapy**, there were 1-2 % that did not receive the treatment. It appears to be difficult to collect reliable data about the amount of training that the patients receive.

Speech therapist

- Over a third of the patients had their speech- or swallow function evaluated by a **speech therapist** during the hospital stay.

Secondary prevention

- Data on information about **smoking cessation** is still missing in every fourth patient, and the efforts to encourage patients to stop smoking seems to be inadequate at many hospitals.
- The proportion patients with an embolic stroke (a combination of atrial fibrillation and ischemic stroke) that receives secondary prevention with **oral anticoagulants** continue to increase. For patients under 80, the proportion with anticoagulant treatment is now 81 %. In addition, a tangible increase could be seen in patients 80 years and older. Almost two thirds of the patients had a prescription with one of the new anticoagulants (NOAK) at discharge.
- The proportion of patients with **antihypertensive medicine** at discharge remains on a high level with relatively small variation between the hospitals.
- The use of **statins** after an ischemic stroke increased further during 2016 but one fourth of the patients were still not receiving the treatment. The variation between the hospitals were large and there were obvious differences between men and women.

Driving

- Information on whether the patients received **advice about driving** or not after stroke were missing in every fourth patient.

Accommodation after discharge and planned rehabilitation

- Three fourths returned to their own home after discharge, while 23 % were discharged to a nursing home.

- **Early supported discharge with rehabilitation at home** from a multidisciplinary team associated to the stroke unit was planned for 17 % of the patients who were discharged to their own home, while some other type of home rehabilitation was planned for 19 % of the patients. There were large variations in the proportion with rehabilitation at home and in a hospital-based day rehabilitation clinic.
- A third of the patients, discharged to their own home were judged to have no need of any rehabilitation according to the hospital team, although these proportions varied significantly between the different regions.
- Eighty-two per cent of the stroke patients had a planned **follow up visit** at hospital or in primary care.

3-MONTH FOLLOW UP

Follow-up

- Out of the 21 797 stroke events in 2016, 84 % had a **follow up** or were diseased at 3 months after their stroke.
- The proportion of patients followed up after 3 months decreased in 2016 compared to 2015, and the proportion of hospitals reaching high and moderate target levels also decreased.

Survival

- Seventeen per cent of the patients were **deceased within 90 days** after their stroke and 33 % were **deceased or ADL dependent** at follow up. These proportions are unchanged since previous year.
- There were a significantly variation between the hospitals in the proportion of deceased, and deceased or ADL dependent, but the differences were small between the regions after statistical adjustment for age, sex and consciousness level.

Function

- The proportion of patients who are **dependent in ADL** has further decreased (with 1 % compared to the previous year), and over a 10-year period a slow decrease has been seen with 4 %.
- Patient characteristics can partly explain the differences in proportion of ADL-dependent patients between the hospitals. There are still considerable differences between the hospitals even after statistical adjustment.

Accommodation

- Three months after the stroke, 64 % of the patients lived in their own home without community service, 21 % in their own home with community service, 14 % in nursing homes and 2 % in some other living facility.

Hospital achievements

- The proportion of patients who were **satisfied or very satisfied with the rehabilitation** during the hospital stay (among those who received rehabilitation) were high (91 %) for the whole nation, with a moderate variation between the counties/regions.
- The proportion who stated that they had received **rehabilitation at home** (early supported discharge) had increased, from 27 % to 30 %. Large variations across regions persists.

- More than 60 % of the stroke patients with self-reported speech problems had seen a **speech therapist** for evaluation or treatment. The variations between the counties/regions were large.
- The proportion of stroke patients who quit **smoking** are unchanged at 45 %. Nearly half the patients had received advice on smoke cessation.
- Patient compliance in **hypertension medicine** seems to be at a very high level.

Symptoms and quality of life

- Seventy-seven per cent of the patients reported their **general health** to be very good or good, with moderate variation between the hospitals.
- Fatigue, depression, pain, speech difficulties and memory difficulties are common after a stroke. About a third of the patients had three or more of these symptoms.

Acute care satisfaction

- Most of the stroke patients were satisfied with the acute care, and the differences in satisfaction between the hospitals were moderate.

Need of support

- Fifty-eight per cent of the patients stated that the support from the hospitals and the municipality after discharge were satisfactory, this proportion is the same as previous year. The proportion who were **satisfied with the support** varied substantially between the hospitals, and more than half of the hospitals did not reach moderate target level.
- Three months after stroke, more than half of the stroke patients who lived at home stated that they were **fully or partly dependent of the help from a relative** (this proportion is unchanged compared to previous year). Even among the patients living in a nursing home, the proportion in need of help from a relative was very high.

Figures

Number of stroke events in Riksstroke 1994-2016

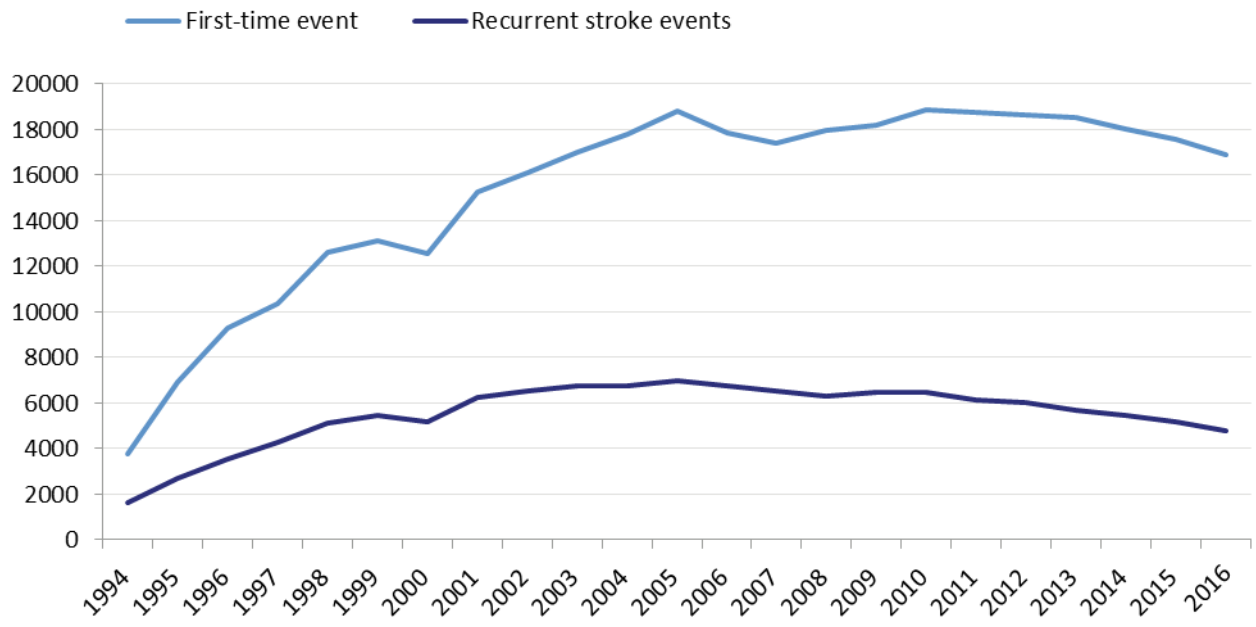


***Figure 1**. Cumulative number of stroke events registered in Riksstroke from 1994 to 2016. Separate lines for first-time events and recurrent stroke events.*

Direct admission to stroke unit or other type of care

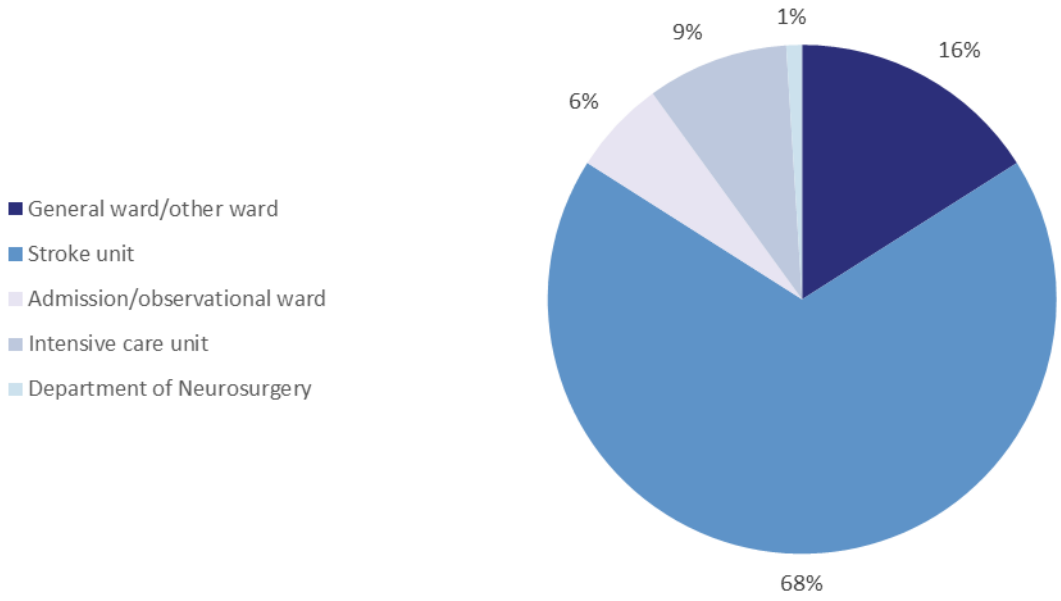
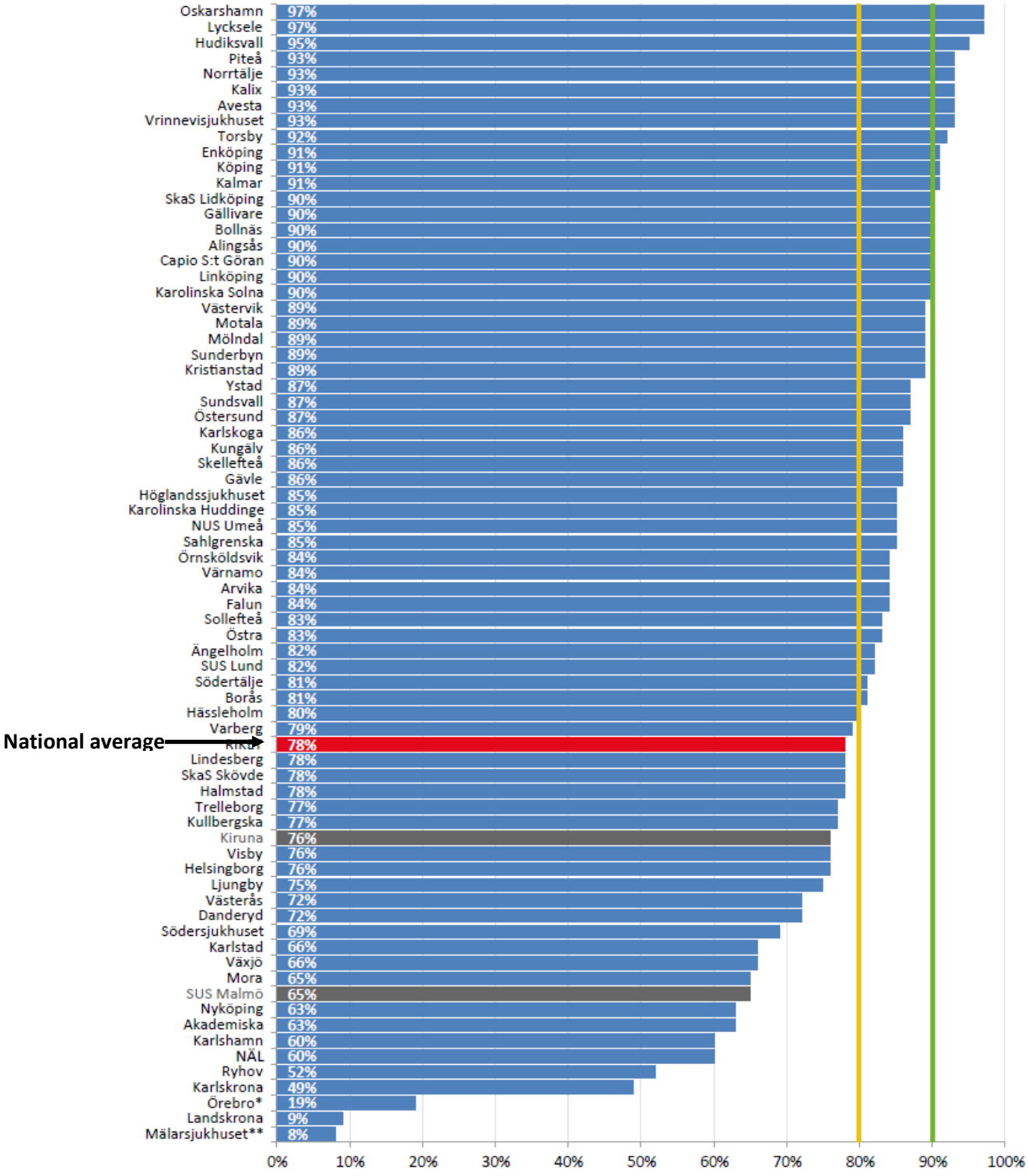


***Figure 2**. Proportion (%) of acute stroke patients directly admitted to stroke unit, intensive care unit, department of neurosurgery or other type of ward, 2016.*

Direct admission to stroke unit (as first level of care)



*Örebro did not have a stroke unit during the first three quarters 2016

**Mälarsjukhuset had no stroke unit in 2016

Figure 3. *Proportion (%) of acute stroke patients directly admitted to a stroke unit, intensive care unit or department of Neurosurgery, 2016. The green line represents a high target level and the yellow a moderate target level of care. Hospitals with at coverage of less than 75 % (and therefore uncertain data) have shaded bars.*

Stroke unit care (at some period during the acute phase)

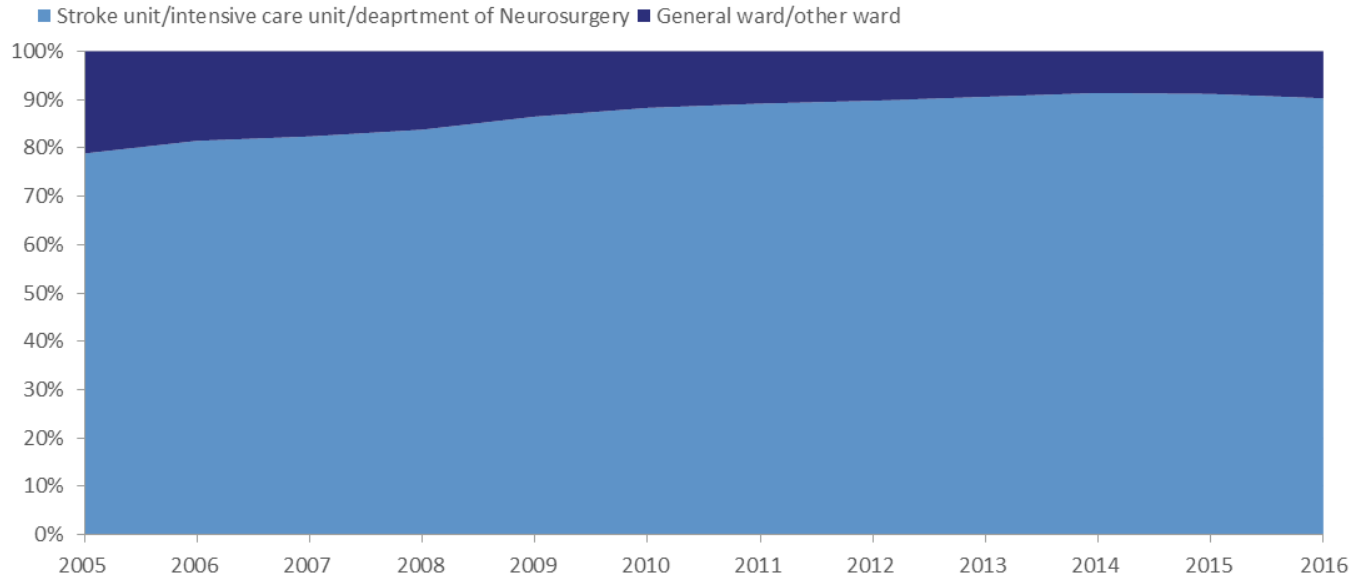


***Figure 4**. The proportion (%) of acute stroke patients treated in a stroke unit*/intensive care unit/department of Neurosurgery or in general ward/other ward, 2005-2016.*

**Stroke unit at some point during the acute phase*

Stroke unit care (at some period during the acute phase)

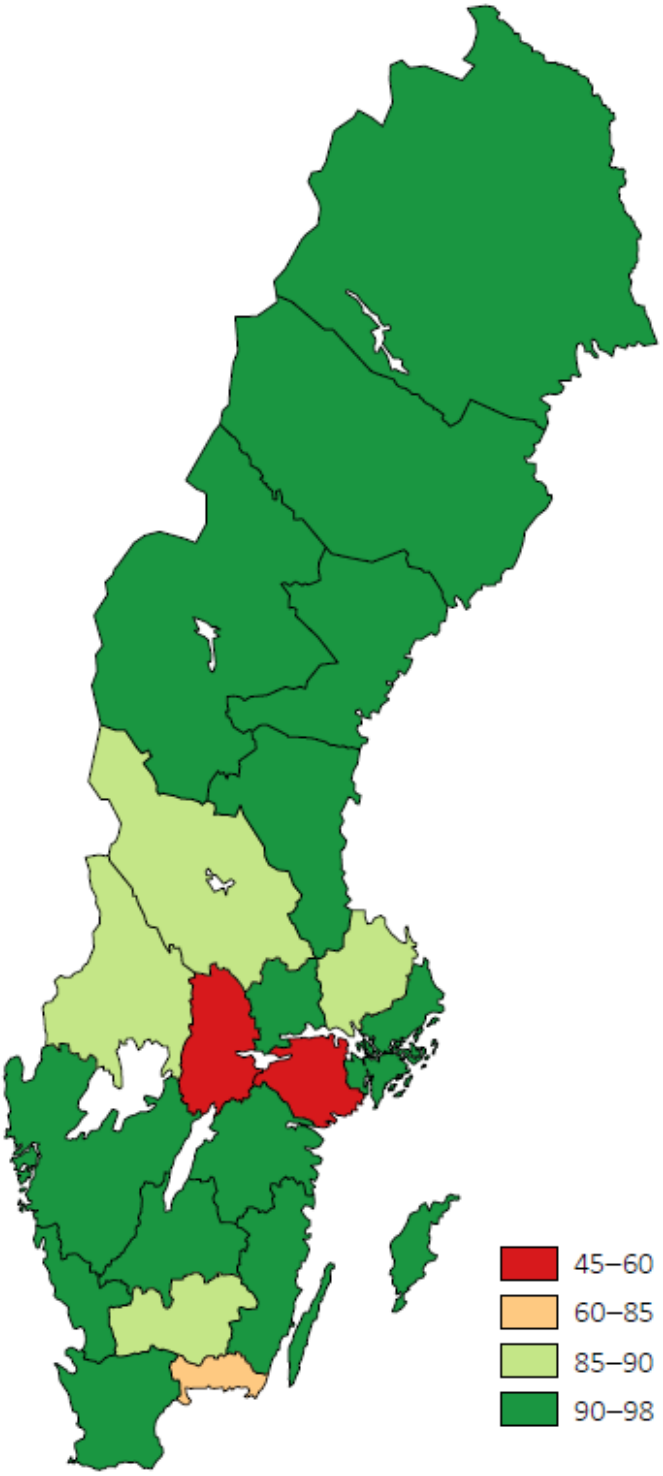
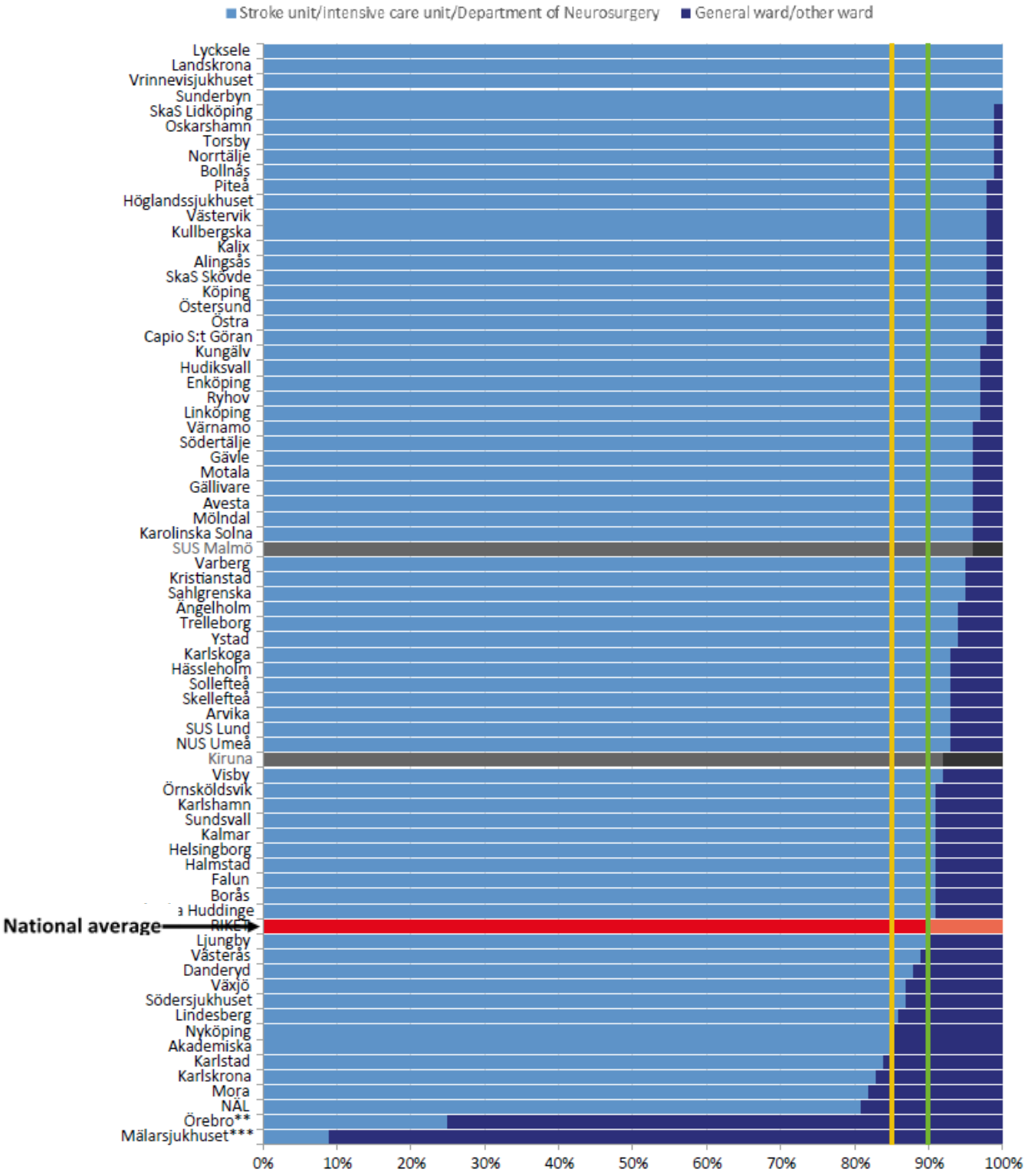


***Figure** 5. The proportion (%) of acute stroke patients treated in a stroke unit*/intensive care unit/department of Neurosurgery. Per county, 2016.*

**Stroke unit at some period during the acute phase.*

Stroke unit care (at some period during the acute phase)



**Örebro did not have a stroke unit during the first three quarters 2016
***Mälarsjukhuset had no stroke unit in 2016

Figure 6*. The proportion (%) of acute stroke patients treated in a stroke unit*/intensive care unit/department of Neurosurgery. Per hospital 2016. The green line represents a high target level and the yellow a moderate target level of care. Hospitals with at coverage of less than 75 % (and therefore uncertain data) have shaded bars.*

Swallowing assessment

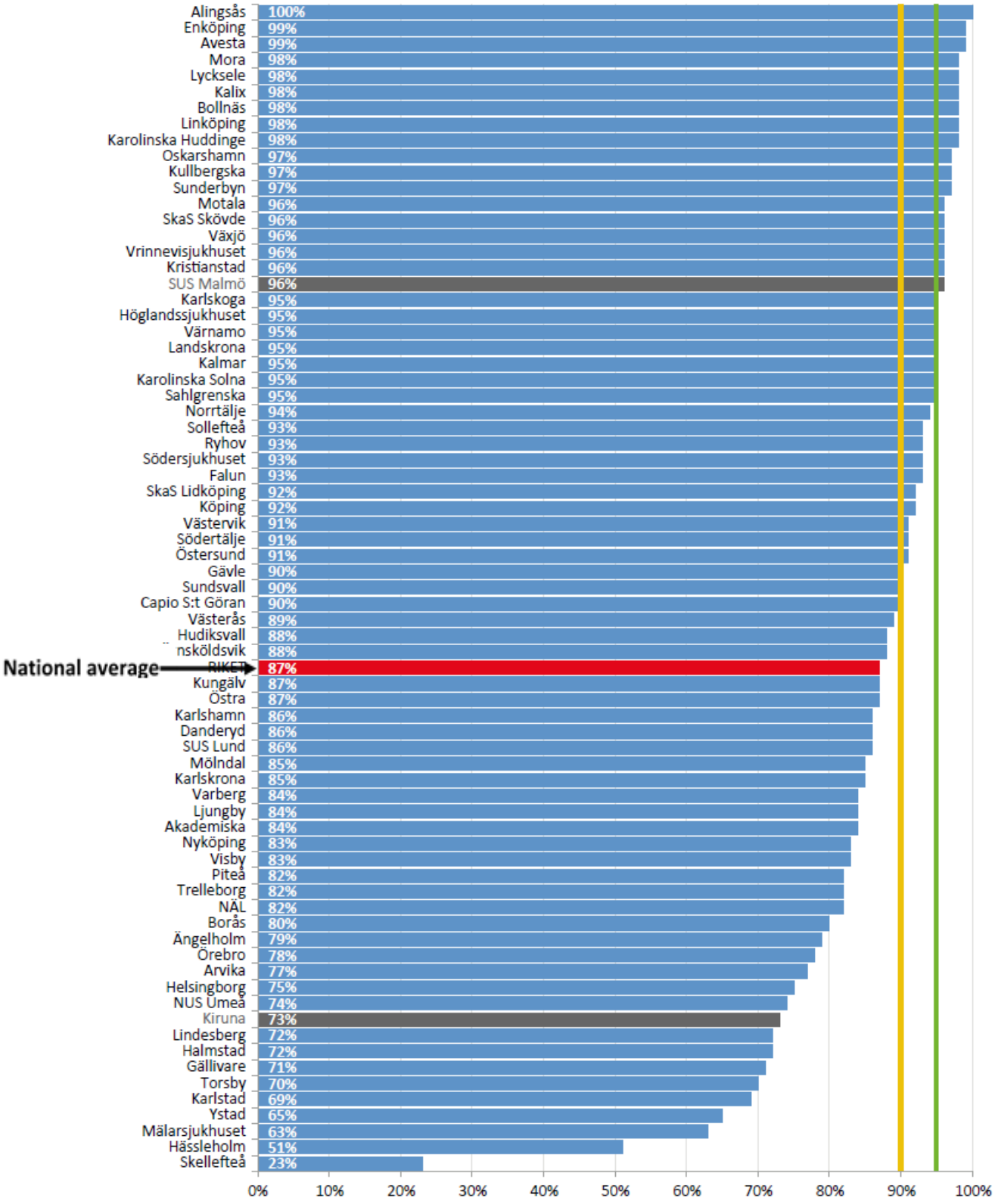


***Figure 7**. Proportion (%) of patients who had their swallowing tested or was not eligible for assessment. Per hospital 2016. The green line represents a high target level and the yellow a moderate target level of care. Hospitals with at coverage of less than 75 % (and therefore uncertain data) have shaded bars.*

Reperfusion therapy 2010-2016

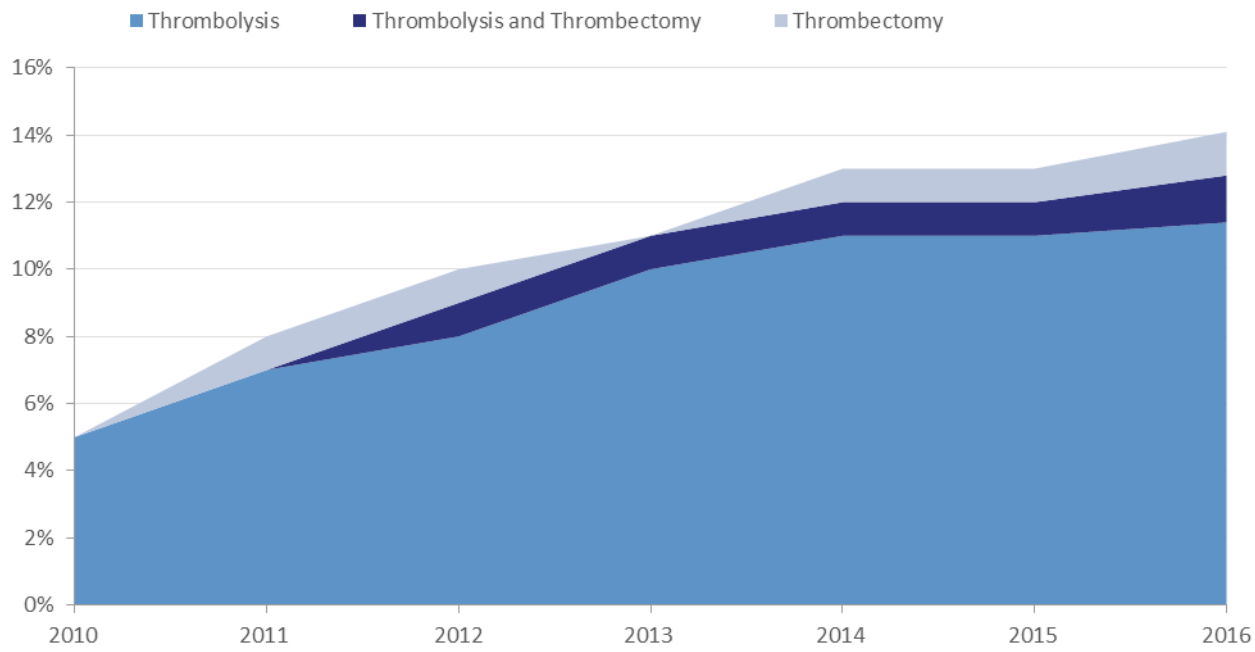


***Figure 8**. The proportion of ischemic stroke patients who received reperfusion therapy (thrombolysis and/or thrombectomy), 2010-2016.*

Reperfusion therapy

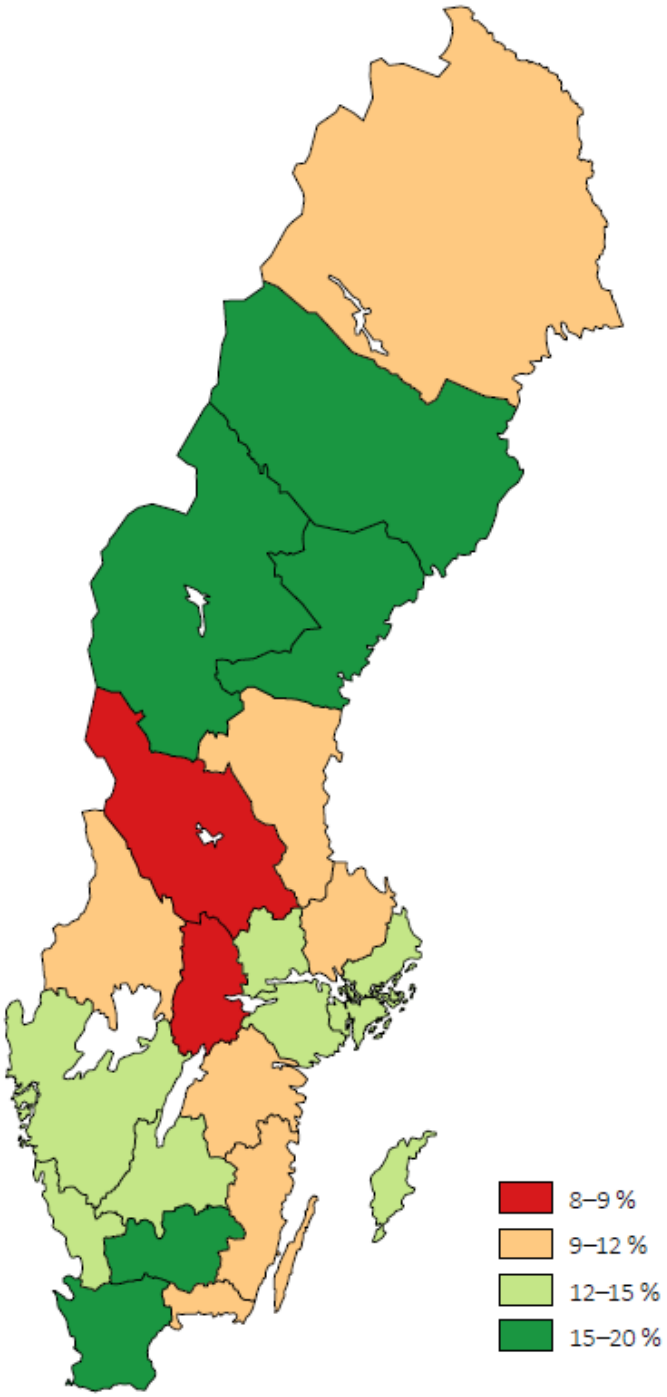


***Figure 9**. The proportion of ischemic stroke patients who received reperfusion therapy (thrombolysis and/or thrombectomy), per county 2016.*

Door-to-needle times

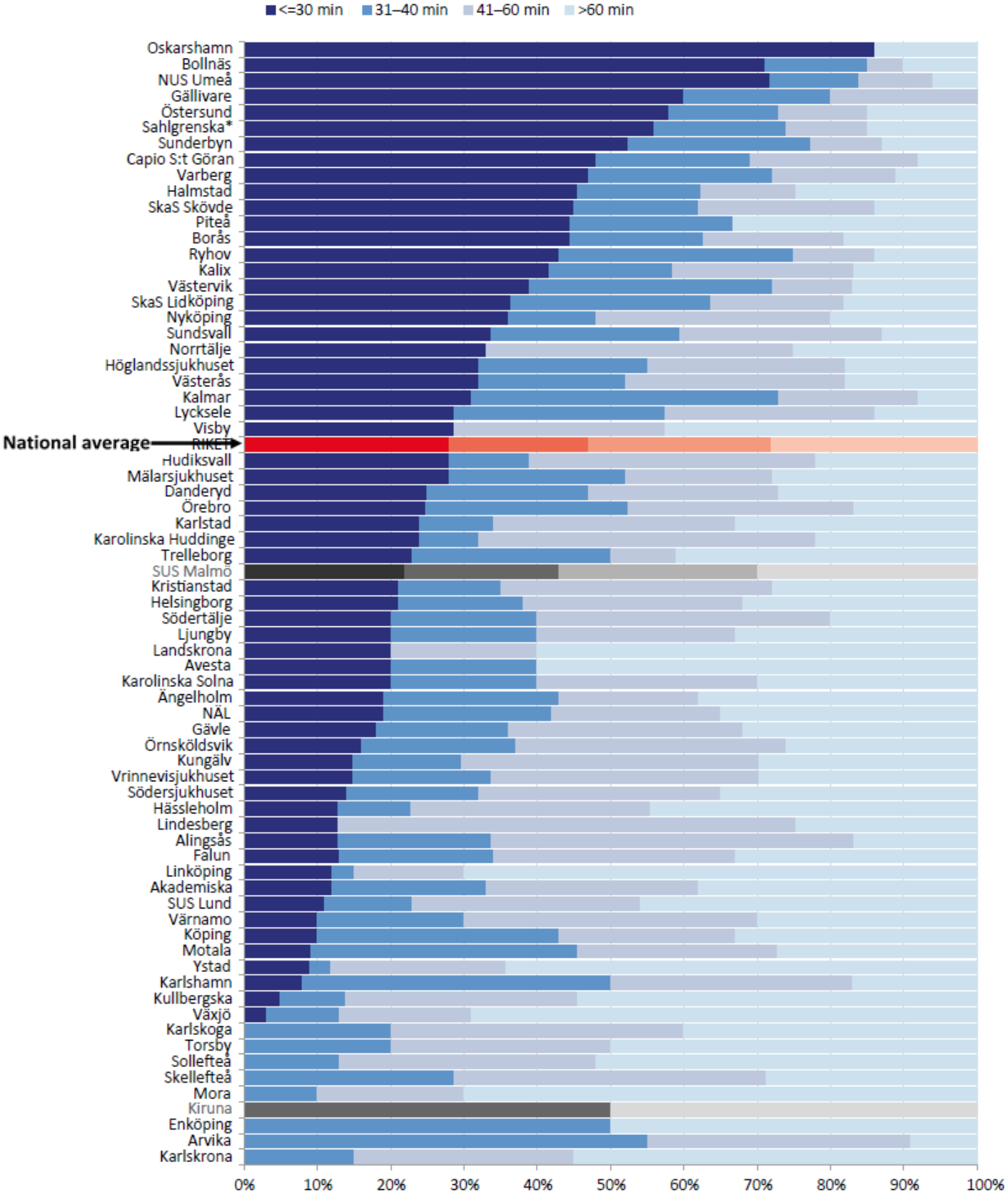


***Figure 10**. Time from hospital arrival to start of thrombolysis (door-to-needle time). Per hospital 2016. Hospitals with at coverage of less than 75 % (and therefore uncertain data) have shaded bars.*

Antiplatelet treatment at discharge

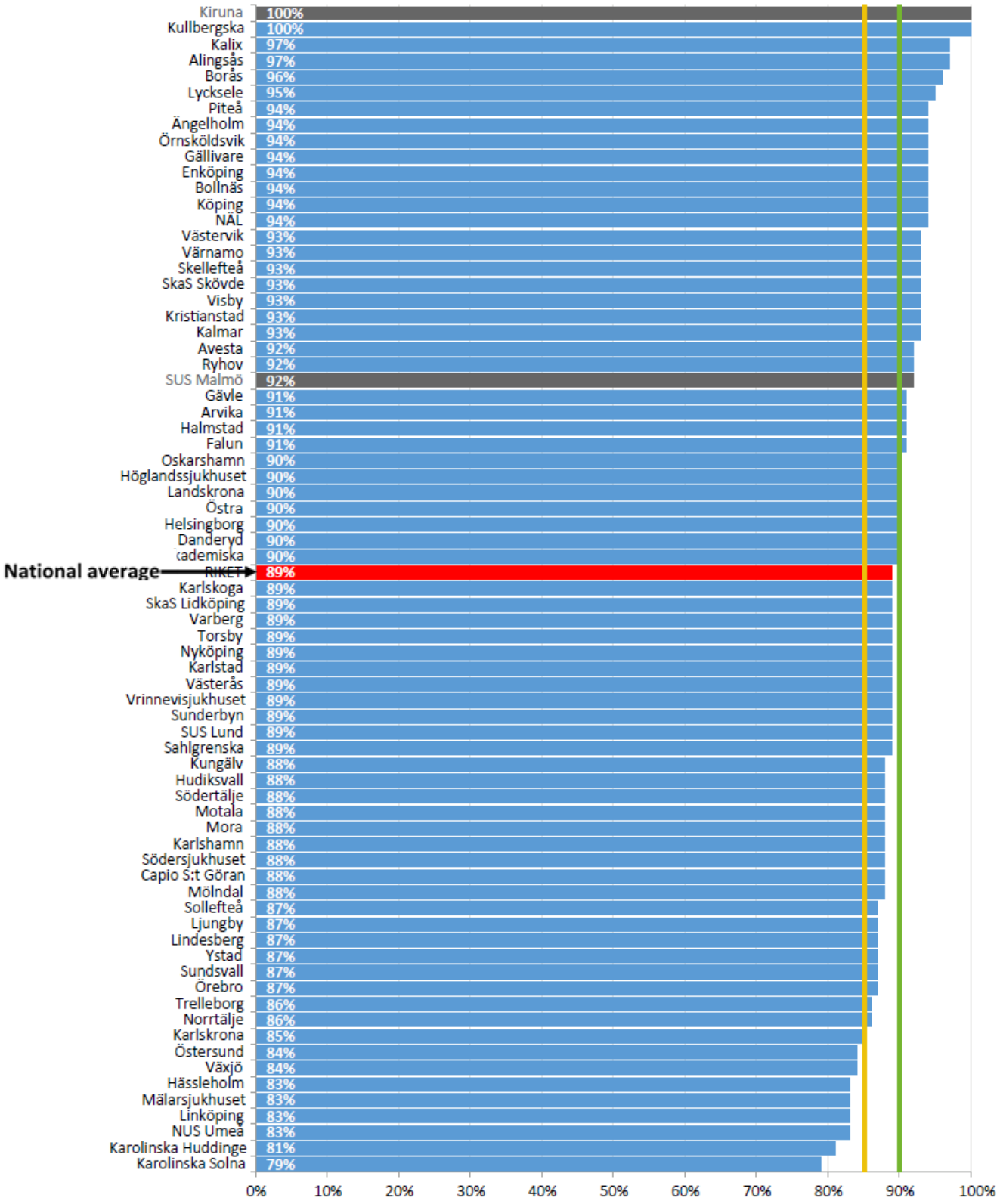


***Figure 11**. Proportion (%) of patients with ischemic stroke and no atrial fibrillation who were prescribed antiplatelet drugs at hospital at discharge. Per hospital 2016. The green line represents a high target level and the yellow a moderate target level of care. Hospitals with at coverage of less than 75 % (and therefore uncertain data) have shaded bars.*

Anticoagulant treatment at discharge 2001-2016 in patients with acute ischemic stroke and atrial fibrillation

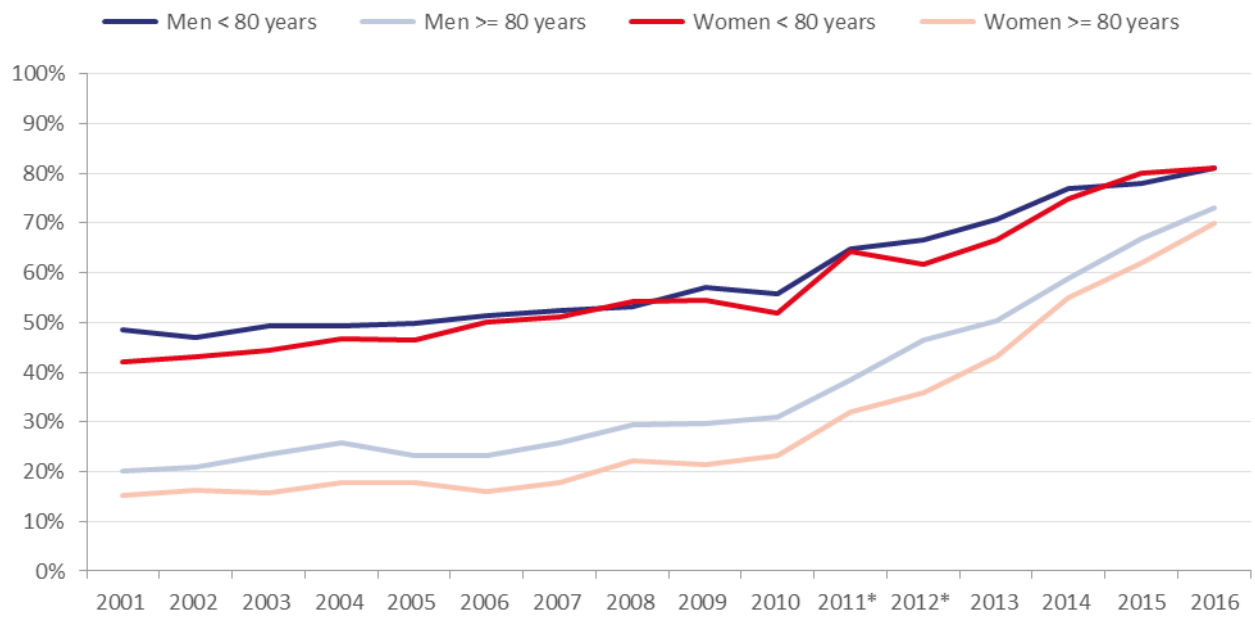


***Figure 12**. Proportion (%) of patients with ischemic stroke and atrial fibrillation who were prescribed anticoagulant treatment at discharge. 2001-2016.*

Anticoagulant treatment at discharge in patients with acute ischemic stroke and atrial fibrillation

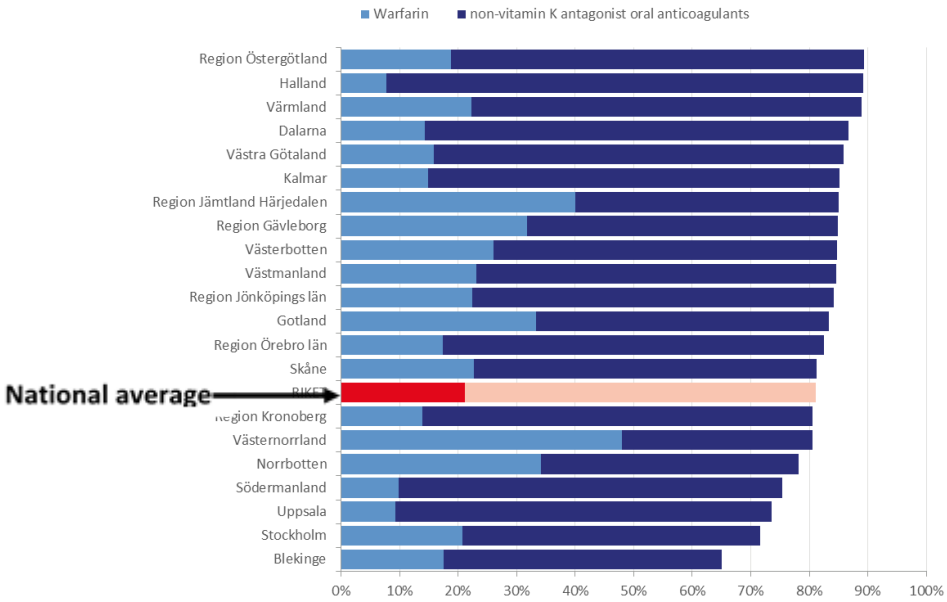


***Figure 13**. Proportion (%) of patients under the age of 80 with an ischemic stroke and atrial fibrillation who were prescribed anticoagulant treatment at discharge (Warfarin or non-viamin K antagonist oral anticoagulants). Per county, 2016.*

Anticoagulant treatment at discharge in patients with acute ischemic stroke and atrial fibrillation

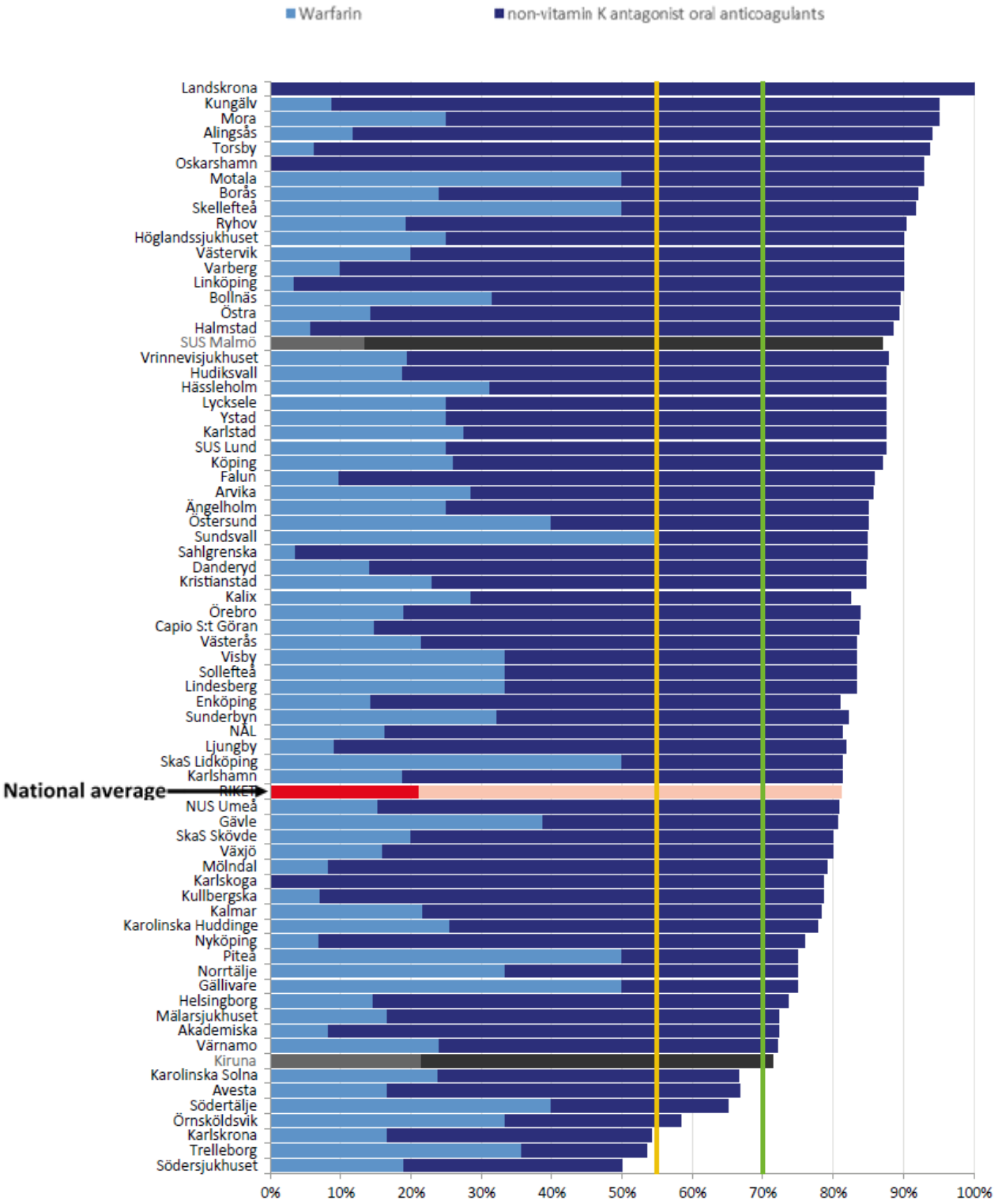


***Figure 14**. Proportion (%) of patients under the age of 80 with an ischemic stroke and atrial fibrillation who were prescribed anticoagulant treatment at discharge (Warfarin or non-viamin K antagonist oral anticoagulants). Per hospital, 2016. The green line represents a high target level and the yellow a moderate target level of care. Hospitals with at coverage of less than 75 % (and therefore uncertain data) have shaded bars.*

Statin treatment at discharge

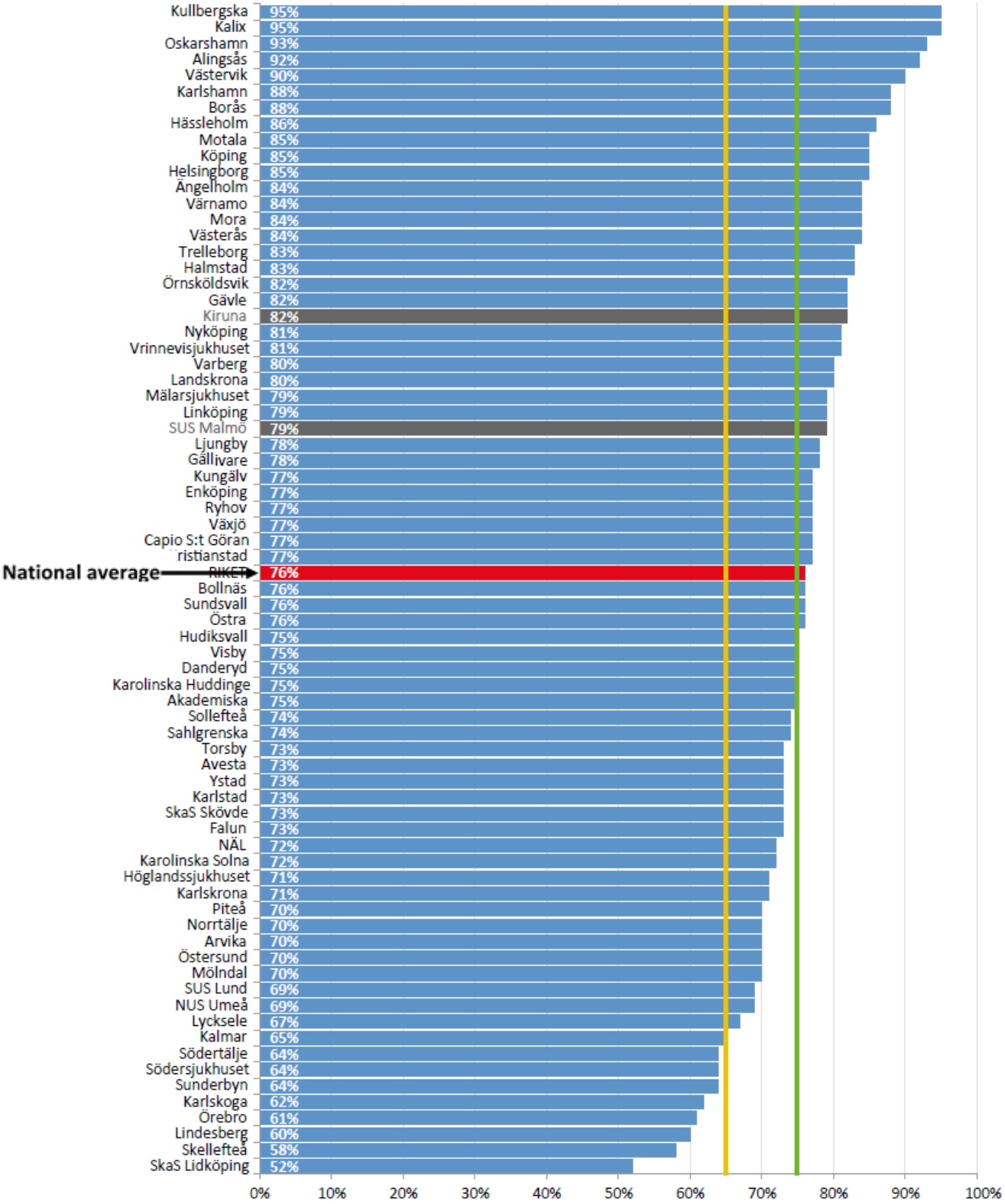


Figure 15. *Proportion (%) with ischemic stroke who were prescribed statin drugs at discharge. Per hospital, 2016. The green line represents a high target level and the yellow a moderate target level of care. Hospitals with at coverage of less than 75 % (and therefore uncertain data) have shaded bars.*

Case fatality 90 days after stroke

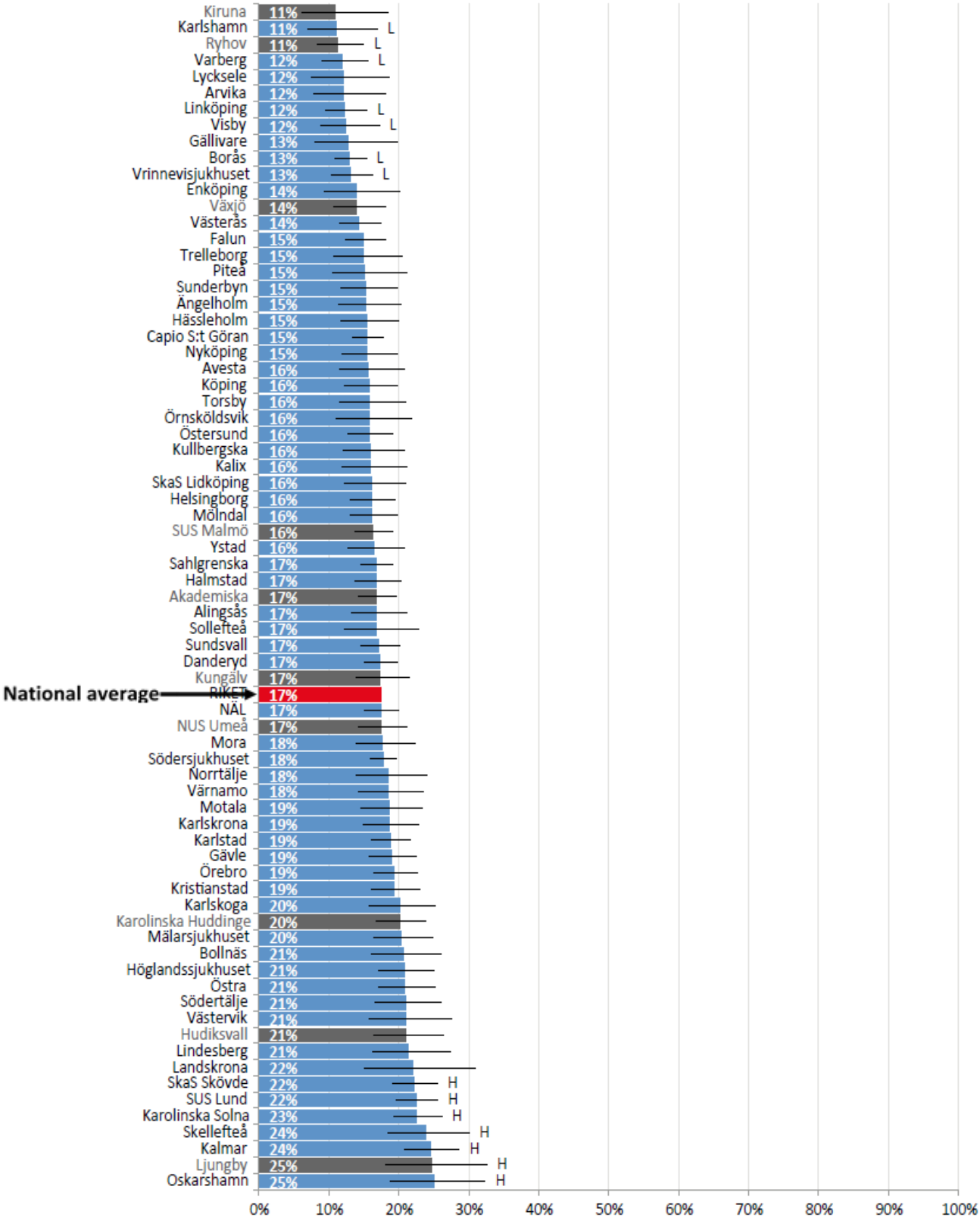


***Figure 16**. 3-month case fatality 2016. Statistically adjusted for age, sex and consciousness level. L=statistically lower than the nation and H=statistically higher than the nation. Hospitals with a coverage or a follow-up proportion of less than 75 % (and therefore uncertain data) have shaded bars.*

Case fatality 120 days or ADL-dependent

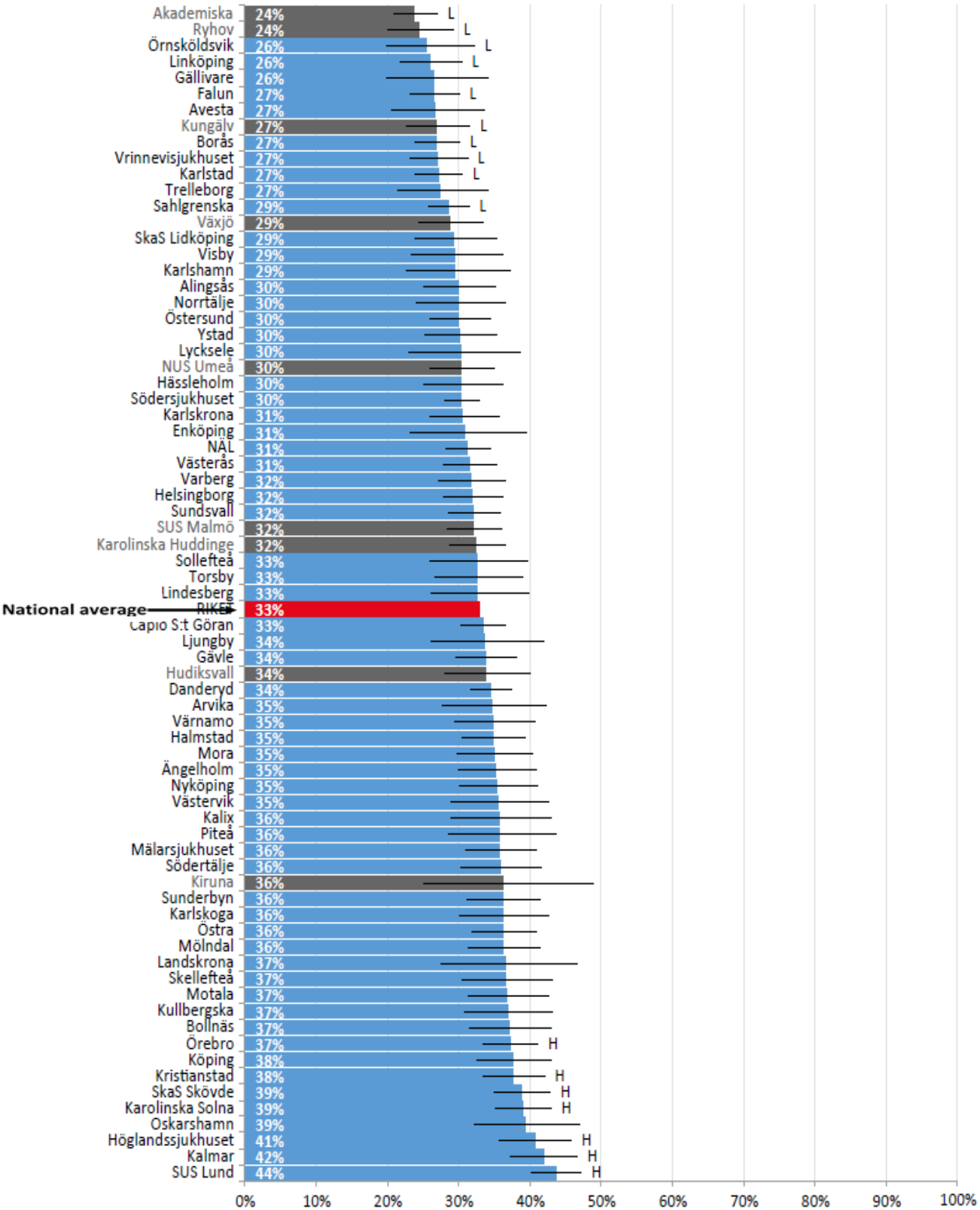


Figure 17*. 3-month case fatality or ADL-dependent 2016. Statistically adjusted for age, sex and consciousness level. L=statistically lower than the nation and H=statistically higher than the nation. Hospitals with a coverage or a follow-up proportion of less than 75 % (and therefore uncertain data) have shaded bars.*

ADL-dependent 3 months after stroke, 2001-2016

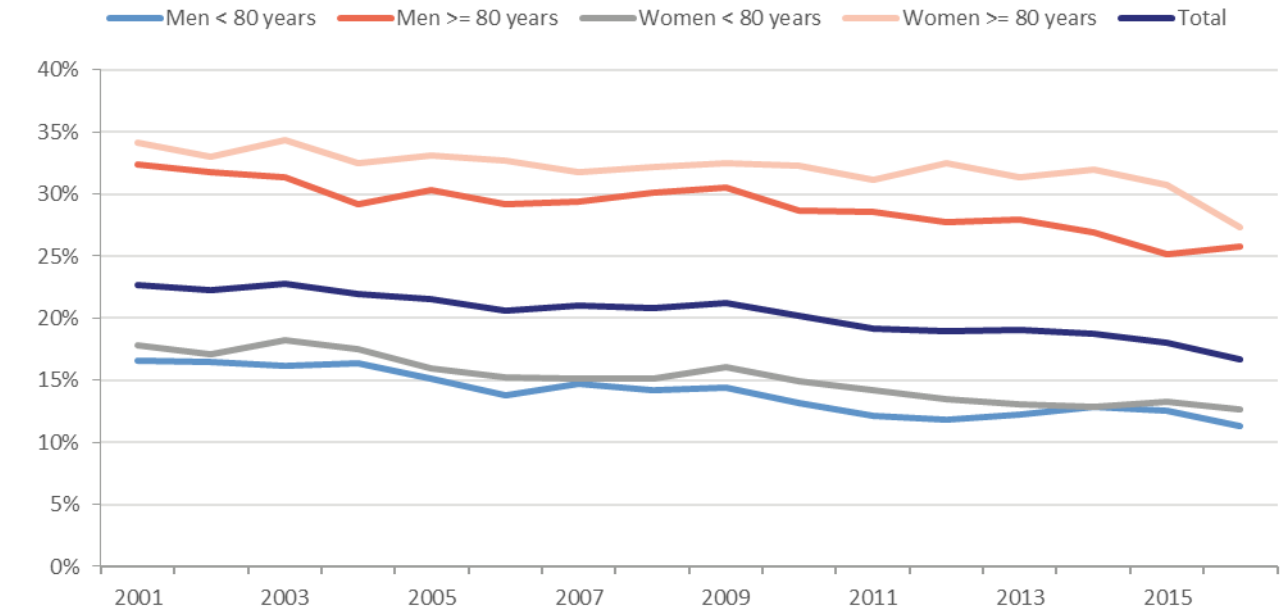


***Figure 18**. The proportion of patients who were ADL-dependent three months after stroke, 2001-2016. Patients who already were ADL-dependent before their stroke are excluded from the calculations.*

Rehabilitation at home

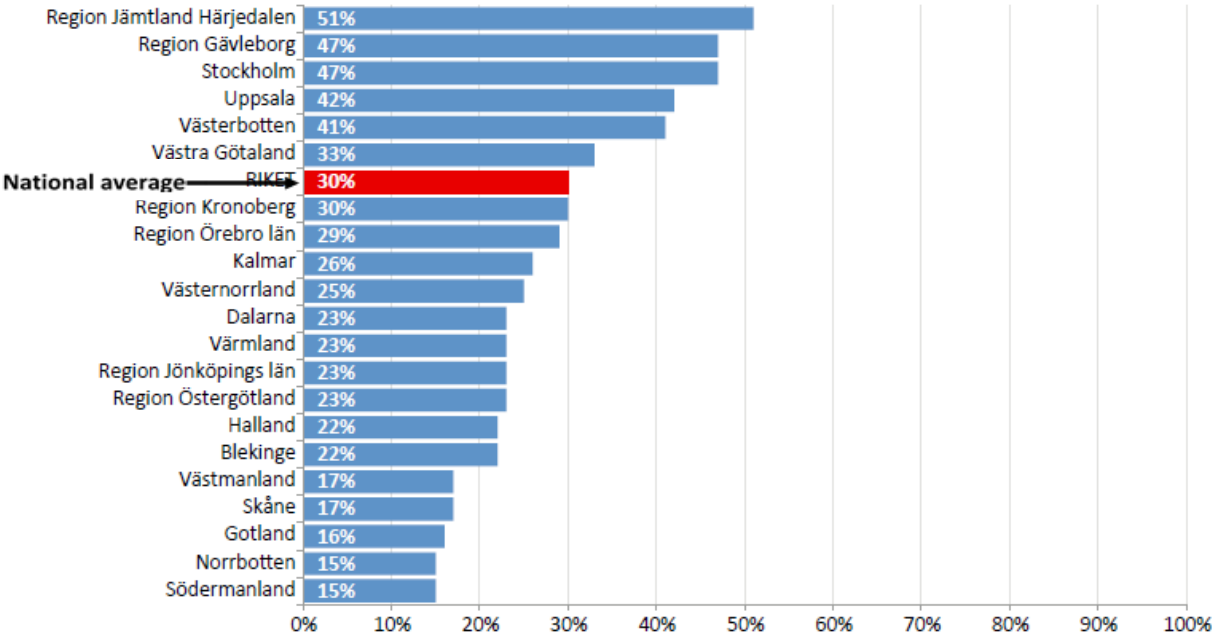


***Figure 18**. The proportion of patients who received rehabilitation at home (of those who received rehabilitation in some form).*

Smoking cessation

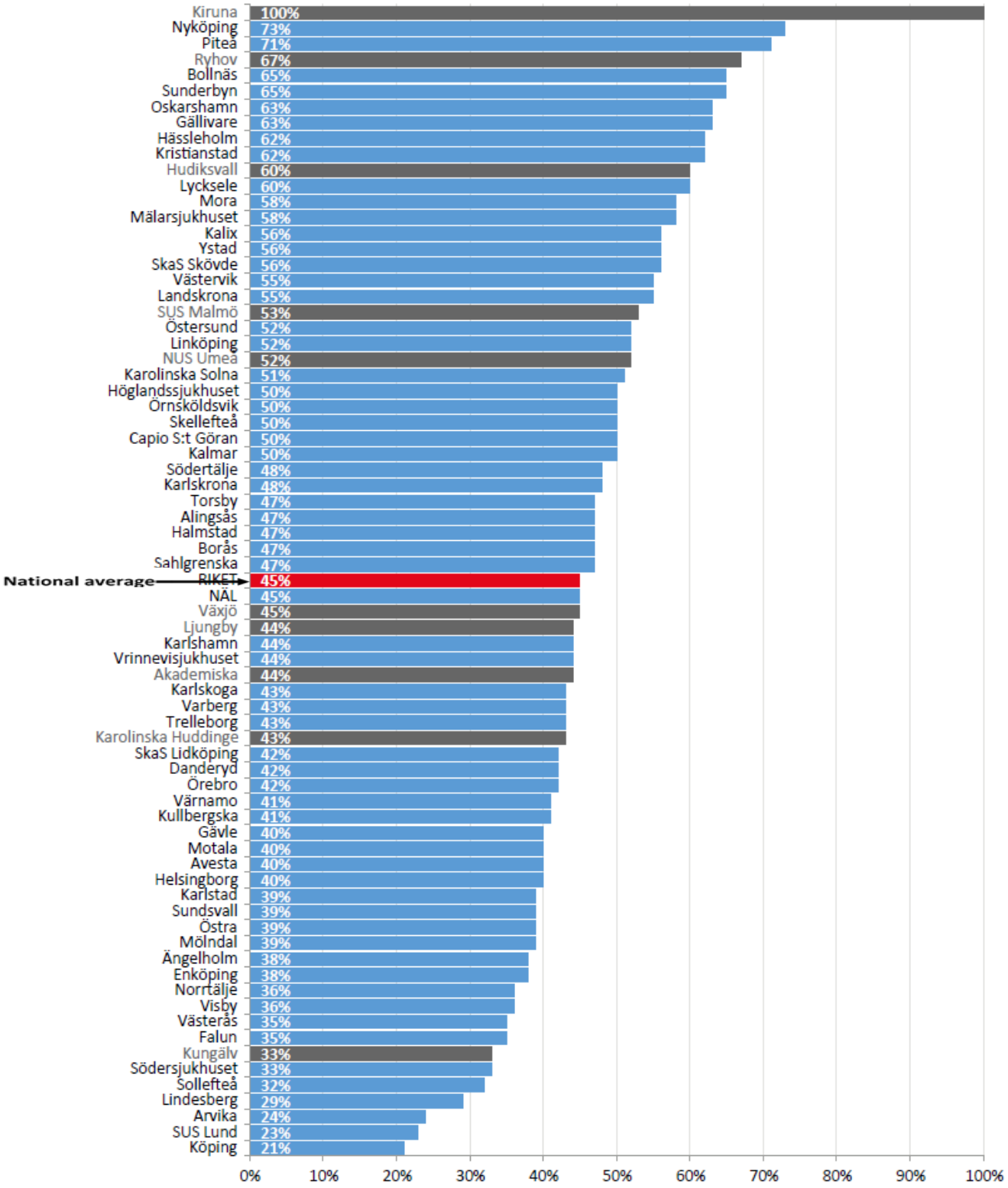


***Figure 19**. The proportion of patients who had stopped smoking three months after the stroke. Hospitals with a coverage or a follow-up proportion of less than 75 % (and therefore uncertain data) have shaded bars.*