



**SOReg**  
SCANDINAVIAN OBESITY  
SURGERY REGISTRY

**SOReg 2016**  
**Norway-Sweden first joint report**

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Data for this report were extracted in August 2017

## Background

Scandinavian Obesity Surgery Registry (SOReg) was launched as a national registry in Sweden in 2007. The ambition from the start was to include all Scandinavian countries. However, due to legal issues mainly pertaining to transfer of patient data across borders this was found to be difficult. Therefore, Denmark established a national registry (not included in SOReg), and after years of legal struggle Norway was able to establish a SOReg based register in 2014 with one hospital reporting data. During 2015 several hospitals joined the registry and at the end of 2016 most hospitals in Norway are reporting to SOReg. In Sweden all hospitals including all private units have been reporting to SOReg since 2011.

SOReg uses an IT-platform design by UCR (Uppsala Clinical Research Center) and the data is stored on a UCR's server. An exact copy of SOReg is transferred to Tromsø, Norway, where the same platform is used. An adaption to Norwegian system is done, including translation and connection to the Norwegian National Registry. Developments and changes to the register platform is made after agreements in a joint SOReg Committee with representatives from both countries.

Both the Swedish and Norwegian version of SOReg have previously published their report for 2016 which can be found on the registries' respective home pages. This report is the first attempt to produce a combined report where we present and compare figures on the use of bariatric surgery in Sweden and Norway. We only present aggregated data on national levels. In this initial joint report we present aspects of base-line data and short-term follow-up.

## Bariatric centres, number and type of operations

In 2016 56,5 operations/100.000 inhabitants were performed in Sweden while in Norway the number is 54,6. In both countries an unknown number of patients (estimated to be low) are operated abroad and not included in these estimates. The number of centres performing bariatric surgery per inhabitant seems comparable between the two countries (Table 1).

The use of the most common surgical procedures are presented in Table 1. For the last two decades, gastric bypass has been the dominating procedure in Sweden. During the last 2-3 years, there has been an increase in sleeve gastrectomy in Sweden, but gastric bypass is still the most common procedure; more than 60% of all operations in 2016 were gastric bypass. In Norway, the percentage of sleeve gastrectomy has been higher than in Sweden during several years, and in 2016 52% of all bariatric operations registered in SOReg-N were sleeve gastrectomies. As not all hospitals in Norway reported to SOReg throughout all of 2016, there might be a skewness in data as variations in the dominating procedure may differ between hospitals.

Other procedures such as duodenal switch and minigastric bypass (one anastomosis gastric bypass) are only performed in small numbers in both countries. The annual percentage of revisional surgery is low, about 3% in both countries. Other uncommon procedures performed include reversal to normal anatomy, initiated but not fulfilled operation, gastric plication, SADI, gastric banding, aspire and balloons.

The coverage ratio (number of procedures in SOReg/number of procedures in the country) has been estimated to be 98% in Sweden for 2016. In Norway several hospitals started to register during 2016 and the estimated coverage ratio is therefore lower; 64% for public hospitals and 13% for private hospitals (Table).

*Table 1. Bariatric centres and number and types of operations registred in Norway and Sweden 2016.*

	<b>Norway</b>	<b>Sweden</b>
Total number of centres (n)	21	41
Reporting centres (n)	15	41
Reported number of procedures (n)	1358	5650
Gastric bypass (n, %)	594 (43,7 )	3589 (63,5)
Sleeve gastrectomy (n, %)	710 (52,3 )	1894 (33,5)
Mini gastric bypass (n, %)	37 (2,7)	0 (0)
Duodenal switch (n, %)	1 (0,1 )	44 (0,8)
Other procedures (n, %)	16 (1,2 )	123 (2,2)
Revisional procedures (n, %)	43 (3,2)	187 (3,3)

## Financing and referral logistics in public and private units

The time from referral from physician to surgery is considerable shorter in Sweden than Norway (table 2). This may be caused by Swedish legislation giving the patient a right to see a specialist and have an operation if needed within 6 months of referral. Interpretation of these data should be made with caution, as there is an uncertainty to how the registration of referral date is performed in different centres.

Table 2. Number of procedures in public and private units and finance form in Norway and Sweden 2016.

	Norway	Sweden
<b>Public Hospitals</b>		
Hospitals performing bariatric surgery (n)	14	32
Hospitals reporting to SOReg (n)	13	32
Operations reported to SOReg (n)	<b>1242 *</b>	<b>3410*</b>
Time from referral letter received to surgery (days, median)	389 (461) #	212 (253) #
Missing data on time to surgery (n, %)	8 (0,7)	616 (18,8)
<b>Private hospitals</b>		
Hospitals performing bariatric surgery (n)	6	9
Hospitals reporting to SOReg (n)	3	9
Operations reported to SOReg (n)	<b>114 <sup>¤</sup></b>	<b>2240 <sup>¤</sup></b>
<b>Finance form for operations in private hospitals</b>		
Public financing, (n, %)	0 (0)	1223 (55)
Insurance, (n, %)	1 (1)	14 (0,5)
Paid by patient, (n, %)	111 (97)	992 (44)
Missing data on financing, (n, %)	2 (2)	11 (0,5)

\* Calculated coverage ratio in Norway is 64 %, and in Sweden 98 %. In Norway 5 public hospitals started to report to SOReg during 2016.

# For primary operations. This is normally calculated using the date referral letter is registered at operating hospital and operating date. Routines may differ between hospitals.

¤ Calculated coverage ratio in Norway is 13 %, and in Sweden 98 %.

Most operations are publically financed in both countries, although in Sweden a significant number of operations are publically financed but performed in private units. In Norway this is not common practice. Few patients have their operation financed by private insurance in both countries. Relevant for the interpretation of data is also the fact that registrations from public and private hospitals are not yet complete in Norway.

## Demographics

In both countries, the majority of patients are women (Table 3). This concurs with reports from most countries worldwide (The third IFSO Global Registry Report 2017). Our definition of comorbidity is the use of medical drugs (use of CPAP in the case of sleep apnea) for respective diagnoses. All comorbidities seems to have a little higher prevalence in the Norwegian population. The biggest difference is found in the prevalence of sleep apnea, hypertension, dyslipidemia, dyspepsia and particularly in musculoskeletal pain. The only comorbidity with a higher prevalence in Sweden seems to be depression. The percentage of patients with diabetes are rather low in both countries compared to most international reports.

*Table 3. Preoperative characteristics of patients operated with bariatric surgery in Norway and Sweden 2016.*

	Norway	Sweden
Age (years, SD)	42,8 (10,9)	41,1 (11,5)
Gender (m/f), (% females)	331/1027 (75)	1278/4372 (77,4)
Preoperative weight, (kg, SD)	123 (20,5)	118 (21,7)
Length (cm, SD)	170 (8,9)	169 (8,8)
BMI, (kg/m <sup>2</sup> ,SD)	42,6 (5,4)	41,0 (5,8)
Patients with any comorbidity (n, %)	838 (61,7)	3116 (55,1)
Sleep apnea (n, %)	197 (14,5)	525 (9,3)
Hypertension (n, %)	421 (31)	1369 (24,2)
Diabetes (n, %)	171 (12,6)	662 (11,7)
Dyslipidemia (n, %)	175 (12,9)	519 (9,2)
Dyspepsia (n, %)	195 (14,4)	611 (10,8)
Musceloskeletal pain (n, %)	419 (30,9)	1185 (21,0)
Depression (n, %)	158 (11,6)	897 (15,9)

## Perioperative results

Laparoscopic approach is dominating in both countries with very low conversion rates (table 4). The length of hospital stay and operating time is slightly longer in Norway. The prevalence of postoperative complications are quite similar between the two countries, with 6,3% of Norwegian patients and 6,6% of Swedish patients registered with some kind of complication.

Few patients experience severe complications; only 1,9 % of Norwegian patients and 2,5% of Swedish patients are registered with a complication score of Clavien-Dindo 3B or more. (Clavien-Dindo of 3B or more means that an intervention in general anesthesia or intensive care treatment is needed.)

There were no mortality in the first 30 postoperative days in any of the registries.

Table 4. Surgery and complication data from Norway and Sweden 2016.

	Norway	Sweden
Laparoscopic approach (n, %)	1353 (99,6)	5563 (99,0)
Conversions (n, %)	5 (0,2)	8 (0,1)
Operative time (min, SD)	66 (32,2)	60 (32,8)
Length of hospital stay (days, SD)	2,0 (2,7)	1.61 (2,9)
Any postoperative complication* (n, %)	85 (6,3)	376 (6,6)
Leakage (n, %)	15 (1,1)	47 (0,8)
Bleeding (n, %)	24 (1,8)	60 (1,1)
Intraabdominal infection (n, %)	12 (0,9)	33 (0,6)
Clavien-Dindo $\geq$ 3B (n, %)	26 (1,9)	142 (2,5)
Reoperations (n, %)	34 (2,5)	136 (2,4)
30 days postoperative mortality (n, %)	0 (0)	0 (0)

## Summary

There are many similarities between Norway and Sweden when it comes to organisation of health care. The indications for bariatric surgery are also similar. Therefore it is no surprise that we see few differences between the two countries in this report. Even though the majority of operations are publically funded, we see more publically funded operations being performed in private units in Sweden. Differences seen in waiting time may be explained by different legislation.

Sleeve gastrectomy is a more common operation in Norway whereas gastric bypass is dominating in Sweden. The prevalence of complications are similar between the two countries, but we see a slightly higher prevalence of severe complications in Sweden and a slightly higher prevalence of leakage and bleeding in Norway. The explanation for these differences will need future analysis of hopefully larger patient groups

The results must be interpreted with some caution since the Norwegian data for 2016 are not complete.

Both registries are using the same system for auditing which include checking the database for strange and unusual data combinations and control of data between medical record and SOReg on randomly chosen patients. We will come back with results from auditing.

The similarities in demographics and results, combined with a similar auditing system is a good foundation for future research projects based on joint registry data.

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