The IFSO Global Registry

IFSO
GLOBAL REGISTRY

Second IFSO Global Registry Report

2016

Prepared by

Richard Welbourn
John Dixon
Kelvin Higa
Robin Kinsman
Johan Ottosson
Almino Ramos
Bart van Wagensveld
Peter Walton
Rudolf Weiner
Natan Zundel

IFSO & Dendrite Clinical Systems Ltd

International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO)

Second IFSO Global Registry Report

2016

Prepared by

Richard Welbourn
John Dixon
Kelvin Higa
Robin Kinsman
Johan Ottosson
Almino Ramos
Bart van Wagensveld
Peter Walton
Rudolf Weiner
Natan Zundel

IFSO & Dendrite Clinical Systems Ltd

The International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) operates the IFSO Global Registry in partnership with Dendrite Clinical Systems Limited. The Society gratefully acknowledges the assistance of Dendrite Clinical Systems for:

- building, maintaining & hosting the data-entry web portals
- data analysis and
- publishing this report

Dendrite Clinical Systems Ltd is registered under the Data Protection Act;
Data Protection Act Registration Register Number Z88 55 307

This document is proprietary information that is protected by copyright. All rights reserved. No part of this document may be photocopied, stored in a retrieval system, transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the permission of the publishers and without prior written consent from The International Federation for the Surgery of Obesity and Metabolic Disorders and Dendrite Clinical Systems Limited.

Price: US$40.00

September 2016 A catalogue record for this book is available from the British Library

ISBN 978-0-9929942-1-1

Published by

Dendrite Clinical Systems Ltd

The Hub, Station Road, Henley-on-Thames,

Oxfordshire RG9 1AY, United Kingdom

phone +44 1491 411 288

fax +44 1491 411 377

e-mail publishing@e-dendrite.com

Printed and bound by

Preface

Bariatric and / or metabolic surgery, has reached a point where the expanding evidence base of high-quality randomized controlled trials and longitudinal studies, such as the Swedish Obese Subjects study, make the case for surgery ever more compelling. However, we are at a crossroads, since the rate of surgery in public health systems is not increasing above a tiny fraction of those patients who fulfil the eligibility criteria.

As surgeons struggle to combat the epidemic of obesity worldwide and improve the lives of our patients with this disease, it is even more important to know on a global scale who we are operating on, why, and what procedures are being undertaken. The more we know, the better we will be able to help our patients, but, not only that, we will understand the global situation, and also the regional situation, and perhaps intervene through our members societies, to improve not only quality-of-care, but also the access of patients to suitable treatment.

After a successful Pilot Project, the IFSO Executive Council took the formal decision to fund a Global Registry in 2014, and this Second Report is the next logical step from the pioneering work of Drs Scopinaro, Buchwald, Angrisani, Weiner and others in their surveys of national society members from within the Federation. It is the next important step in describing and comparing the baseline characteristics and operative outcomes in large numbers of patients as we build up a more and more representative picture of what is happening around the world.

I know, first hand the difficulties and cost of collecting data. That's why we, the IFSO Executive Leadership team, decided to cover the cost of the collection, publication and delivery of such bariatric surgery data collected from around the world. We partnered with one of the leading clinical software companies in the world, who have extensive experience in this kind of process, so as to make it happen in the most professional way possible.

The response from our members and member societies has been pretty good, but lower than our expectations.

We believe that this initiative is an important part of the global response to the obesity epidemic, and we would like to encourage all national societies and individual surgeons to actively participate in the next iteration. We would like to offer our sincere thanks to all those who have submitted their data so far.

Personally, I truly believe that when you see the final product of these endeavours, all of you will not only benefit for this information, but also will want to join this journey towards a truly Global Registry, which will ultimately be to the benefit of our patients.

Finally I want to thank all the members of the Data Registry Committee for all their hard work and offer a special thank you to Richard Welbourn and Peter Walton for their commitment and work throughout this Herculean task.

Natan Zundel

IFSO President

Contents

Contents

Foreword

The epidemic of obesity can no longer be ignored. Once perceived as penance for the sins of economically developed countries, it has attacked poorer, less advanced cultures with the same level of aggression.

Obesity is a global disease of unprecedented proportions, insidious in its penetrance, devastating in its consequences; not only through lives lost, but through its global effects on the economy. Through agriculture, domestication of livestock, genetic manipulation and chemical engineering, we have succeeded in replacing starvation with an equally harmful form of malnutrition - obesity.

Treatment of this disease is surprisingly difficult given the obvious, naive answer: eat less, exercise more. Despite evidence for the futility of this dictum and for the effectiveness of our surgical interventions, universal acceptance of surgical treatment has been elusive. Perhaps understandable, as we, ourselves, have incomplete evidence as to the patho-physiology of our interventions or precise long-term outcomes - and even less insight as to which operations will give the best performance in a given patient.

In the United States, as well as other countries, bariatric surgery registries have failed to capture enough data to be of significance. We, as surgeons, suffer from the same lack of insight as our critics - had we universally participated in such programs from the beginning, think how different the landscape would be today. The importance of the contribution made by longitudinal endeavours such as the Swedish Obese Subjects study cannot be over-emphasized. Data derived from Center of Excellence programs will not have the broad, long-range answers to the global questions that plague us. Surgeons will retire, programs will close as new ones emerge, and patients will change insurance or simply move to a new town. It is not feasible to rely upon a single practice to keep track of every patient forever. By contrast it is possible for a health care system to keep track of every patient who has had a bariatric / metabolic procedure and this should be among the highest of priorities.

The IFSO Global Registry is an important step in this direction. Every surgeon who performs a bariatric / metabolic procedure should consider participation a mandatory part of this specialty.

Kelvin Higa

IFSO President Elect

Introduction

It is a privilege to present data on baseline obesity-related disease, operation types, operative outcomes and disease status after bariatric surgery in over 140,000 patients accumulated from 31 local and national databases and registries from all over the world. This initiative of IFSO, the first of its kind, could help the bariatric community establish essential benchmark knowledge about the patients we are operating upon, their age and gender distributions, body mass index (BMI) and comorbidity disease burden, as well as track trends in surgery over time. The data are presented not as the standard abstract, introduction, methods, results, discussion and conclusions format of a peer-reviewed publication. Rather, using a small and necessarily far from comprehensive dataset, we present the data as simple tables and graphs using usually 2 variables, one for each axis, plus a dedicated commentary for each. Even though this is a very basic presentation of data, many of the results demonstrate clear and important differences in bariatric practice between countries.

A comprehensive Founding Charter has been set up regarding use and ownership of the accumulated and merged data, and contributors can be assured that we have steered well clear of attempting to make statistical comparisons between different units, and that their submitted data will not be misused. We are also fully aware of the inherent problems of over interpretation and reading too much into the data.

If there are to be further developments and reports for the IFSO Global Registry, attractive aims could also include agreeing and developing models of risk stratification and the setting of international benchmarks for post-operative complications or mortality. The registry could help in these aims by standardizing data collection. As it progresses, the data it contains might also be useful in influencing policy internationally and increasing service provision in countries where there is little or no bariatric surgery. I encourage all key stakeholders in bariatric surgery (especially surgeons, providers and commissioners of care) to embrace this data collection and reporting process at individual clinics and hospitals, and onwards / upwards at both national and international levels. It will require widespread involvement and on-going commitment from all those involved in the care of the bariatric patient to ensure high-quality data can be collected, properly analysed and shared, so that we will be better able to understand shifts in disease patterns, practice and outcomes on a global scale.

Thank you to all those surgeons who have committed their data for inclusion in this second report, your contribution is very much appreciated.

Bariatric surgery has great potential to improve health in a vast number of patients in a cost effective manner; however, it is made available to very few obese people who could benefit from it. Little is known internationally about which patients are being operated on, other than the worldwide survey of bariatric surgery undertaken by Prof. Scopinaro, Prof. Buchwald and more recently by Prof. Angrisani [1, 2, 3, 4, 5]. Although we know from their surveys which operations are being performed, we do not yet know basic demographic data on variables such as gender distribution, starting BMI, and prevalence of comorbidities such as type 2 diabetes, hypertension and sleep apnea. Nor do we have any data on surgical outcomes such as survival, length-of-stay or improvement in comorbidities between different populations.

Therefore the aims of this project are to:

1. Establish baseline demographic characteristics for patients operated in different countries either from the respective national registries or individual units in these countries
2. Record basic 1-year post-operative data

The data presented are not intended to be a definitive global representation of bariatric surgery, as data from many countries with large volumes of surgery are not yet included. However, the report is the start of a process that shows what can be achieved within the constituent countries of IFSO. For instance, the data could in future be used to estimate inequalities of provision of surgery internationally, and provide benchmarks for access to surgery to those people with specific obesity-related disease such as diabetes.

1. Scopinaro N. The IFSO and obesity surgery throughout the world. *Obesity Surgery*. 1998; **8**: 3–8.
2. Buchwald H, Williams SE. Bariatric surgery worldwide 2003. *Obesity Surgery*. 2004; **14**: 1157–64.
3. Buchwald H, Oien DM. Metabolic/bariatric surgery worldwide 2008. *Obesity Surgery*. 2009; **19(12)**: 1605–11.
4. Buchwald H, Oien DM. Metabolic / bariatric surgery worldwide 2011. *Obesity Surgery*. 2013; **23(4)**: 427–36.
5. Angrisani L, Santonicola A, Iovino P, et al. Bariatric surgery worldwide 2013. *Obesity Surgery*. 2015; **25**: 1822-32.

Contents

Second IFSO Global Registry Report

Executive summary

This is the second comprehensive, international analysis of outcomes from bariatric (obesity) and metabolic surgery, gathered under the auspices of the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) in collaboration with Dendrite Clinical Systems.

In overview

- 31 countries from 5 continents contributed a total of 141,748 operation records; 54,490 of these records fell in the calendar years 2013-2015
- the number of records submitted ranged from 55 from a single centre to over 47,000 submitted by the national registry from the United Kingdom
- this précis reports on 82,264 gastric bypass operations (58% of all the records submitted), 36,263 sleeve gastrectomy procedures (25.6%), and 13,824 gastric banding operations (9.8%)
- most of the database records fell in the period 2009-2015 (88.5% of the total); 59,490 of operations were dated in the calendar years 2013-2015 (42.0%)

The dataset and completeness of data entry

- the simple dataset used for the previous IFSO report was extended slightly to include a total of 40 variables (28 baseline data-items; 12 in the follow-up section)
- overall, 62.4% of the baseline records were >80% complete for operations dated in the calendar years 2013-2015

Initial data from 2013-2015

Funding and gender inequality

- 58.3% of operations were funded by public health services; there was a great deal of variation in the rates of publicly-funded surgery across the contributor countries
- there was also a wide variation in the country-specific gender ratios, ranging from 54.2% female (in Brazil) to 80.3% female (in the Netherlands)

Primary operations and BMI range

- the patients' average BMI pre-surgery was 44.7 kg m^{-2} (inter-quartile range: 39.4-48.8 kg m^{-2}); there was a wide variation between different contributor countries, ranging from 36.6 kg m^{-2} in Peru to 49.1 kg m^{-2} in Ireland
- patients' average age was 42.0 years (inter-quartile range: 33.0-51.0 years)
- the overall proportion of female patients was 73.3% (95% CI: 73.0-73.7%)
- Switzerland (100.0%), Sweden (92.8%) and Mexico (86.7%) reported the highest proportions of gastric bypass surgery; Peru (100.0%), Saudi Arabia (100.0%) and Qatar (100.0%) reported the highest rates of sleeve gastrectomy operations
- 97.8% of all operations were performed laparoscopically
- 88.1% of patients who had a gastric band inserted were discharged within 1 day of their operation; after gastric bypass, 75.4% of patients were discharged within 2 days of surgery; and 86.8% of sleeve gastrectomy patients went home within 3 days of their operation

Comorbidities prior to surgery

- 22.0% of patients were on medication for type 2 diabetes (inter-country variation: 7.4-63.2%)
- 31.9% were treated for hypertension (inter-country variation: 15.8-92.7%)
- 17.6% of patients were on medication for depression (inter-country variation: 0.0-46.3%)
- 27.8% of patients required treatment for musculo-skeletal pain (inter-country variation: 0.0-58.9%)
- 18.9% of patients had sleep apnea (inter-country variation: 0.0-63.2%)
- 29.6% of patients had GERD (inter-country variation: 9.1-90.9%)

Stratification for operative risk

- the Obesity Surgery Mortality Risk Score (OSMRS) varied widely by country
- Turkey, Ireland and Hong Kong had the highest-risk patient populations (OSMRS groups B & C: 57.9%. 56.9% and 55.1% respectively)
- Peru, the Netherlands and Panama appeared to have the least risk (OSMRS groups B & C: 22.2%, 23.9% and 26.0% respectively)

Follow up data for primary surgery carried out in the calendar years 2009-2015

- there were 189,141 valid follow up records
- average percentage excess weight loss was 72.4% one year after surgery
- the corresponding percentage weight loss was 30.4% one year after surgery
- one year after primary surgery 64.7% of those taking medication for type 2 diabetes beforehand were no longer on medication; the proportion of patients no longer treated for diabetes was highly dependant on weight loss achieved
- there were also significant reductions in the rates of treatment for depression, hypertension and musculo-skeletal pain
- rates of confirmed sleep apnea and GERD also fell one year after bariatric surgery

Implications for bariatric surgery

- a simple dataset and the willingness of many centres in different countries to contribute can lead to a large body of pooled and merged data
- this second report quantifies the gender inequality evident worldwide and also shows inequality of access to surgery in many countries
- on the scale of a large international collaboration, the data on improvement in diabetes demonstrate the profound treatment effect that bariatric surgery has on this disease
- therefore, this initiative may be useful in advancing the status and acceptability of bariatric surgery worldwide and suggests many international research projects that could be undertaken

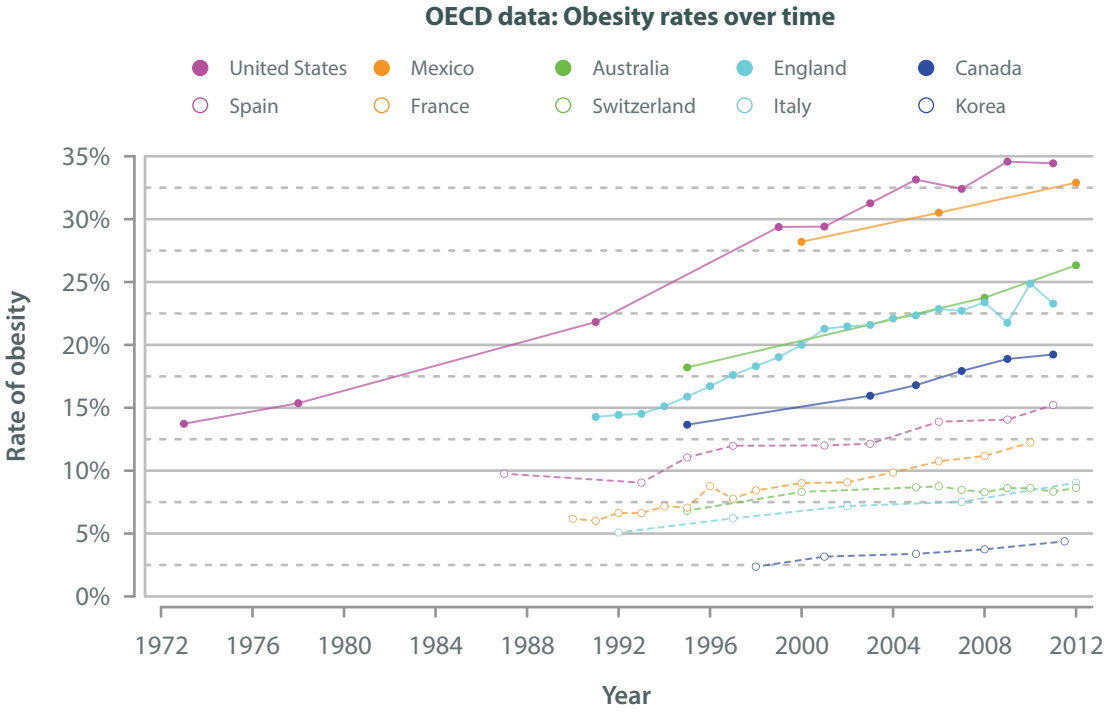
Contents

Contents

WHO data

The chart below shows the inexorable increase in obesity rate among the OECD countries. Baseline prevalence of obesity varies greatly with global region, but the trends are the same. Unfortunately obesity prevalence tells only part of the story as a doubling of the obesity rate in a country typically generates a 3-fold increase in the prevalence of a BMI >35 kg m^{-2}, a 5 fold increase of a BMI >40 kg m^{-2}, and a 9-10 fold increase in individuals with a BMI >50 kg m^{-2} [1]. Of course, these trends are not restricted to developed countries, but are universal as indicated in the recent NCD (non-communicable diseases) collaborative data from 200 countries following 19.2 million participants [2]. The data indicate a global exponential increase in the numbers of people with obesity, and severe obesity especially in women, between 1975 & 2014. Sadly there is no hint that trends are changing. This continuing epidemic is driving an extraordinary increase in the rates obesity-related complications such as type 2 diabetes, cardiovascular disease and specific cancers.

Bariatric-metabolic surgery is one of few highly effective tools to manage this growing burden of chronic disease. However, there are major ethnic and regional differences in the pattern of obesity related complications and the BMI that generates the risk of these. There may also regional differences in the choice of surgery resulting from cultural acceptability, team skills and resources available, ethnic differences in the response to specific surgical procedures, and regional risks of specific GI malignancies.



A key element in the delivery of care to those in need and most likely to benefit will be an understanding of surgical risk-to-benefit throughout the life-cycle, and the influence of obesity-related complications on this analysis. This will assist in clarifying individual patient selection, but also guide the issue of surgical eligibility *versus* recommendation. Limited resources, an overwhelming need, and the preponderance of whole of community delivery of health services in developed countries will drive a priority for surgical recommendation rather than eligibility.

To address these national and regional issues it is important to pool our resources and understand the delivery of bariatric-metabolic surgery on a global basis. The IFSO international registry provides a vital component in monitoring the response to this epidemic.

1. Sturm R. Increases in clinically severe obesity in the United States, 1986-2000. *Archives of Internal Medicine*. 2003; **163(18)**: 2146-8.
2. Collaboration NCDRF. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *Lancet*. 2016; **387(10026)**: 1377-96.

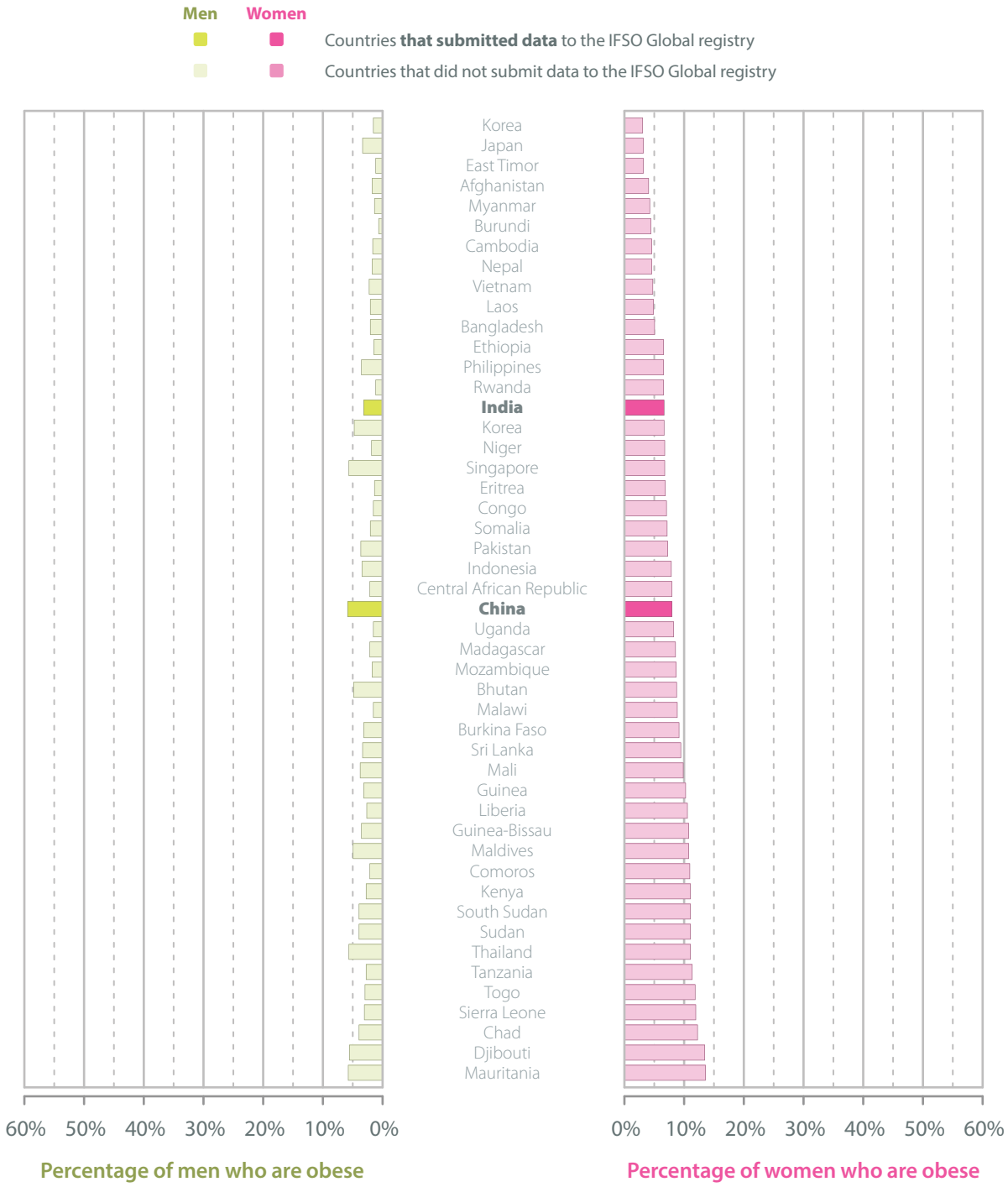
Contents

Global prevalence of obesity

The next four graphs show the latest data available for the prevalence of obesity (defined as body mass index of ≥30 kg m^{-2}) by gender from the World Health Organisation (apps.who.int/gho/data/node.main.A900A?lang=en). Together with the graph on the previous page they illustrate the severity of the problem affecting all, especially the more developed, countries.

Here we see the countries with the lowest prevalence of obesity. However, two contributors to the registry, China and India, have the greatest burden of type 2 diabetes globally with approximately 100 million and 70 million people respectively. The difference in the prevalence between men and women is clear and consistent throughout these countries that currently exhibit the lowest levels of obesity.

WHO data: Gender & age standardised rates of obesity by country; countries ordered by increasing rates of obesity in the female population; people over the age of 17; data from the year 2014



Countries represented on this page are from a range of regions. It is easy to recognise the European countries as it is in these countries that the prevalence of obesity in men is similar to or even exceeds that in the female population.

There are many developed countries contributing to the registry in this group of countries. It is noticeable that the gender divide in obesity prevalence is greatest in the sub-Saharan African nations.

Contents

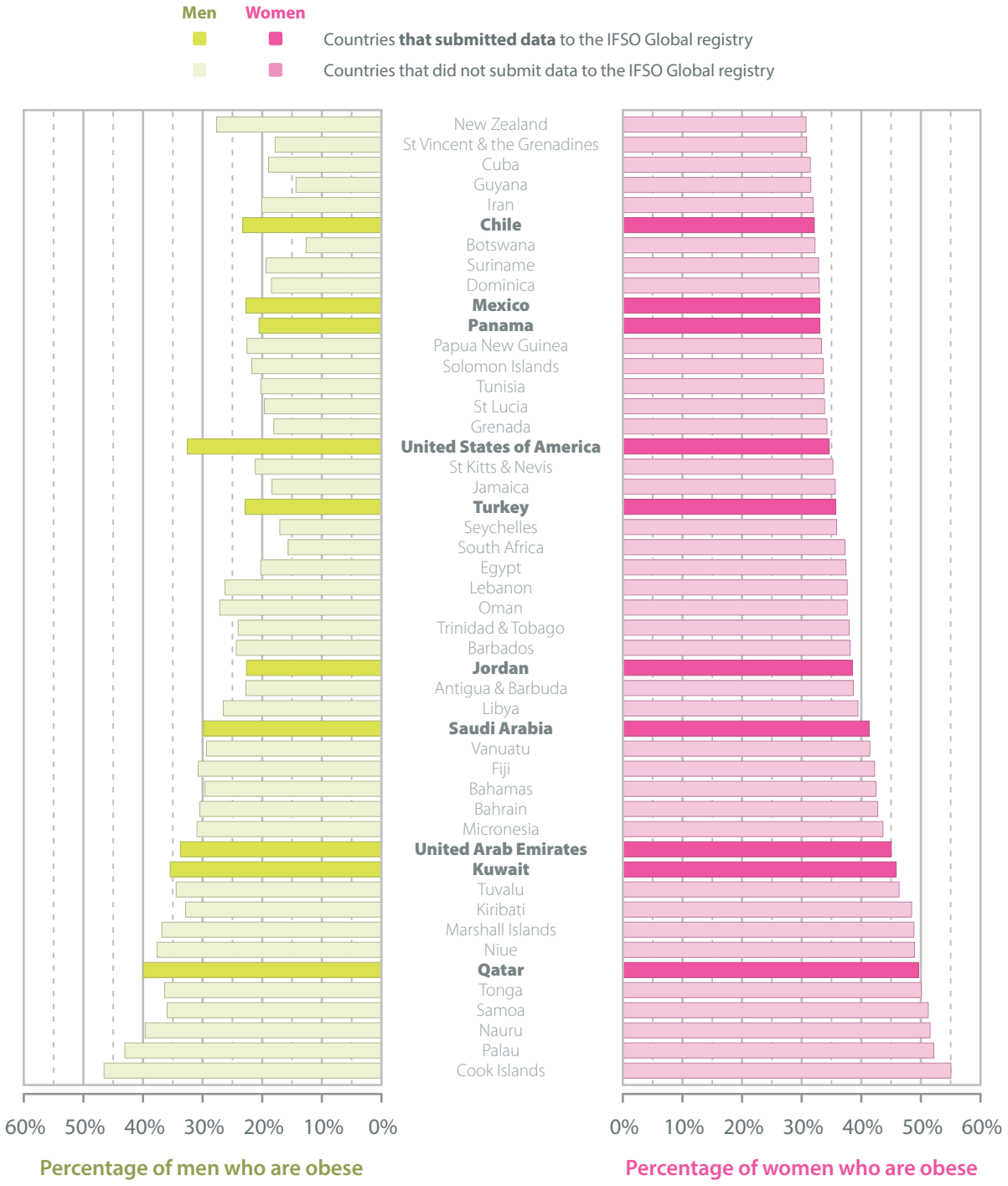
WHO data: Gender & age standardised rates of obesity by country; countries ordered by increasing rates of obesity in the female population; people over the age of 17; data from the year 2014

Contents

WHO data: Gender & age standardised rates of obesity by country; countries ordered by increasing rates of obesity in the female population; people over the age of 17; data from the year 2014

The countries represented here are those with the highest prevalence of obesity globally. Regions are very distinct and include the Pacific Islands, the Middle East, the United States, Mexico, Caribbean Islands, and parts of Central and South Americas.

WHO data: Gender & age standardised rates of obesity by country; countries ordered by increasing rates of obesity in the female population; people over the age of 17; data from the year 2014



Contents

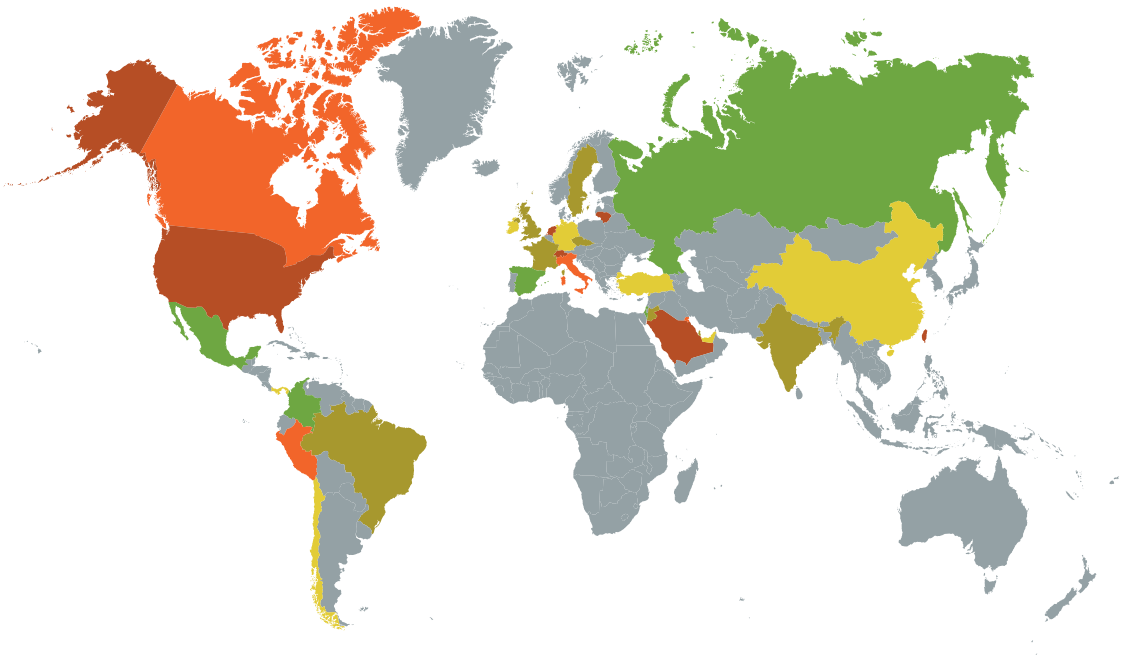
Contributors

Following the success of the initial IFSO Pilot Global Registry (which reported results at the IFSO meeting in Montreal in 2014), Dr Natan Zundel, the President of IFSO, extended a personal invitation to every IFSO member country National President to encourage their Society to join the registry. Just over 50% of the invited countries were willing and able to contribute data. In addition, two national Society Presidents indicated that while they could not submit this year, they would be prepared to do so in future years.

New national registries joining the project included India, Israel, the Netherlands and Turkey. In some countries only one or two individual bariatric surgery centres were able to supply data, usually because no national registry yet exists. This does mean that the data supplied may well **not** be representative of practice across those countries and hence the resulting analyses must be viewed with caution.

The map below is only intended to give an impression of the geographic spread of the contributors to the IFSO Global Registry. It does show that the data for this project have come from a widespread and diverse group of countries. Some of these contributor countries have data coming from a single centre, whereas others have sent data from their National Registry, covering up to 100% of bariatric surgery in that particular country.

The countries in grey have not provided any data to the IFSO Global Registry as yet.



The table spread across these two pages shows exactly which countries, in which continental region, successfully submitted data either as national registries or as individual contributors. A full list of the contributors on a named hospital basis, by country, is available in the Appendix on pages 40 to 45.

Contributors to the IFSO Global Registry

		Operations	Data source
N America	Canada	2,143	Single centre
	Mexico	1,633	Multi-centre
	Panama	80	Single centre
	United States	3,706	Single centre

Contributors to the IFSO Global Registry

		Operations	Data source
S America	Brazil	1,185	Single centre
	Chile	8,171	Multi-centre
	Colombia	55	Multi-centre
	Peru	358	Single centre
Europe	Czech Republic	1,319	Single centre
	France	216	Single centre
	Germany	472	Single centre
	Ireland	375	Single centre
	Italy	2,398	Single centre
	Lithuania	67	Single centre
	Netherlands	6,742	**National Registry**
	Russia	2,343	**National Registry**
	Spain	656	Single centre
	Sweden	34,244	**National Registry**
	Switzerland	2,029	Single centre
	Turkey	906	**New National Registry**
	United Kingdom	47,064	**National Registry**
Middle East	**Israel**	8,996	**National Registry**
	Jordan	280	Single centre
	Kuwait	1,000	Single centre
	Qatar	100	Single centre
	Saudi Arabia	4,167	Single centre
	United Arab Emirates	1,052	Single centre
Asia	China	726	Single centre
	Hong Kong	608	Multi-centre
	India	2,888	**New National Registry**
	Taiwan	6,769	Multi-centre

Mechanics

New contributor invitees were sent an IFSO Global Registry *Charter* document that outlined and explained:

- aims of the Dendrite / IFSO Global Registry Project
- data protection
- access
- data ownership
- publication and other use of the data
- principles of operation: roles and responsibilities
- data validation
- supervising authorities

Once each invitee had returned their signed Charter document, for those that had the capability to upload data electronically, each was then sent a unique contributor *submit* identifier code, a username and password to access the dedicated Dendrite / IFSO *Upload-My Data* portal, and four key documents:

1. **The Database Form**: to provide a quick overview of the central database design. This is available in the Appendix in this report on pages 46 to 48.
2. **The File Specification Document**: that provides a detailed specification of the file format output required for submitting / uploading electronic data files.
3. **The Data Dictionary**: detailing the data definitions of the database answer options.
4. **The User Manual**: to explain how the Upload-My-Data software can be used.

All these documents are available on-line at:

rs2.e-dendrite.com / CSP / PUBLIC / DocPublic / UploadMyData / IFSO2 / ifso2.csp

For those centres without a local database, Dendrite constructed and provided an on-line database system accessible over the Internet. This portal enables surgeons / data managers to enter cases (with anonymised patient identifiers) using a simple on-line data form with just 4 pages of questions, that typically takes just 3-4 minutes to complete *per* patient record.

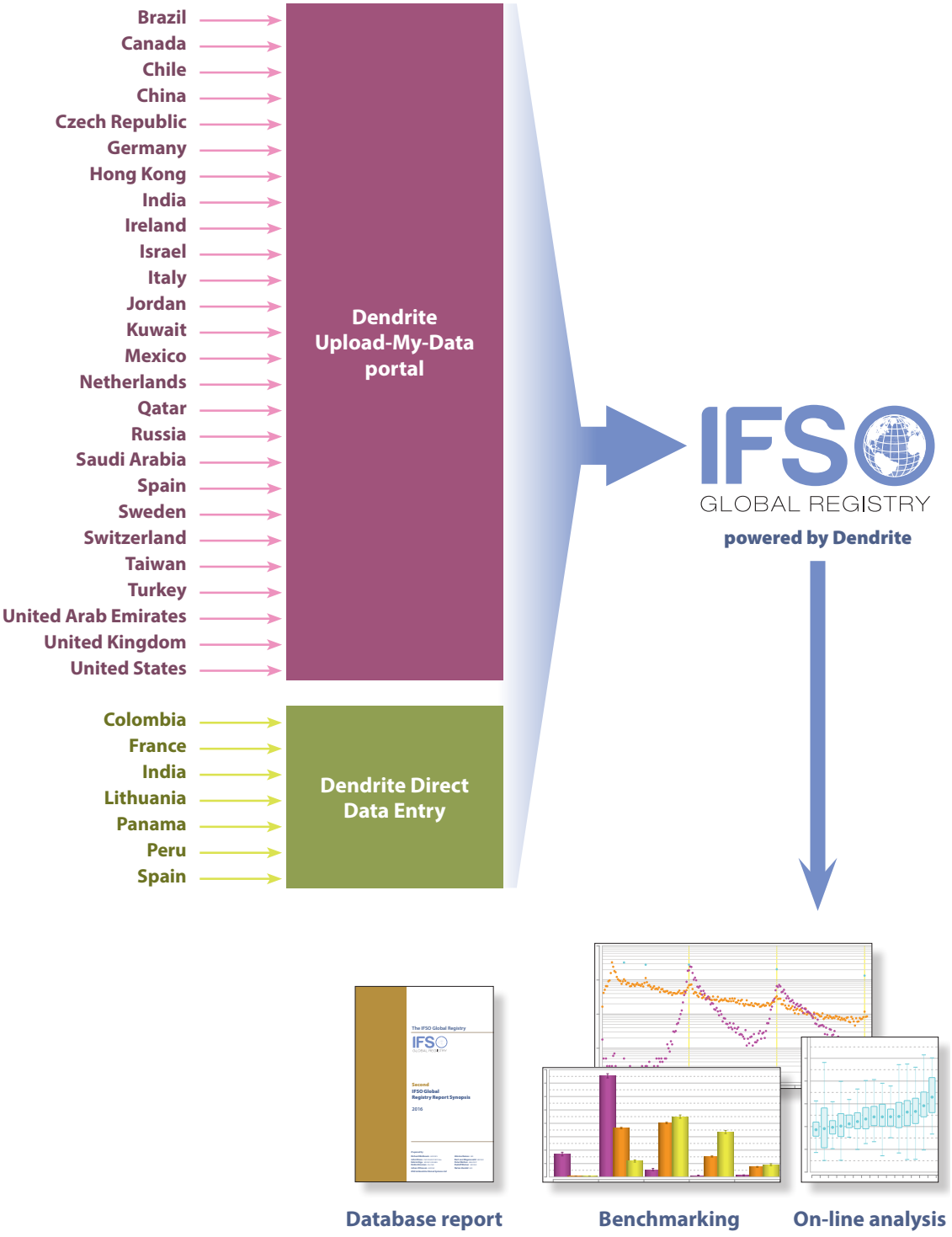
The Dendrite *Upload-My-Data* software platform is a proven interface, designed to enable a community of surgeons or physicians to create a national or international database; even if there are different database systems at the local level, the data from each can be integrated into the central, merged registry. This platform has been successfully utilised in a number of other national and international registries (*e.g.,* for cardiac surgery, thoracic surgery) and has been specifically tailored for the IFSO project to enable both individual centres and national registries to submit data in batches on-line.

The software has been designed to walk the user through a series of simple steps using a menu structure and on-screen instructions from an initial Welcome Page through a series of file and data validation checks to a final *Data Commit* page and a Summary Screen that provides a brief *précis* of the data received in the central IFSO Global Registry following each upload.

The diagram opposite illustrates the fact that most countries (and all national databases) were successfully able to upload data electronically through this Upload-My-Data web portal.

By combining the data from the Upload-My-Data area with the data submitted on-line case-by-case, through the Direct-Data-Entry module, it was then possible to run the analyses on data gathered from 31 countries as illustrated in this report.

The next step is to create and publish some dynamic on-line analyses so that these can be accessed anywhere in the world where there is an Internet connection. The design and publication work for this task is on-going.


Brazil
Canada
Chile
China
Czech Republic
Germany
Hong Kong
India
Ireland
Israel
Italy
Jordan
Kuwait
Mexico
Netherlands
Qatar
Russia
Saudi Arabia
Spain
Sweden
Switzerland
Taiwan
Turkey
United Arab Emirates
United Kingdom
United States
Dendrite Upload-My-Data portal
Colombia
France
India
Lithuania
Panama
Peru
Spain
Dendrite Direct Data Entry
IFSO
GLOBAL REGISTRY
powered by Dendrite
Database report
Benchmarking
On-line analysis

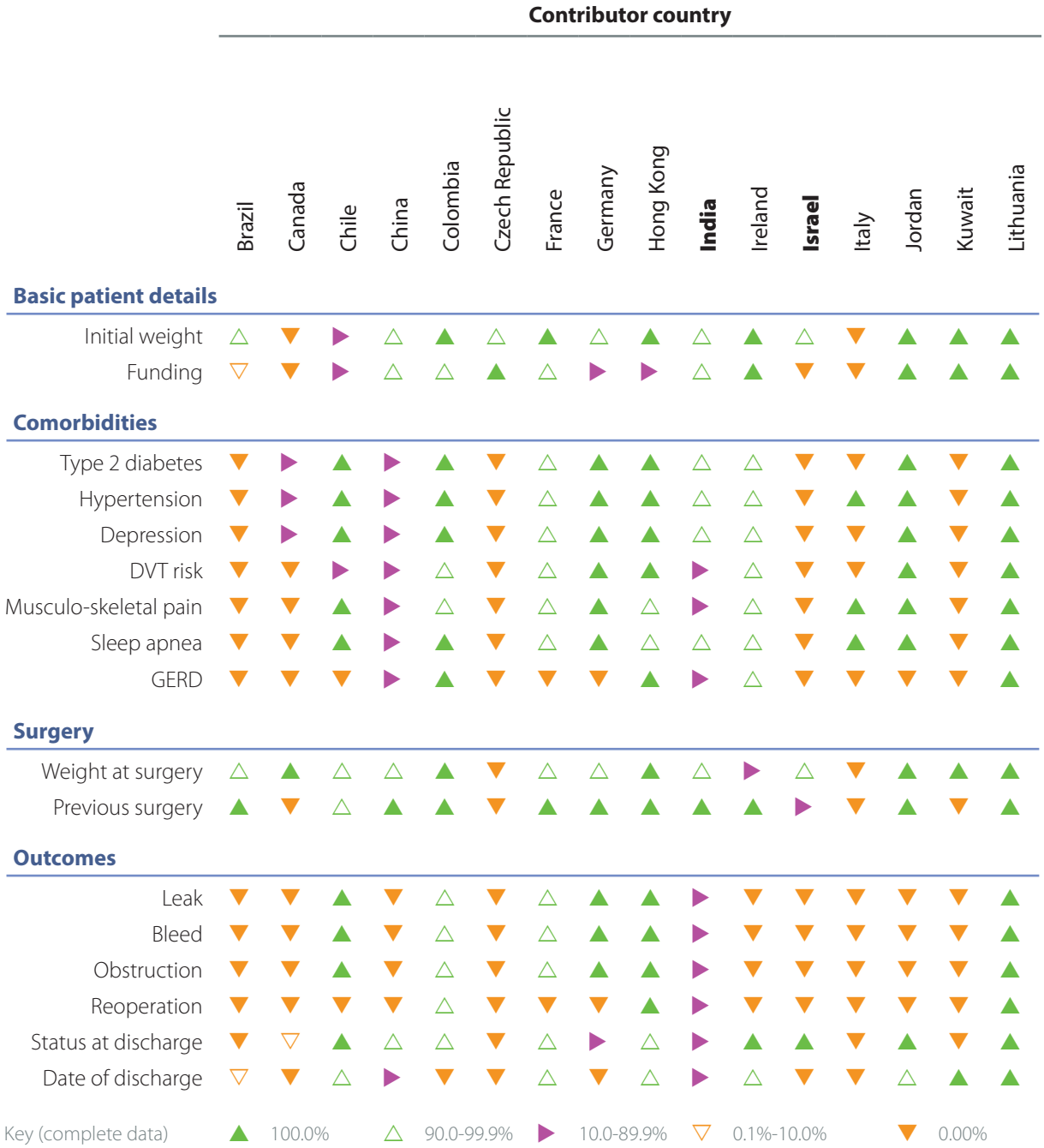
Data completeness

Mandatory questions (required to create an entry on the database) were:

- the patient's date-of-birth or age in years
- the patient's gender
- the patient's height
- date-of-operation
- operative approach
- type of operation

This table shows the completeness of data submitted in the required electronic format for inclusion in the report. There was wide variation; this could either be due to the specific data-point not being included in the patient record that was uploaded to the Global Registry, or the data were left out of initial entry into the local database. Some apparently missing data reported here may represent a simple incompatibility between the local database and the central IFSO registry, rather than representing a complete absence of information at the local level. For

Non-mandatory data in the IFSO Global Registry



example, the National Bariatric Surgery Registry in the United Kingdom does record operative complications, but not in a suitable format to map into the IFSO Global Registry. In some countries data were missing or unavailable for the purposes of this report in over 90% patients. Missing patient records, incomplete data entry and erroneous entries are major concerns, and act as impediments to meaningful and accurate reporting of outcomes. Some countries may have dedicated administrative staff who are able to check every record; however, it is unlikely that this is the case in perhaps the majority of countries submitting data here. The quality of data might be expected to improve in future, but it is important to state that the purpose of this second report is not to provide benchmarks nor quality control; rather, it is intended to demonstrate that data can be submitted successfully to a central registry and useful basic analyses can be performed. It is remarkable that so many of the data fields are shared between different registries and are over 90% complete (the solid green triangles in the table) . The term musculo-skeletal pain was chosen as a generic term for all related conditions, so as to be inclusive, and collect as much data as possible on this comorbidity. Confirmed sleep apnea includes only patients on therapy. The full question titles and corresponding response-options are documented in the Appendix at the end of this report.

Contents

Non-mandatory data in the IFSO Global Registry

	Contributor country														
	Mexico	**Netherlands**	Panama	Peru	Qatar	**Russia**	Saudi Arabia	Spain	**Sweden**	Switzerland	Taiwan	**Turkey**	United Arab Emirates	**United Kingdom**	United States
Basic patient details															
Initial weight	▶	△	▲	△	▼	▲	▲	▶	▲	▼	▶	▲	▼	△	▶
Funding	▲	▼	▲	△	▲	▲	▲	▲	▽	▼	▶	△	▼	△	▶
Comorbidities															
Type 2 diabetes	▲	△	▲	△	▲	▶	▲	▲	▲	▼	△	△	▲	△	▲
Hypertension	▲	▶	▲	△	▲	▶	▲	▲	▲	▼	△	△	▲	△	▲
Depression	▶	△	▲	△	▲	▶	▲	▶	▲	▼	▶	△	▼	▶	▼
DVT risk	▶	△	▲	△	▼	▶	▼	▶	▶	▼	▶	△	▼	▶	▲
Musculo-skeletal pain	▶	△	▲	△	▼	▶	▼	▶	▼	▼	▶	▲	▼	▶	▼
Sleep apnea	▲	△	▲	△	▲	▶	▲	▲	▲	△	△	△	▲	△	▲
GERD	▶	▶	▲	▼	▲	▶	▲	▼	▼	△	▼	△	▼	▶	▲
Surgery															
Weight at surgery	△	▽	▲	△	▲	▲	▲	△	△	▲	△	△	△	▶	▲
Previous surgery	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Outcomes															
Leak	▲	△	▲	△	▲	▲	▲	▲	△	▲	▼	▼	▲	▼	▲
Bleed	▲	△	▲	△	▲	▲	▲	▲	△	▼	▼	▼	▲	▼	▲
Obstruction	▲	△	▲	△	▲	▲	▲	▲	△	▼	▼	▼	▲	▼	▲
Reoperation	▶	△	▲	▼	▲	▲	▲	▼	▼	△	▼	▼	▼	▼	▲
Status at discharge	▲	▽	▲	△	▲	▲	▲	▲	△	▲	▶	△	▲	△	▲
Date of discharge	△	▼	△	△	△	▶	▲	△	△	▶	△	△	▼	△	▲

Key (complete data) ▲ 100.0% △ 90.0-99.9% ▶ 10.0-89.9% ▽ 0.1%-10.0% ▼ 0.0%

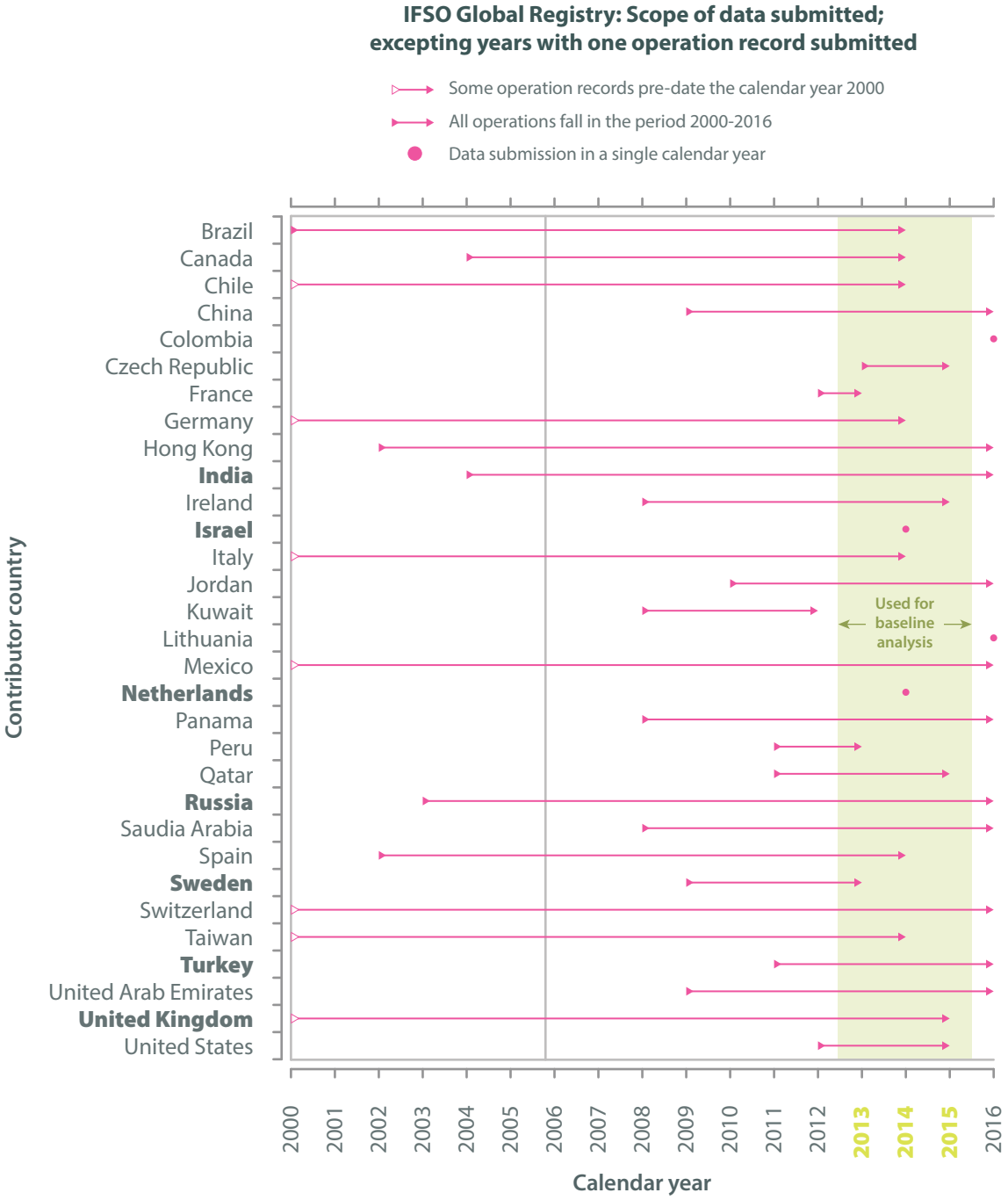
Contents

Submissions

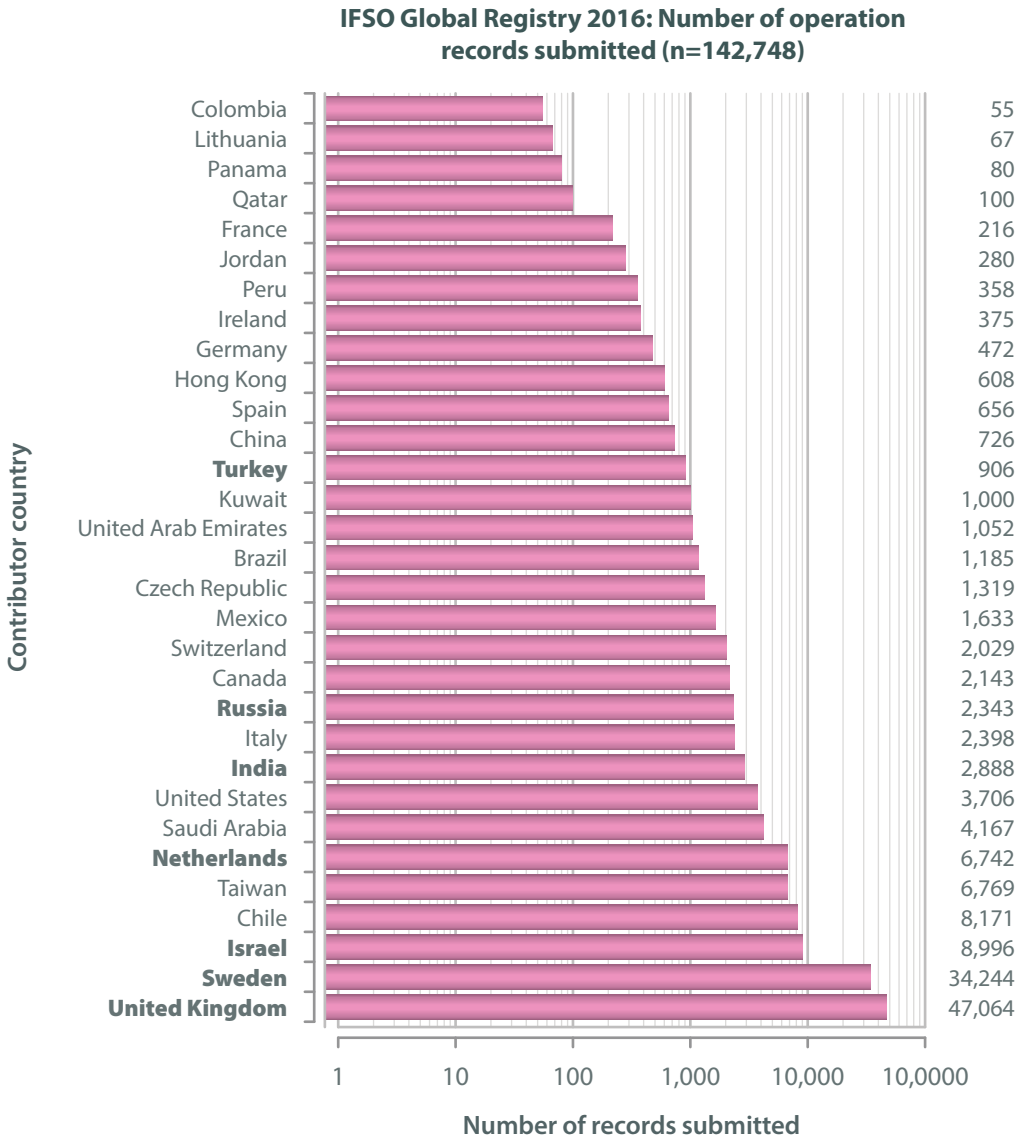
In this Second IFSO Global Registry Report 2016 data from over 140,000 patient records were submitted from 31 countries. The numbers submitted range from exports of data from existing national registries (*e.g.*, Sweden and the United Kingdom) to individual units in other countries that might not be fully representative of overall existing practice in those countries.

However, this is the first time that data have been combined from so many countries. Thus, this is the start of an iterative process as data potentially accumulate over time. In future we hope to add data from more countries and describe accurately the demographics and prevalence of baseline obesity-related disease between different populations having bariatric surgery.

Clearly the data presented are also a snap-shot of surgery in many of the countries and are not the total volume of surgery performed. The data in the rest of the report are from the 3 calendar years 2013-15, so as to present the most recent information, indicated by the green column in the chart below.



The data below show the number of operations *per* contributing country in a logarithmic scale. Until we have more complete data for the total number of operations it is not possible to know how representative the data are for each country, especially for those countries submitting only a few patient records to the current report.



1. Please note that the emboldened country labels in charts represent the data that have been submitted from a National Registry.

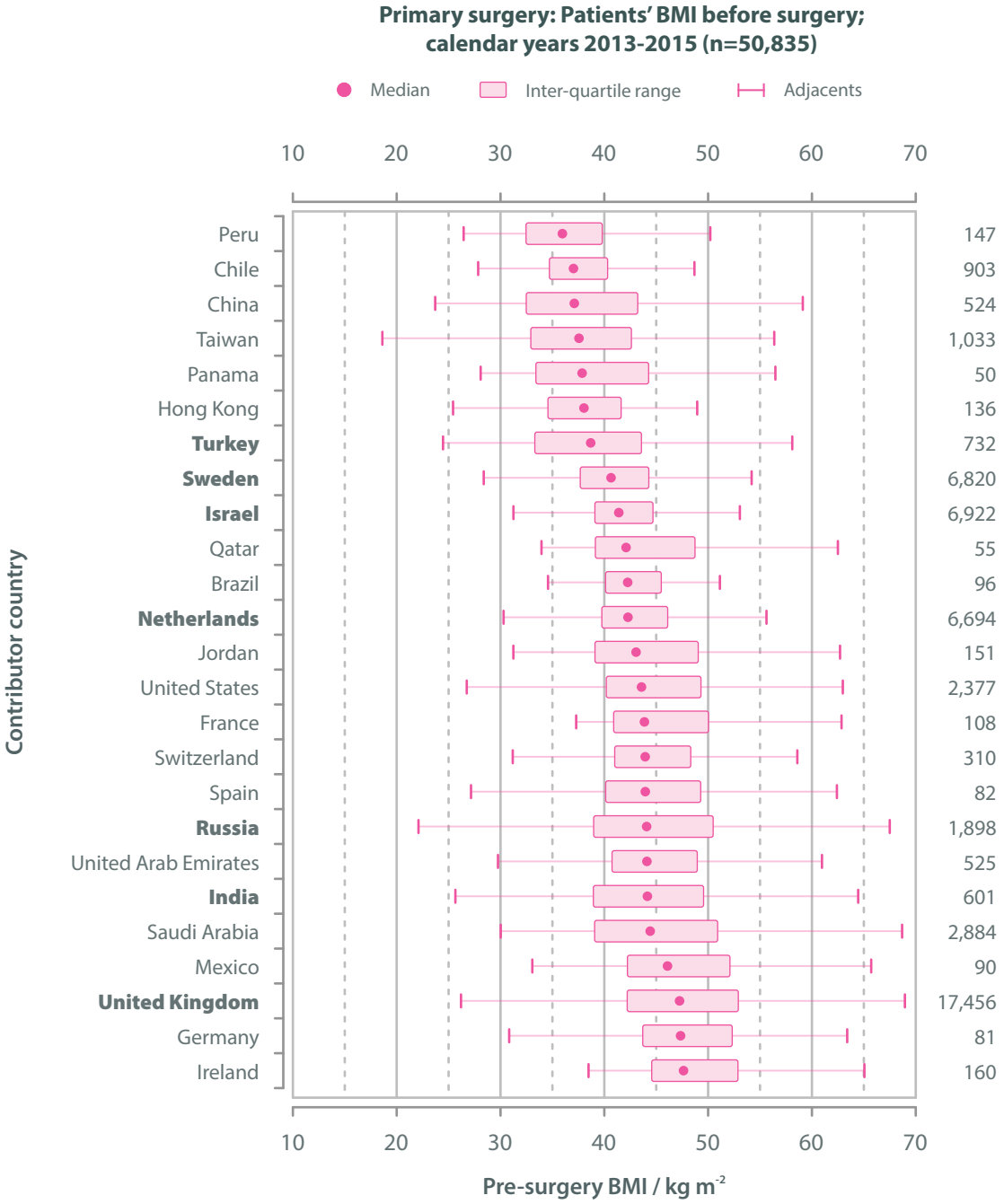
Contents

Contents

Body Mass Index prior to surgery

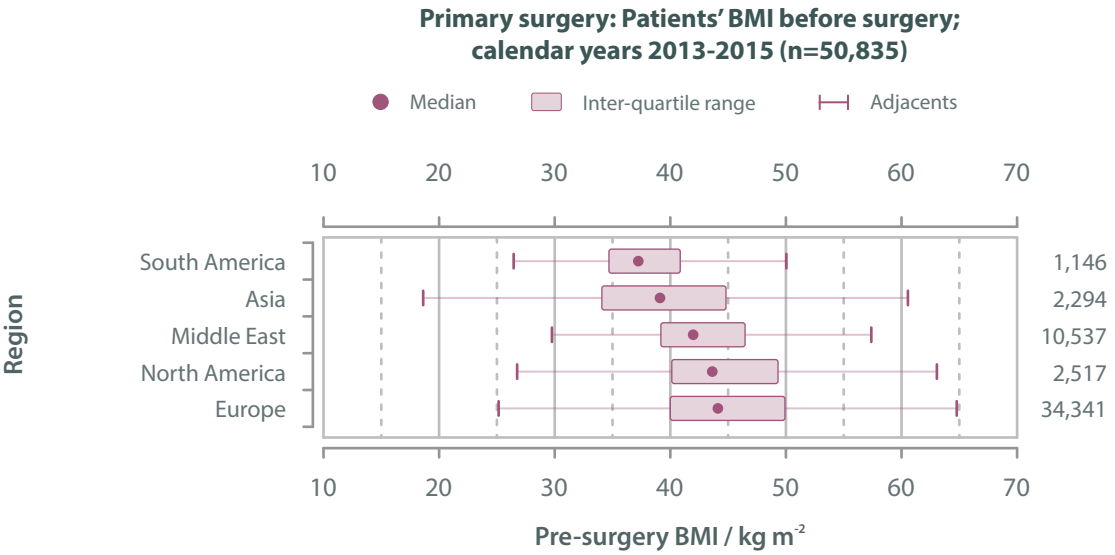
The graph below shows that there is a wide variation in the initial BMI of patients having bariatric surgery in different countries. Germany, the United Kingdom and Ireland have the highest reported BMIs. As increasing BMI is generally associated with a greatest risk of operative complications and mortality, the graph clearly implies that there needs to be caution applied when comparing complication rates between series of patients from different countries. We do not attempt to make these analyses.

We have not sub-divided the pre-operative BMI by funding mechanism. Subsequent analyses would show if there are differences internationally between patients funded by public health or insurance based systems, compared to patients paying for surgery privately.

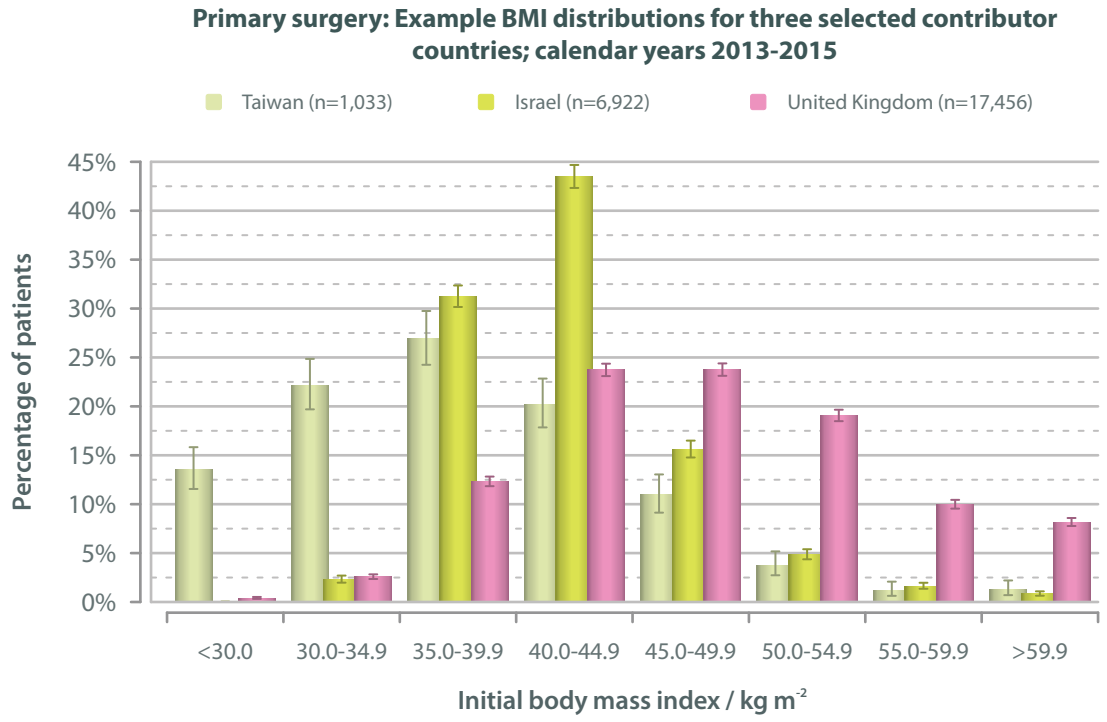


The data illustrate the differences in BMI before surgery in different continents. Although the inter-quartile ranges all overlap, South American patients appear to be less obese than European patients.

The data can be compared to the graph on page 24 showing the age at surgery in different countries.



This comparison graph of pre-operative BMI in 3 countries shows clearly the variation in populations being operated upon in different healthcare systems.



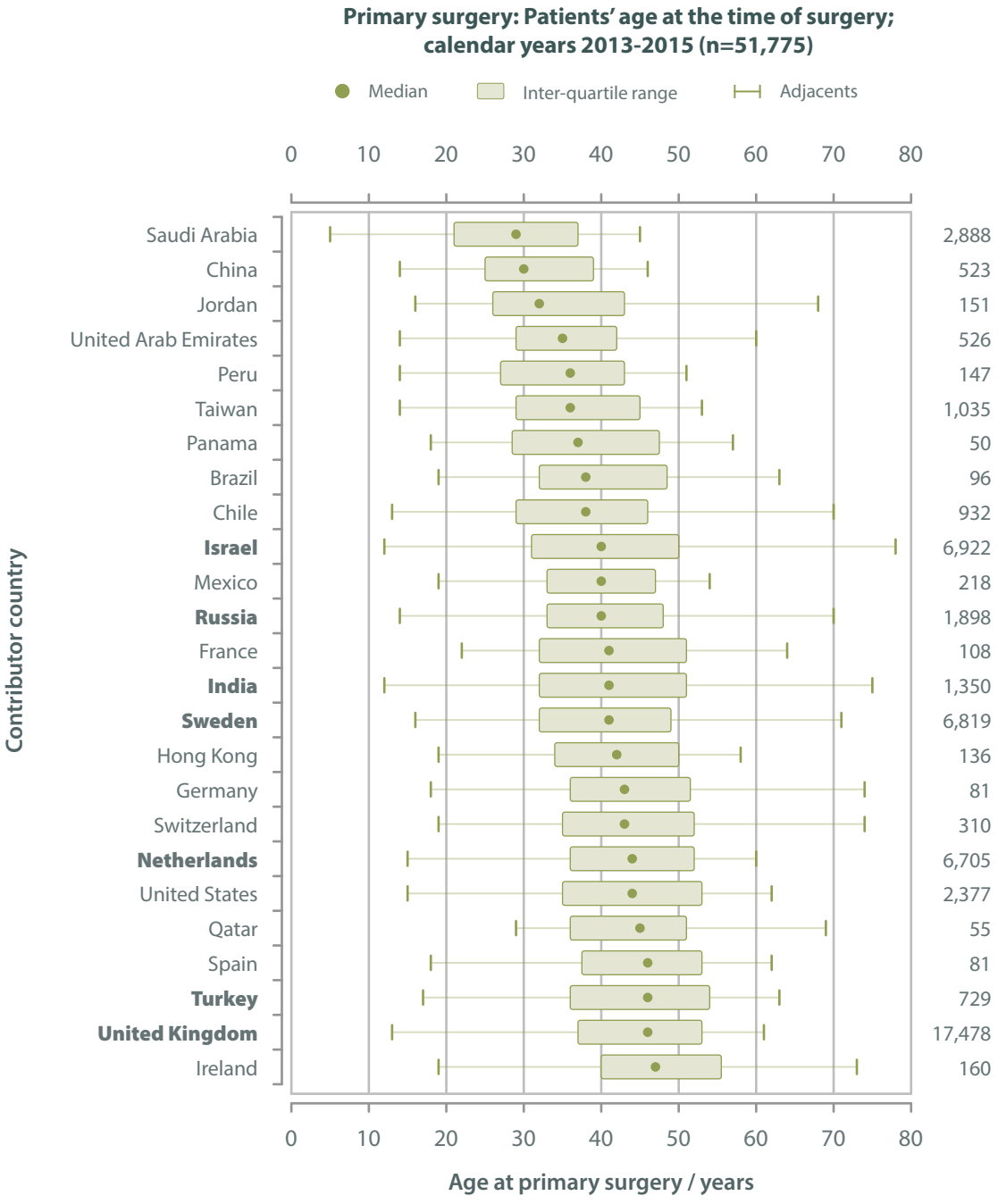
Contents

Demographics

The graph on this page shows the median age of patients at baseline for each of the contributing countries. The patients from Saudi Arabia have the lowest age at surgery, but the centre that submitted these data specialises in child & adolescent surgery, and so the age distribution data is unlikely be fully representative for this country.

Primary surgery in the calendar years 2013-2015: statistics in basic demographic data; all contributor countries are included

		Average (95% CI)	Median (IQR)
Pre-operative demographics	Age / years	42.0 (41.9-42.1)	42.0 (33.0-51.0)
	Gender / % female	73.3 (73.0-73.7)	



Comorbidity

Type 2 diabetes

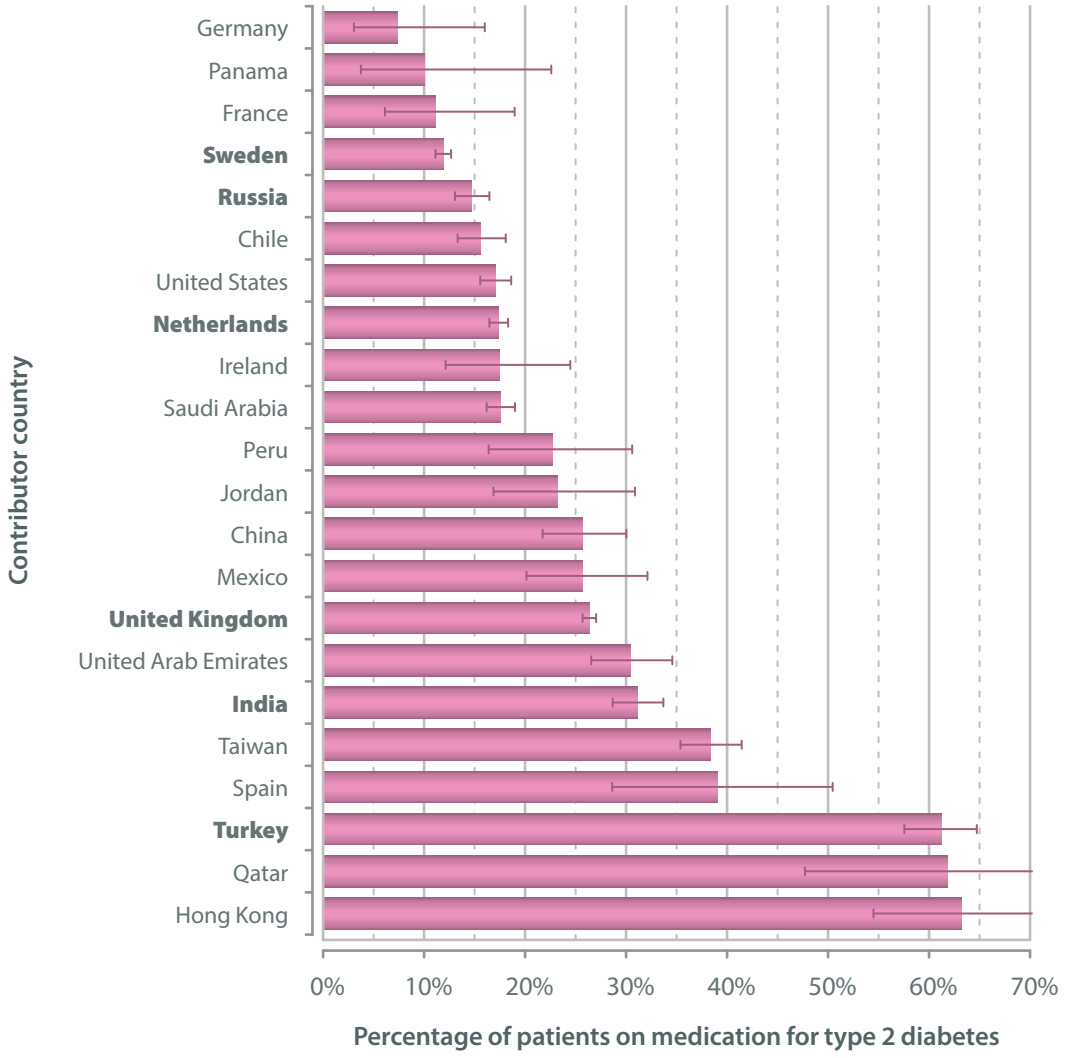
Type 2 diabetes mellitus is the obesity-related disease that has attracted most attention in bariatric surgery due to the demonstrable improvement in diabetes control with surgery, and data suggesting that surgery is cost-effective. In publicly-funded healthcare systems, it may be that patients are being referred for surgery for these reasons, hence forming a substantial proportion of operated patients. This information constitutes basic demographic data as the bariatric community seeks to increase the provision of surgery for the increasing population with this comorbidity.

Interestingly China, India and Hong Kong have some of the largest proportions of diabetic patients, possibly relating to the greater susceptibility of Asian people to developing diabetes at lower BMI levels. The data need to be interpreted in the context of diabetes risk with ethnicity. It may also be that the diabetes story has been taken up as a driver for surgery in these countries, contrasting with some other countries where the proportion of patients with diabetes having surgery is much lower. This area of inequality of access to bariatric surgery is ripe for research.

New international guidelines state that bariatric surgery should be a recommended treatment for type 2 diabetes in patients with BMI of 40 kg m^{-2} or more.

Contents

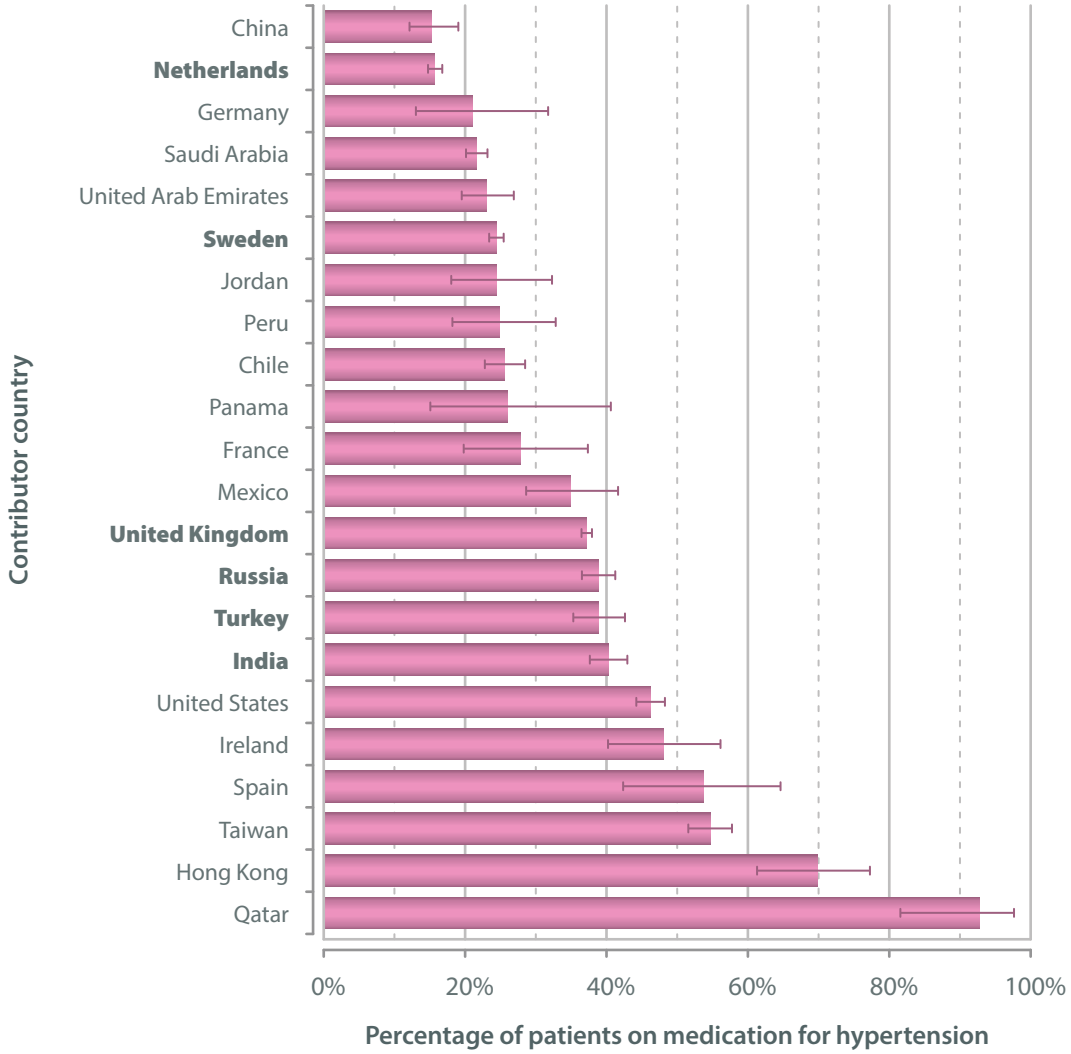
Primary surgery: Patients on medication for type 2 diabetes prior to surgery; calendar years 2013-2015 (n=43,174)



Hypertension

Again, there is widespread variation in the prevalence of hypertension between the different countries, with Taiwan, Hong Kong and Qatar having the highest rates. In some countries hypertension is associated with diabetes as part of the Metabolic Syndrome. However, there is also strong ethnic propensity to one or the other condition. As hypertension is associated with central obesity, it would also be expected that this is a predictor of operative risk (more difficult laparoscopic surgery), and thus it is one of the factors included in the Obesity Surgery Mortality Risk Score (OSMRS) shown in the following section. Recording of the presence of hypertension is therefore needed as a prerequisite for comparing mortality between different series. The wide variation in the reported rates of hypertension between countries might indicate a need for standardization in the recording of blood pressure between different countries and surgical centres. This would be the key towards achieving accurate reporting and must also be a priority for international research in bariatric surgery in this area.

Primary surgery: Patients on medication for hypertension prior to surgery; calendar years 2013-2015 (n=41,587)



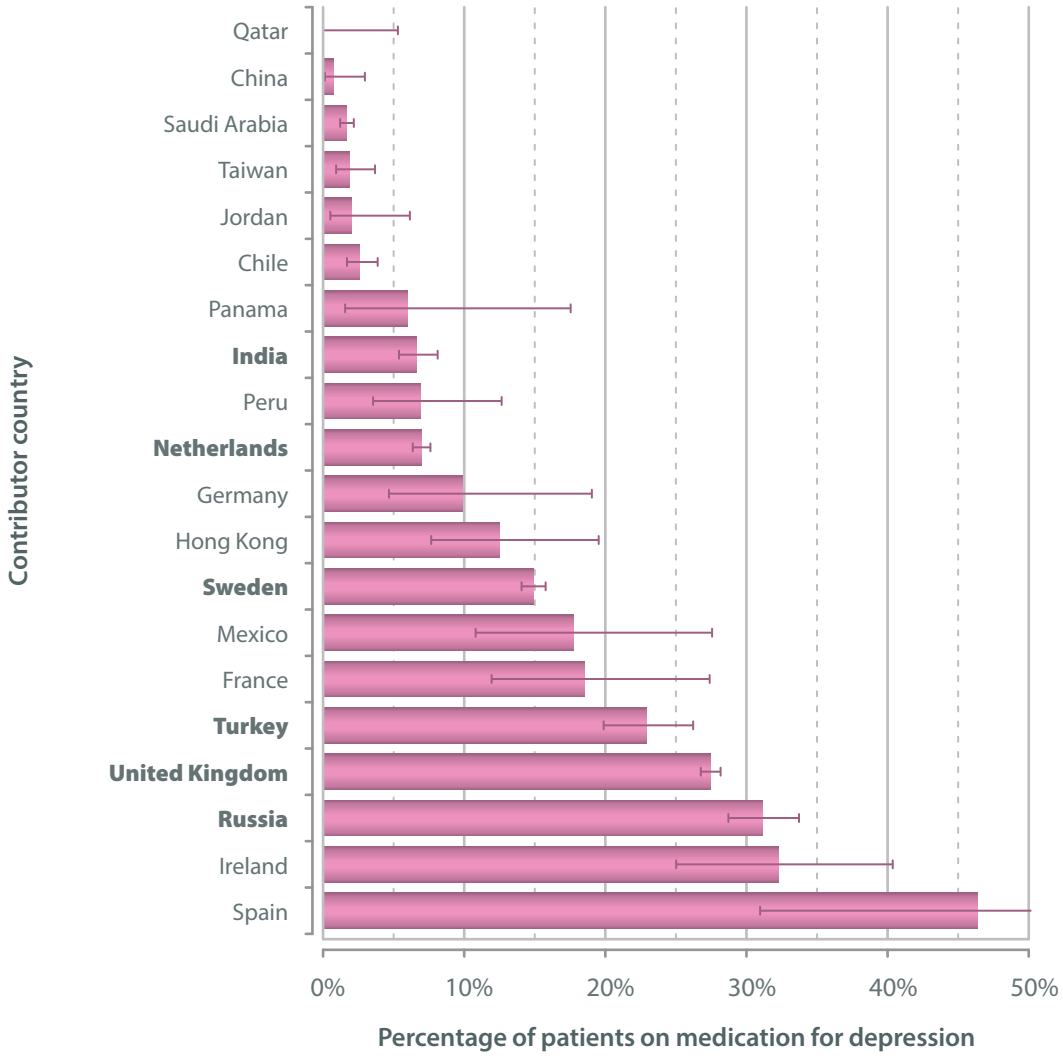
Other comorbidities

The table below show that the recorded rates of clinical depression, dyslipidemia, musculo-skeletal pain, sleep apnea and gastro-esophageal reflux disease in bariatric patients. Current data do not allow us to comment further on the different rates of treatment for depression in those having bariatric surgery in different countries.

Primary surgery in the calendar years 2013-2015: rates of other comorbidities pre-operatively

Comorbidity	Comorbidity present			
	No	Yes	Unspecified	Rate (95% CI)
Depression	31,324	6,677	13,819	17.6% (17.2-18.0%)
Dyslipidemia	24,332	6,838	20,650	21.9% (21.5-22.4%)
Musculo-skeletal pain	20,614	7,957	23,249	27.8% (27.3-28.4%)
Confirmed sleep apnea	34,958	8,130	8,732	18.9% (18.5-19.2%)
GERD	21,265	8,923	21,632	29.6% (29.0-30.1%)

Primary surgery: Patients on medication for depression prior to surgery; calendar years 2013-2015 (n=76,002)



Contents

Obesity Surgery Mortality Risk Score

The OSMRS (Obesity Surgery Mortality Risk Score) stratifies patients undergoing bariatric surgery into three categories depending on how many of the following risk factors they possess (each risk factor scores one point):

- male gender
- age ≥45 years at the time of surgery
- BMI >50 kg m^{-2}
- hypertension
- risk factors for deep vein thrombosis / pulmonary embolism

Primary surgery in the calendar years 2013-2015: Obesity Surgery Mortality Risk Score; excludes those countries where all database entries have one or more data-items required by the OSMRS missing

Contributor country	OSMRS group				
	A (0-1)	B (2-3)	C (4-5)	Unspecified	All
Brazil	0	0	0	96	**96**
Chile	574	205	3	150	**932**
China	89	46	2	390	**527**
France	68	34	6	0	**108**
Germany	51	28	2	0	**81**
Hong Kong	61	74	1	0	**136**
India	25	12	3	1,310	**1,350**
Ireland	69	84	7	0	**160**
Israel	0	0	0	6,922	**6,922**
Jordan	96	40	15	0	**151**
Mexico	43	42	5	128	**218**
Netherlands	3,701	1,135	25	1,846	**6,707**
Panama	37	13	0	0	**50**
Peru	112	31	1	3	**147**
Qatar	0	0	0	55	**55**
Russia	707	494	56	641	**1,898**
Saudi Arabia	0	0	0	2,888	**2,888**
Spain	20	18	3	41	**82**
Sweden	4,916	1,849	52	3	**6,820**
Switzerland	0	0	0	310	**310**
Taiwan	309	160	2	564	**1,035**
Turkey	295	372	34	31	**732**
United Arab Emirates	0	0	0	526	**526**
United Kingdom	7,670	7,381	1,188	1,273	**17,512**
United States	1,226	1,085	66	0	**2,377**
All	**20,069**	**13,103**	**1,471**	**17,177**	**51,820**

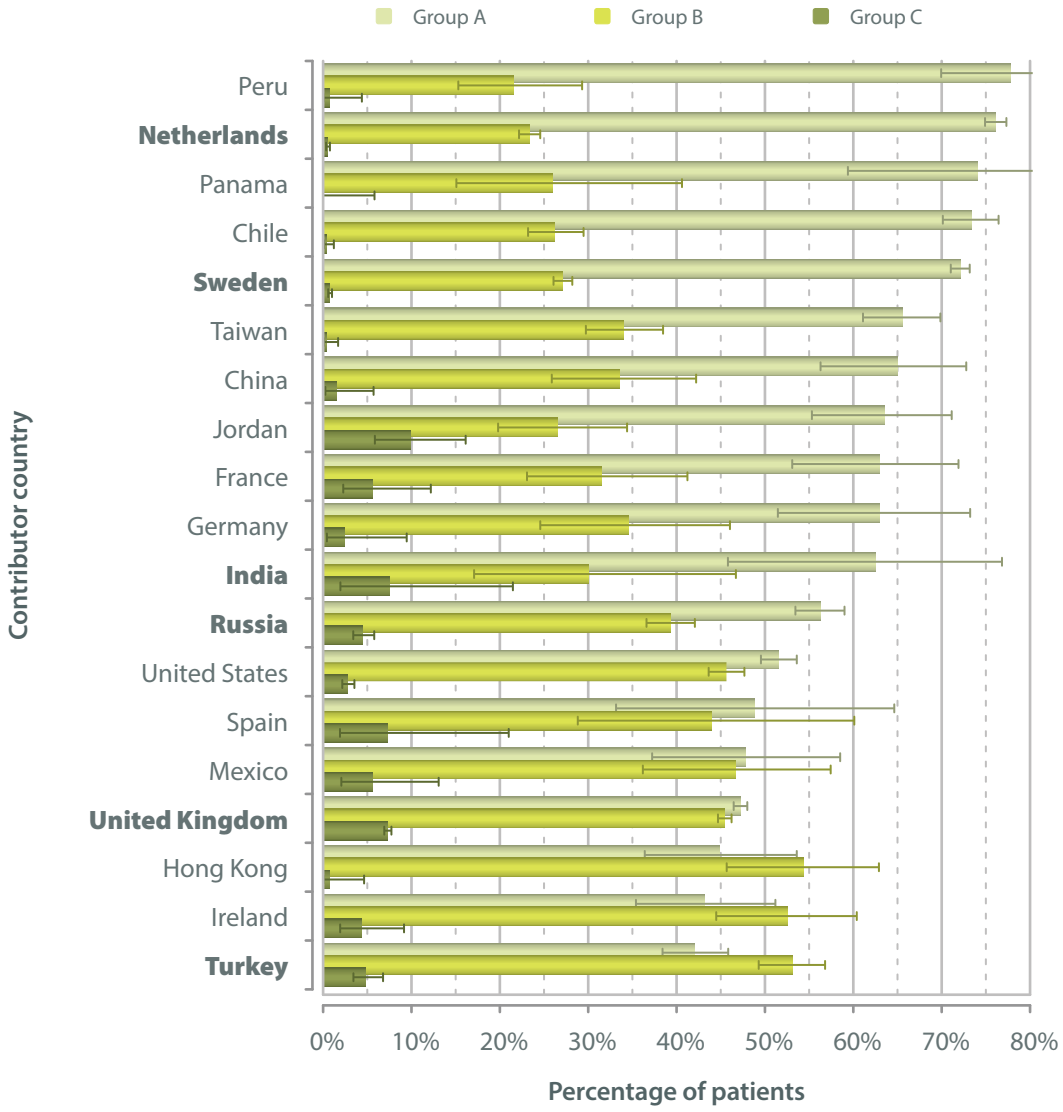
1. DeMaria EJ, Portenier D, Wolfe L. Obesity surgery mortality risk score: proposal for a clinically useful score to predict mortality risk in patients undergoing gastric bypass. *Surgery for Obesity and Related Diseases*. 2007; **3(2)**: 134-140.

The patient is given one point for each of the OSMRS risk factors and a cumulative score determined, giving a total score in the range zero to five; this score is grouped into one of three categories:

- group A: score 0-1 (low risk)
- group B: score 2-3 (moderate risk)
- group C: score 4-5 (high risk)

Contents

Primary surgery: OSMRS distributions ordered by increasing risk (group B & group C); calendar years 2013-2015 (n=34,643)



The comparison of operative risk and mortality between different series and different countries is problematic unless there is a way of stratifying for pre-operative risk. This may be relevant in the situation where systematic reviews and meta-analyses are undertaken when the baseline data are not comparable. The data in the graph show that there is, again, wide variation in OSMRS, an accepted risk-assessment tool, between different countries. As the IFSO Registry continues to gather data it may become representative of the whole operated population, and therefore will provide a benchmark for risk stratification in assessing outcomes. This graphical representation of operative risk also provides important baseline information for prioritisation of which patients should receive treatment in different countries.

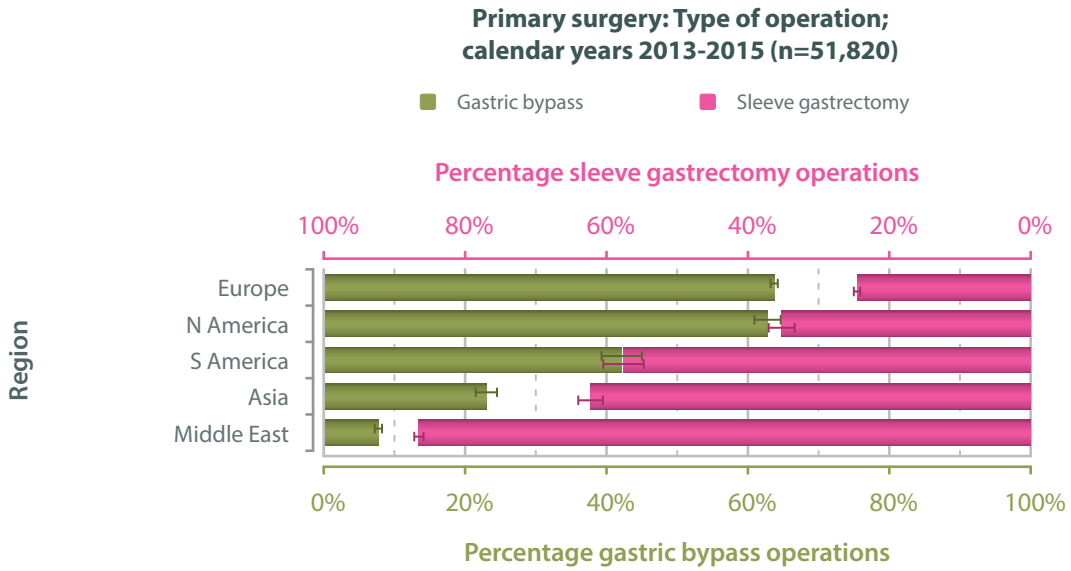
Surgery

Type of surgery

These data can be compared directly to those produced by Angrisani [1], where gastric bypass was the most prevalent operation in 2011-2013, with sleeve gastrectomy rapidly increasing and gastric banding decreasing in prevalence.

Primary surgery in the calendar years 2013-2015: operation

Operation	Count	Percentage
Gastric band	2,865	5.5%
Gastric bypass	25,594	49.4%
Sleeve gastrectomy	21,079	40.7%
Bilio-pancreatic diversion	21	0.0%
Duodenal switch	29	0.1%
Duodenal switch with sleeve	305	0.6%
Other	1,927	3.7%
All	**51,820**	

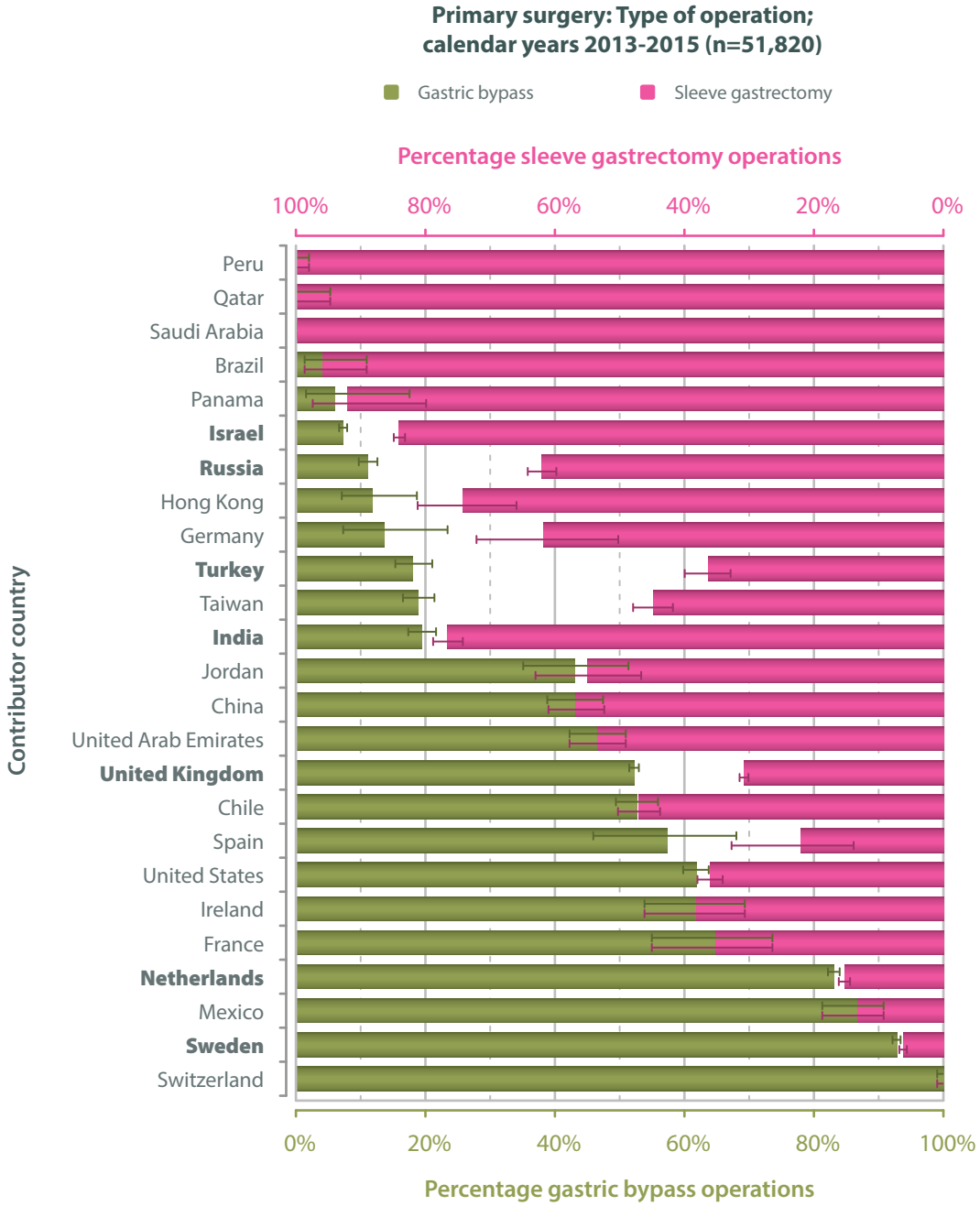


1. Angrisani L, Santonicola A, Iovino P, Formisano G, Buchwald H, Scopinaro N. Bariatric Surgery Worldwide 2013. *Obesity Surgery*. 2015; **25**: 1822-1832.

It is interesting to note that almost all the operations in Peru, Qatar & Saudi Arabia are sleeve gastrectomies, while in Sweden almost all are gastric bypasses. The reasons for these differences in practice are not known. It could be that countries newer to bariatric surgery have taken up sleeve gastrectomy, while countries with a longer history of bariatric surgery continue with the gastric bypass. All other procedures such as gastric banding, single anastomosis gastric bypass, bilio-pancreatic diversion and duodenal switch are represented by the blank spaces between bypass and sleeve.

The white space in between the two sets of bars for each country represents the proportion of other kinds of bariatric surgery, such as gastric banding.

Contents



The following chart shows the change in rates of gastric bypass surgery over time for each region. Most of the chart uses data from only those contributors that submitted records across the entire period 2013-2015. However, data from every single contributor are included in the set of bars on the far right-hand side of the graph for the sake of comparison.

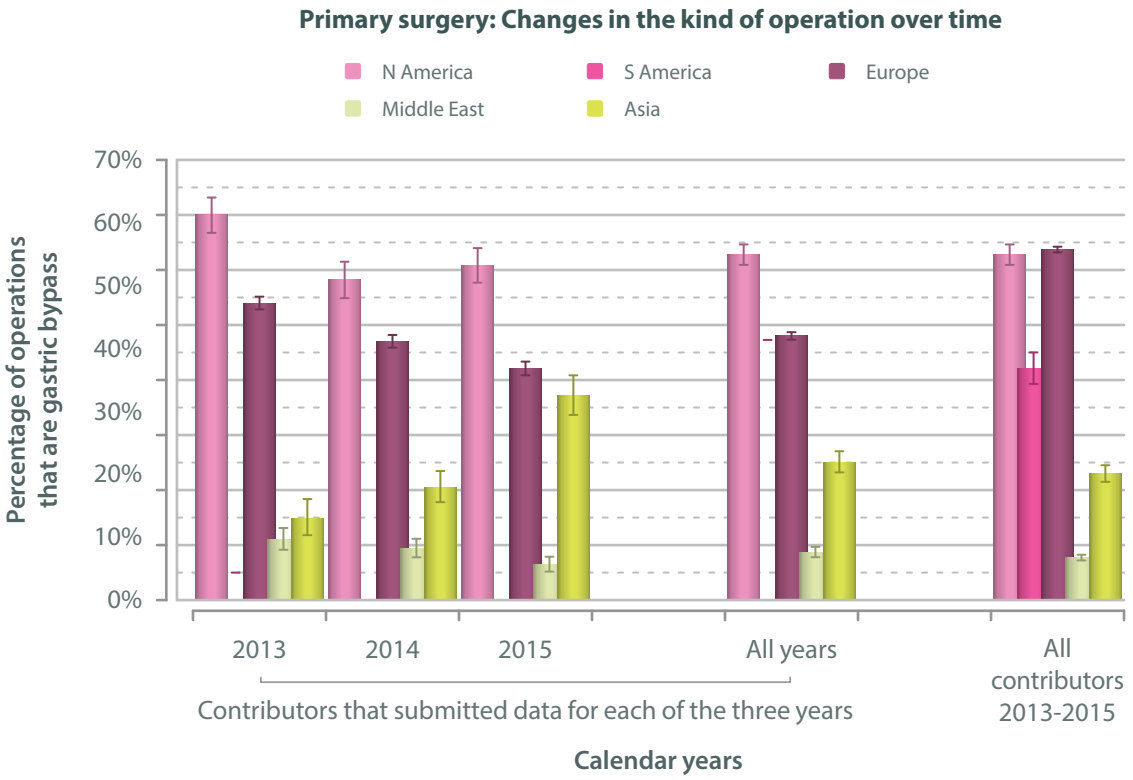
Contributors that provided data for only one or two of these calendar years were excluded from the time-series because their inclusion might have disproportionately skewed the results for a particular year, and what we are trying to demonstrate is that there have been some systematic changes in the kind of surgery that is provided for patients with severe and complex obesity.

In the European region, the rate of gastric bypass is very different in the *All years* group compared to the *All contributors* group in the chart, both of which represent data from the period 2013-2015. This shows the powerful effect on the calculated percentage caused by one or more contributors that submitted data for only on or two years.

The data for South America appear only in the *All contributors* section of the chart simply because none of the contributors from this region supplied data in 2013, 1024 and 2015.

It is plain to see that the rate of gastric bypass is going up in Asia, and yet declining in Europe and the Middle East. These changes in practice are a result of clinicians reflecting on information suggesting that one type of operation might be more beneficial for their patients than another kind of bariatric surgery.

There is as yet no clear consensus on the *best* kind of bariatric surgery.



Contents

Operative approach

The rapid expansion of bariatric surgery over the last 25 years has mirrored the development of laparoscopic techniques. The following table shows the prevalence of the laparoscopic approach for the different operations.

Almost 99% of all operations were performed laparoscopically, an achievement that could not have been forecast even 20 years ago.

Primary surgery in the calendar years 2013-2015: Operation and approach

Operation	Approach				
	Laparoscopic	Endoscopic	Lap converted to open	Open	Laparoscopic rate
Gastric band	2,861	1	2	1	99.9%
Gastric bypass	25,368	1	58	167	99.1%
Sleeve gastrectomy	20,968	3	33	75	99.5%
All	**50,678**	**527**	**101**	**514**	**97.8%**

Outcomes

Post-operative stay

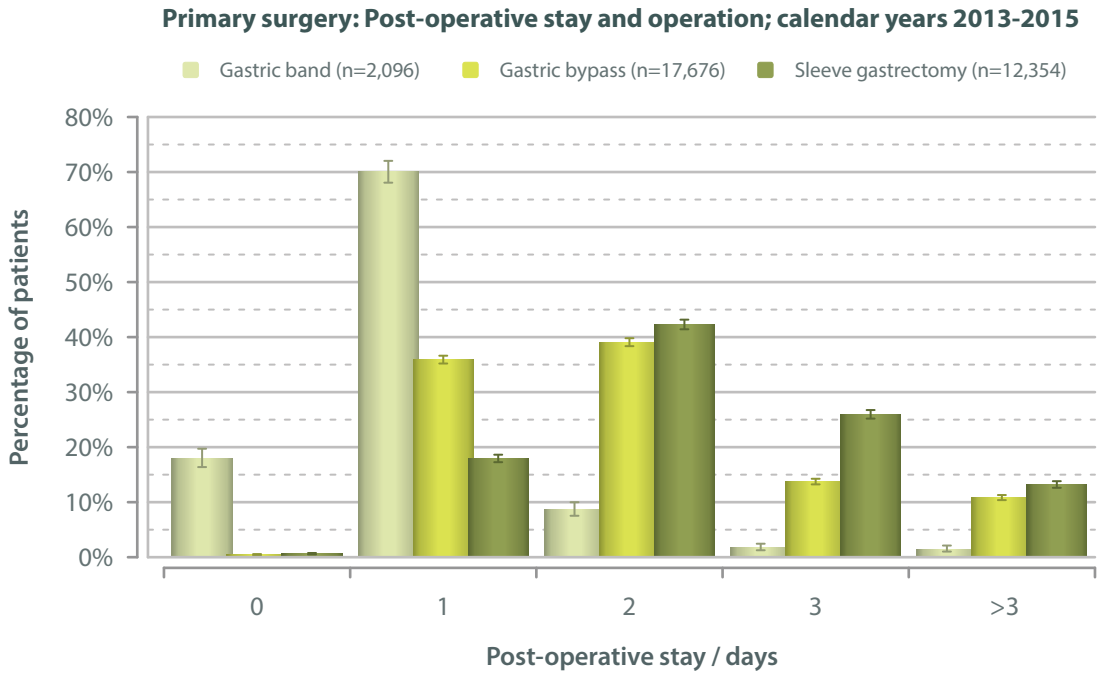
This is the second international comparison of post-operative length-of-stay between the 3 common kinds of operation: gastric banding, gastric bypass and sleeve gastrectomy. As expected, the shortest length-of-stay was for gastric banding, followed by gastric bypass and then sleeve gastrectomy. Over 85% of band patients were discharged within 24 hours of their operation, 75% of bypass patients were discharged by day 2 and nearly 85% of sleeves were discharged by day 3. As is seen in the graphs on the next page, the timing of discharge may very much depend on the local healthcare environment.

After gastric bypass, over 60% of the North American and Middle Eastern patients were discharged by day 1 whereas in South America 70% of patients were discharged on day 3. Asian patients tended to stay longer with 35% being discharged on day 3.

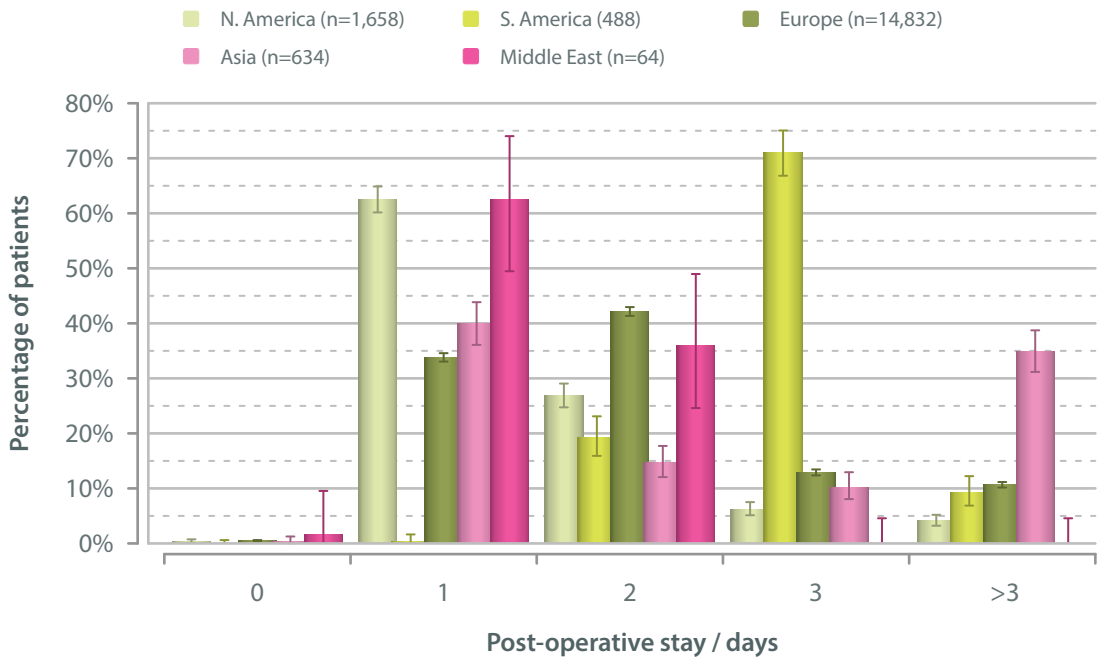
Similar to gastric bypass, over 55% of the North American sleeve gastrectomy patients were discharged on day 1. In contrast most Middle Eastern patients were discharged on days 2 or 3.

Primary surgery in the calendar years 2013-2015: post-operative stay and operation

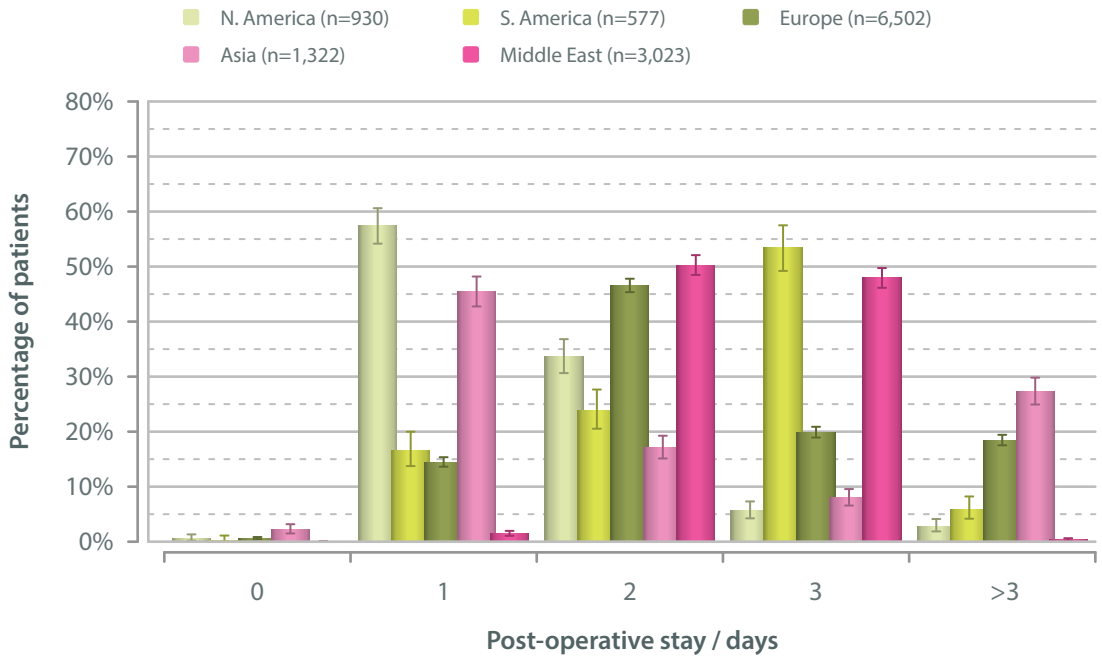
Post-operative stay / days	Operation				
	Gastric band	Gastric bypass	Sleeve gastrectomy	Others	All
0	377	80	75	378	**910**
1	1,469	6,347	2,216	268	**10,300**
2	182	6,907	5,225	434	**12,748**
3	37	2,428	3,207	245	**5,917**
>3	31	1,914	1,631	746	**4,322**
Unspecified	769	7,918	8,725	211	17,623
All	**2,865**	**25,594**	**21,079**	**2,282**	**51,820**



Primary gastric bypass surgery: Post-operative stay and region; calendar years 2013-2015



Primary sleeve gastrectomy: Post-operative stay and region; calendar years 2013-2015



One-year weight loss

We present weight loss data here as % weight loss and % excess weight loss.

Percentage excess weight loss (%EWL) has been defined as:

$$\frac{\text{initial weight (kg) - current weight (kg)}}{\text{initial weight (kg) - [25 (kg m}^{-2}\text{) } \times \text{ height}^2 \text{ (m}^2\text{)]}} \times 100\%$$

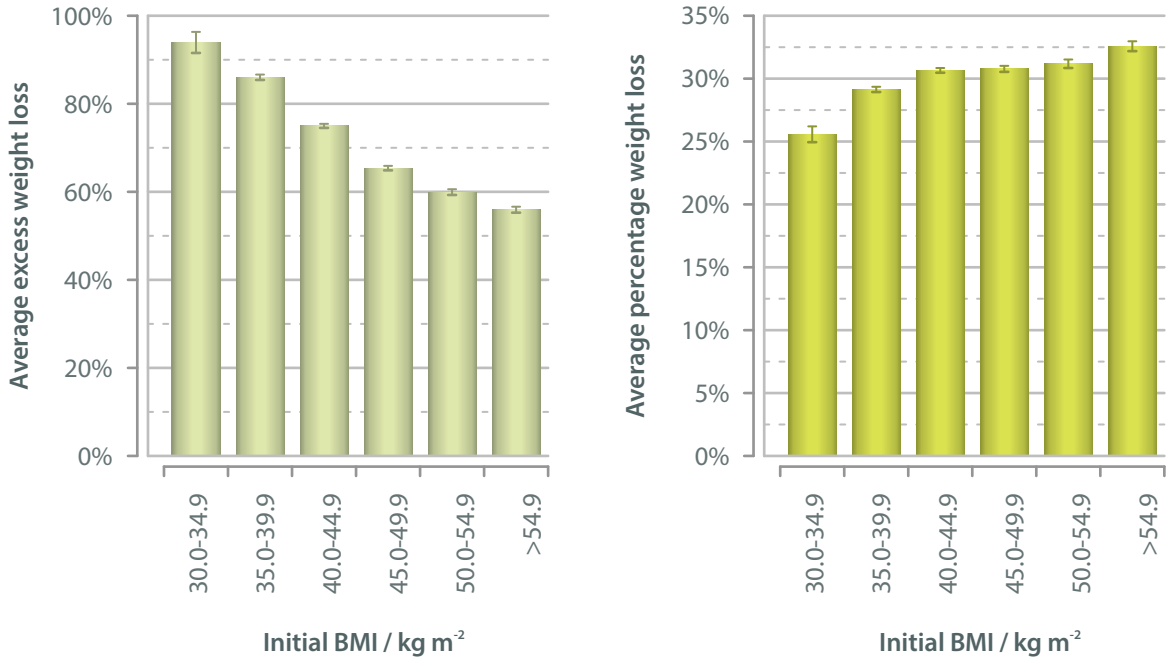
It calculates the post-operative weight loss compared to the patient's initial weight and an arbitrary weight (equivalent to a BMI of 25 kg m^{-2}) . Numerically, this is exactly the same as percentage excess BMI loss (%EBMIL) when the arbitrary standard is set at a BMI of 25 kg m^{-2} . Naturally, if the patient loses so much weight that their BMI drops below the arbitrary value of 25 kg m^{-2} then their percentage excess weight loss will be greater than 100%.

The data are combined for all primary operations.

Primary surgery in the calendar years 2009-2015: weight loss at one year

Initial BMI / kg m^{-2}	Weight loss at one year after surgery			
	Excess weight loss / %		Percentage weight loss / %	
	Count	Average (95% CI)	Count	Average (95% CI)
30.0-34.9	675	93.9 (91.5-96.3)	768	25.6 (24.9-26.2)
35.0-39.9	6,372	86.0 (85.4-86.6)	6,436	29.1 (28.9-29.4)
40.0-44.9	8,494	75.0 (74.5-75.4)	8,496	30.7 (30.5-30.8)
45.0-49.9	5,775	65.4 (64.9-65.9)	5,775	30.8 (30.5-31.0)
50.0-54.9	3,270	59.9 (59.3-60.6)	3,270	31.2 (30.8-31.5)
>54.9	2,496	55.9 (55.3-56.6)	2,496	32.6 (32.2-33.0)

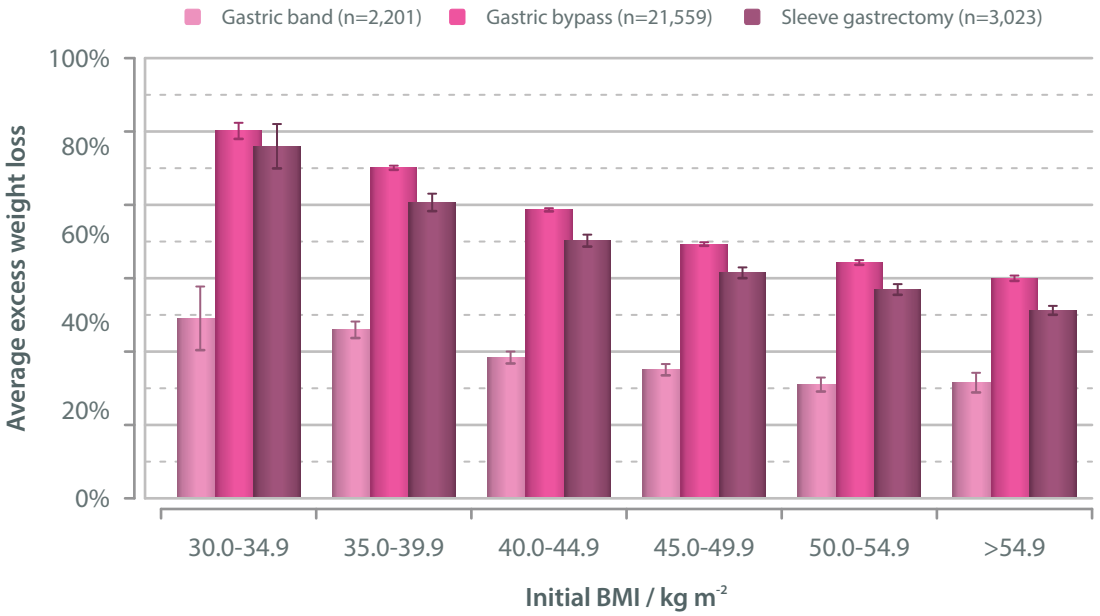
Primary surgery: Weight loss one year after surgery according to initial BMI; calendar years 2009-2015



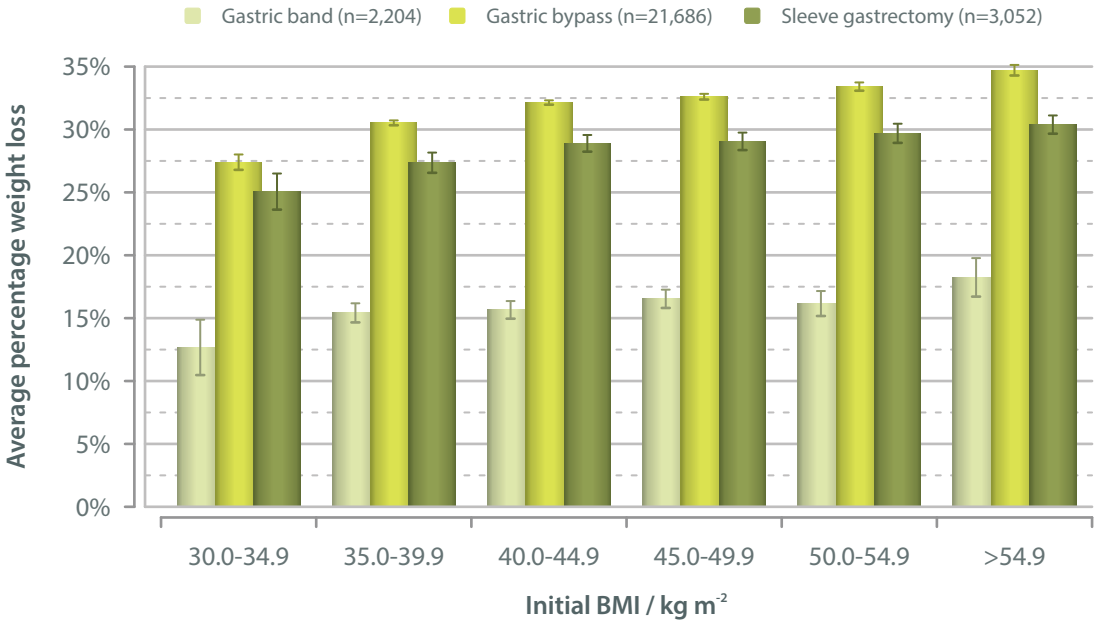
Contents

The graphs here show visually the differences between calculating % excess weight loss and % weight loss. A greater % excess weight loss (%EWL) is shown for a given amount of absolute weight lost if the patient's initial BMI is lower. Conversely patients with a greater initial BMI lose a greater percentage of their weight.

Primary surgery: Excess weight loss one year after surgery according to initial BMI and operation; calendar years 2009-2015



Primary surgery: Percentage weight loss one year after surgery according to initial BMI and operation; calendar years 2009-2015



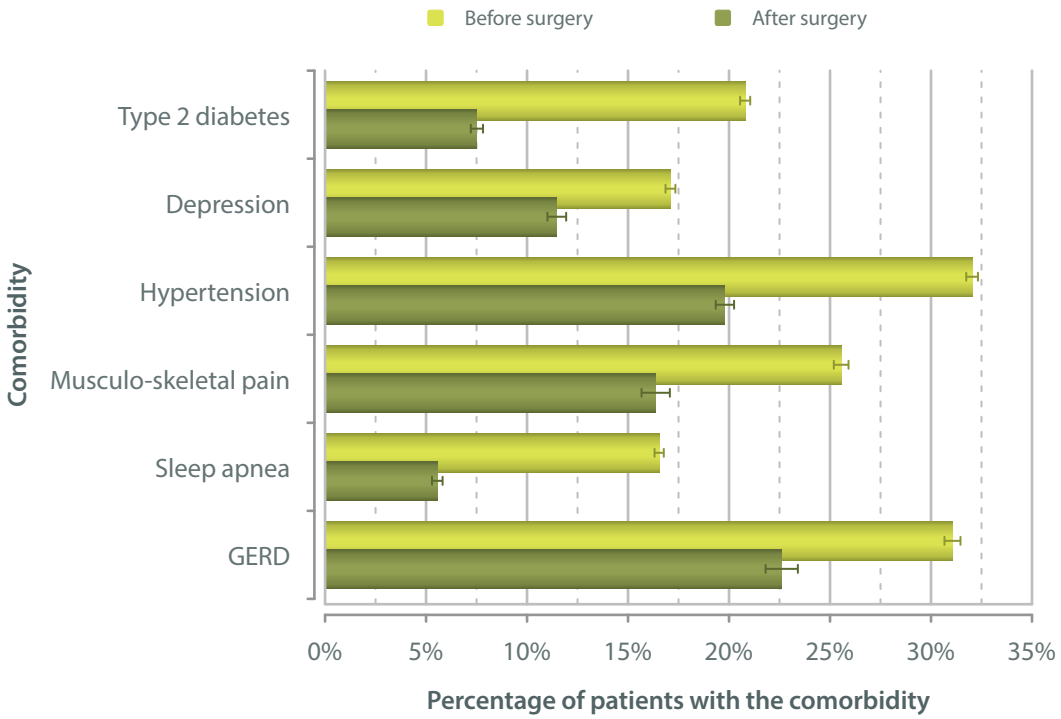
Effect of surgery on obesity-related disease

In this iteration of the registry we have used the simplest data terms likely to be used by the majority of the contributors. We have not attempted to collect numbers of diabetes medications or HbA1c or treatment for other obesity-related disease. The categoric *yes* / *no* definitions still reveal highly significant improvements in disease one year after surgery in over 100,000 patients worldwide, even though the rate of recorded follow up is poor.

Primary surgery in the calendar years 2009-2015: comorbidity before and after surgery

Comorbidity	Comorbidity prior to surgery				Comorbidity one year after surgery			
	No	Yes	Unspecified	Rate	No	Yes	Unspecified	Rate
Type 2 diabetes	80,323	21,091	11,130	20.8%	27,527	2,236	82,781	7.5%
Depression	76,113	15,698	20,733	17.1%	16,278	2,108	94,158	11.5%
Hypertension	67,883	31,994	12,667	32.0%	23,914	5,901	82,729	19.8%
Musculo-skeletal pain	41,356	14,193	56,995	25.6%	9,066	1,773	101,705	16.4%
Sleep apnea	84,900	16,825	10,819	16.5%	28,012	1,646	82,886	5.5%
GERD	36,254	16,335	59,955	31.1%	8,247	2,408	101,889	22.6%

Primary surgery: Comorbidity status before surgery and one year after surgery; calendar years 2009-2015



Although the rate of recorded follow up at one year for the type 2 diabetes field is less than 30%, the graphs demonstrate that remission from type 2 diabetes at one year is highly dependent on the amount of weight loss. Before surgery 20.8% patients had type 2 diabetes, at one year the rate was 7.5%. It is expected that International agreement on the dataset will allow the rate of follow-up to improve in future iterations of the global registry.

Primary surgery all for patients with type 2 diabetes pre-operatively: Medication for type 2 diabetes one year after surgery by weight loss at one year; calendar years 2009-2015 (25,884)

In this report we have not attempted to analyse improvement in diabetes according to operation type.

Contents

Contributor hospitals

Brazil

Fabio Viegas Instituto de Cirurgia do Aparelho Digestivo e Obesidade, Rio de Janeiro

Canada

Hôpital du Sacré-Coeur de Montreal

Chile

Centro Clínico de la Obesidad, Santiago
Center for the Treatment of Obesity and Metabolic Diseases, Pontificia Universidad Católica de Chile, Santiago

China

The First Affiliated Hospital of Jinan University, Guangzhou

Colombia

Clínica la Colina, Bogotá

Czech Republic

OB Klinika Mediczech, Prague

France

Centre Médico-Chirurgical du Mans, Pôle Santé Sud, Service de Chirurgie Viscérale, Le Mans
Polyclinique, Lyon Nord-Rillieux

Germany

Marienkrankenhaus Kassel Chirurgische Klinik, Kassel
Adipositaszentrum Nordhessen, Kassel

Hong Kong

Prince of Wales Hospital, Shatin
United Christian Hospital, Kowloon

India

Obesity Surgery Society of India

Apollo Hospital, Kakinada
Apollo Hospital, Chennai
Apollo Spectra Hospital, Mumbai
Asian Bariatrics, Ahmedabad
Asian Institute of Gastroenterology, Hyderabad
Aster CMI Hospital, Bangalore
A V Da Costa Hospital, Goa
Care Institute of Medical Sciences, Ahmedabad
Columbia-Asia Hospitals, Yeshwantpura, Bangalore
Continental Hospital, Telengana
Dhawna Hospital, Panchkula
Fortis Hospital, Vasantkunj, New Delhi
Gunasheela Surgical & Maternity Hospital, Bangalore
Hindija Healthcare Speciality, Mumbai
ILS Hospital, Kolkata
Jammu Hospital, Jalandhar
Jeewan Mala Hospital, New Delhi
Kirloskar Hospital, Hyderbad
Kular Hospital, Ludhiana
Max Super Speciality Hospital, Saket, New Delhi
National Hospital, Mumbai
Wockhardt Hospital, Mumbai
Zen Hospital, Mumbai

Ireland

Bon Secours Hospital, Cork

Israel

The Israel National Bariatric Surgery Registry

Assaf HaRofeh Medical Center, Assaf HaRofeh Hospital
Assuta Medical Center
Bnei Zion Hospital
Elisha Hospital
Emek Medical Center
Hadassah Medical Center, Ein Kerem campus
Hadassah Medical Center, Mount Scopus campus
Herzliya Medical Center
Ichilov Hospital, Tel Aviv Sourasky Medical Center
Kaplan Medical Center
Laniado Hospital
Meir Medical Center
Mount Carmel Hospital
Rabin Medical Center- Hasharon Hospital
Rabin Medical Center, Beilinson Hospital
Rambam Health Care Campus, Rambam Hospital
Shaare Zedek Medical Center
Soroka Medical Center
St Joseph Hospital
The Baruch Padeh Medical Center, Poriya
The Barzilai Medical Center
The Chaim Sheba Medical Center
The Edith Wolfson Health Center
The EMMS Nazareth Hospital / Scottish Hospital / English Hospital
The Hillel Yaffe Medical Center
The Holy Family Hospital in Nazareth
The Western Galilee Hospital in Nahariya
Ziv Medical Center

Italy

Hospital San Giovanni Bosco, Naples

Jordan

Gastrointestinal Bariatric & Metabolic Center, Jordan Hospital, Amman

Kingdom of Saudi Arabia

King Saud University Hospital, Riyadh
New You Medical Center, Riyadh

Kuwait

Al Amiri Hospital, Kuwait City

Lithuania

Lithuanian University of Health Sciences Hospital, Kaunas

Mexico

Instituto Nacional de la Nutrición Salvador Zubirán, Mexico City
Centro Médico ABC, Mexico City

Netherlands

Dutch Audit for Treatment of Obesity

Albert Schweitzer Ziekenhuis Dordrecht
Bariatrisch Centrum Zuid West Nederland
Catharina Ziekenhuis Eindhoven
Maasstad Ziekenhuis Rotterdam
Máxima Medisch Centrum Eindhoven / Veldhoven
MC Zuiderzee Lelystad
MC Slotervaart Amsterdam
Medisch Centrum Leeuwarden
Nederlandse Obesitas Kliniek (NOK) Heerlen
Nederlandse Obesitas Kliniek (NOK) West
Onze Lieve Vrouwe Gasthuis (OLVG) Amsterdam
Rijnstate Ziekenhuis Arnhem
Rode Kruis Ziekenhuis Beverwijk
Sint Franciscus Gasthuis Rotterdam
St Antonius Ziekenhuis Nieuwegein
TweeSteden Ziekenhuis Tilburg
Waterlandziekenhuis Purmerend
Ziekenhuis Groep Twente (ZGT)
ZorgSaam Ziekenhuis Zeeuws-Vlaanderen

Panama

Hospital Punta Pacífica

Peru

Clinica de dia Avendaño, Lima

Qatar

Hamad General Hospital, Hamad Medical Corporation, Doha

Russia

Russian National Bariatric Surgery Registry

AVA- Kazan
Clinic of Endoscopic & Minimal Invasive Surgery, Stavropol State Medical University
Clinic of Excess Weight and Diabetes, Moscow
Clinic UGMK Health, Ekaterinburg
LLC Medical Center, Medeor, Chelyabinsk
LLC SM Clinic, Kazan
Non-State Health Care Facility, Central Clinical Hospital № 2 JSC, Russian Railways Hospital, Moscow
Non-State Health Care Facility, Clinical Hospital, The Station Krasnodar of JSC, Russian Railways Hospital, Krasnodar
Non-State Health Care Facility, Clinical Hospital, The Station Mineral Water of JSC, Russian Railways Hospital
Non-State Health Care Facility, The Station Khabarovsk-1 of JSC, Russian Railways Hospital, Khabarovsk
Non-State Health Care Facility, The Station Voronezh-1 of JSC, Russian Railways Hospital, Voronezh
Pavlov First Saint Petersburg State Medical University, St. Petersburg
Regional Clinical Hospital, Khanty-Mansiysk
Regional Clinical Hospital № 2, Krasnodar
Republic Clinical Hospital of First Aid, Grozny
Samara Regional Hospital
State Clinical Hospital, South Regional Medical Center of Federal Medical Biological Agency, Rostov-on-Don
State Clinical Hospital of First Aid № 2, Omsk
State Hospital of First Aid, Ufa
State Hospital № 5, Nizhny Novgorod
State Regional Clinical Hospital, Ryazan
The Center of Endosurgery and Lithotripsy (CELT), Moscow
The Federal State Budgetary Institute, The Nikiforov Russian Center of Emergency & Radiation Medicine, St. Petersburg
Treatment & Rehabilitation Center of The Ministry of Health of the Russian Federation, Moscow

Spain

Hospital de Torrevieja, Alicante
Hospital Clínico San Carlos, Complutense University Medical School, Universidad Complutense de Madrid

Sweden

Scandinavian Obesity Surgery Registry

Aleris Motala
Aleris Skåne
Axcess Medica Smirishamn
Bariatric Center Skåne
Bariatric Center Sophiahemmet
Blekinge Hospital
Borås Hospital
Capio St Göran Hospital
Carlanderska Hospital
Centrum för titthålskirurgi
Danderyd Hospital
Eksjö Hospital
Ersta Hospital
Falun Hospital
Gävle Hospital
Hudiksvall Hospital
Kalmar Hospital
Ljungby Hospital
Lund University Hospital
Lycksele Hospital
Mora Hospital
Norrköping Hospital
Norrtälje Hospital
Nyköping Hospital
Sahlgrenska University Hospital
Skövde Hospital
Sunderbyn Hospital
Sundsvall Hospital
Södersjukhuset Hospital
Södertälje Hospital
Torsby Hospital
Trollhättan Hospital
Uppsala University Hospital
Varberg Hospital
Värnamo Hospital
Västervik Hospital
Västerås Hospital
Västra Frölunda Hospital
Växjö Hospital
Örebro / Lindesberg University Hospital
Österlenkirurgi Simrishamn
Östersund Hospital

Switzerland

Hôpital du Chablais, Aigle

Taiwan

Min Sheng General Hospital, Taoyuan
Bariatric & Metabolic International Surgery Center E-Da Hospital, Kaohsiung City

Turkey

Turkish National Obesity Database

Büyük Anadolu Hospital, Samsun
Doruk Yıldırım Hospital, Bursa
Fırat University Faculty of Medicine, Elazig
Ibn-i Sina Hospital, Osmaniye
Medical Park Hospital, Samsun
Medilife Beylikduzu Hospital, Istanbul
Metabolic Surgery Clinic, Istanbul
Tekden Hospital, Denizli
Tınaztepe Hospital, Izmir

United Arab Emirates

Bariatric & Metabolic Institute Abu Dhabi, Sheikh Khalifa Medical City, Abu Dhabi

Contents

United Kingdom

The UK National Bariatric Surgery Registy

Ashford Hospital, Middlesex
Ashtead Hospital
Berkshire Independent Hospital, Reading
BMI Albyn Hospital, Aberdeen
BMI Bath Clinic
BMI Chelsfield Park Hospital, Orpington
BMI Mount Alvernia Hospital, Guildford
BMI Sarum Road Hospital, Winchester
BMI The Alexandra Hospital, Manchester
BMI The Clementine Churchill Hospital, Harrow
BMI The Droitwich Spa Hospital
BMI The Hampshire Clinic, Basingstoke
BMI The Harbour Hospital, Dorset
BMI The London Independent Hospital
BMI The Meridien Hospital, Coventry
BMI The Park Hospital, Nottingham
BMI The Princess Margaret Hospital, Windsor
BMI The Priory Hospital, Birmingham
BMI The Ridgeway Hospital, Swindon
BMI The Runnymede Hospital, Chertsey
BMI The Shelburne Hospital, High Wycombe
BMI The South Cheshire Private Hospital, Leighton
BMI Thornbury Hospital, Sheffield
Bradford Royal Infirmary
Castle Hill Hospital, Cottingham
Chelsea & Westminster Hospital, London
Cheltenham General Hospital
Churchill Hospital, Oxford
Circle Bath Hospital
Claremont Hospital, Sheffield
Countess of Chester Hospital
Cromwelll Hospital, London
Darlington Memorial Hospital
Derriford Hospital, Plymouth
Dewsbury & District Hospital, West Yorkshire
Dolan Park Hospital, Bromsgrove
Doncaster Royal Infirmary
Duchy Hospital, Truro
Gloucestershire Royal Hospital, Gloucester
Heartlands Hospital, Birmingham
Hexham General Hospital
Holly House Hospital, Essex
Homerton University Hospital, London
Hospital of St John and St Elizabeth, London
Huddersfield Royal Infirmary
King's College Hospital, London
Lanarkshire University Hospital
Leicester General Hospital
London Bridge Hospital, London
Luton & Dunstable University Hospital
Maidstone Hospital, Kent
Manchester Royal Infirmary
McIndoe Surgical Centre, East Grinstead
Morriston Hospital, Swansea
Musgrove Park Hospital, Taunton
Ninewells Hospital, Dundee
Norfolk & Norwich University Hospital
Northern General Hospital, Sheffield
North Tyneside General Hospital, North Shields
Nuffield Health Bournemouth Hospital
Nuffield Health Brentwood Hospital
Nuffield Health Bristol Hospital
Nuffield Health Cheltenham Hospital
Nuffield Health Derby Hospital
Nuffield Health Glasgow Hospital
Nuffield Health Guildford Hospital
Nuffield Health Leeds Hospital
Nuffield Health Newcastle-upon-Tyne Hospital
Nuffield Health North Staffordshire Hospital
Nuffield Health Plymouth Hospital
Nuffield Health Shrewsbury Hospital
Nuffield Health Taunton Hospital
Nuffield Health The Grosvenor Hospital, Chester
Nuffield Health Warwickshire Hospital
Nuffield Heath The Manor Hospital, Oxford
Nuffield Health Hospital York
Orpington Treatment Centre
Parkside Hospital, London
Poole Hospital, Dorset
Princess Royal Hospital, Telford
Princess Royal University Hospital, Orpington
Queen Alexandra Hospital, Portsmouth
Queen's Hospital Romford
Ramsay Mount Stuart Hospital, Torquay
Ramsey Winfield Hospital, Gloucestershire
Rivers Hospital, Sawbridgeworth
Royal Berkshire Hospital, Reading
Royal Bournemouth General Hospital
Royal Cornwall Hospital, Truro
Royal Derby Hospital
Royal Infirmary of Edinburgh
Royal Shrewsbury Hospital
Salford Royal Hospital
Salisbury District Hospital
Southampton General Hospital
Southmead Hospital, Bristol
Spingfield Hospital, Chelmsford
Spire Bushey Hospital, Watford
Spire Dunedin Hospital, Reading
Spire Elland Hospital, West Yorkshire
Spire Fylde Coast Hospital, Blackpool

United Kingdom continued ...

Spire Gatwick Park Hospital, Horley
Spire Harpenden Hospital
Spire Healthcare
Spire Hull & East Riding Hospital, Anlaby
Spire Leeds Hospital
Spire Little Aston Hospital, Sutton Coldfield
Spire Manchester Hospital
Spire Murrayfield Hospital, Edinburgh
Spire Murrayfield Hospital Wirral
Spire Norwich Hospital
Spire Parkway Hospital, Solihull
Spire Portsmouth Hospital
Spire Regency Hospital, Macclesfield
Spire Roding Hospital, Redbridge
Spire Southampton Hospital
Spire South Bank Hospital, Worcester
Spire Thames Valley Hospital, Slough
Spire Washington Hospital, Tyne & Wear
Spire Yale Hospital, Wrexham
St Anthony's Hospital, London
St George's Hospital, London
St James's University Hospital, Leeds
St Mary's Hospital, London
Stobhill Hospital, Glasgow
St Peter's Hospital, Chertsey
St Richard's Hospital, Chichester
St Thomas's Hospital, London
Sunderland Royal Hospital
The James Cook University Hospital, Middlesbrough
The London Clinic
The Princess Grace Hospital, London
The Yorkshire Clinic, Bingley
University College Hospital London
University Hospital Ayr
University Hospital Aintree
University Hospital Coventry
University Hospital Crosshouse, Kilmarnock
University Hospital Lewisham
University Hospital of North Staffordshire
University Hospital of North Tees, Stockton-on-Tees
Walsall Manor Hospital
Wansbeck Hospital
Whittington Hospital, London
Worcestershire Royal Hospital
York Hospital
Yorkshire Surgicentre, Rotherham

United States of America

Fresno Heart & Surgical Hospital, California

Contents

Contents

Database form

International Federation for the Surgery of Obesity and Metabolic Disorders

IFSO Global Registry

Baseline section; Page 1; Version 2.2 (1 Nov 2015)

Basic demographic data

All baseline data refer to the condition of the patient at the time of surgery, unless otherwise specified.

Unique patient identifier

Baseline data

Basic patient details

Date of birth dd / mm / yyyy

Gender ○ Male ○ Female ○ Unknown

Height cm

Weight on entry to the weight-loss program kg

Funding category ○ Publicly funded ○ Self-pay ○ Private insurer

Comorbidities

Type 2 diabetes on medication	○ No	○ Yes
Diabetes medication type	○ Oral therapy	○ Insulin
Hypertension on medication	○ No	○ Yes
Depression on medication	○ No	○ Yes
Increased risk of DVT or PE	○ No	○ Yes
Musculo-skeletal pain on medication	○ No	○ Yes
Confirmed sleep apnea	○ No	○ Yes
Dyslipidemia on medication	○ No	○ Yes
GERD	○ No	○ Yes

Powered by
Dendrite Clinical Systems

IFSO GLOBAL REGISTRY

International Federation for the Surgery of Obesity and Metabolic Disorders

IFSO Global Registry

Baseline section; Page 2; Version 2.2 (1 Nov 2015)

Unique patient identifier	
Date of operation	dd / mm / yyyy

Surgery

Date of operation	dd / mm / yyyy
Has the patient had a prior gastric balloon	○ No ○ Yes
Weight at surgery	kg
Has the patient had bariatric surgery before	○ No ○ Yes
Operative approach	○ Laparoscopic ○ Endoscopic ○ Lap converted to open ○ Open
Type of operation	○ Gastric band ○ Gastric bypass ○ Duodenal switch with sleeve ○ Sleeve gastrectomy ○ Bilio-pancreatic diversion ○ Duodenal switch ○ Other
Type of bypass	○ Roux-en-Y ○ Single anastomosis ○ Banded gastric bypass
Details of other procedure	○ Gastric plication ○ Single anastomosis duodenal-ileal surgery ○ Vertical banded gastroplasty ○ Other

Outcomes

Leak within 30 days of surgery	○ No ○ Yes
Bleeding within 30 days of surgery	○ No ○ Yes
Obstruction within 30 days of surgery	○ No ○ Yes
Re-operation for complications within 30 days of surgery	○ No ○ Yes
Patient status at discharge	○ Alive ○ Deceased
Date of discharge or death	dd / mm / yyyy

Powered by

Dendrite Clinical Systems

IFSO GLOBAL REGISTRY

Contents

International Federation for the Surgery of Obesity and Metabolic Disorders

IFSO Global Registry

Follow up section; Page 3; Version 2.2 (1 Nov 2015)

Unique patient identifier	
Date of follow up	dd/mm/yyyy

Follow up

Weight at follow up	kg	
Type 2 diabetes on medication	○ No	○ Yes
Diabetes medication type	○ Oral therapy	○ Insulin
Hypertension on medication	○ No	○ Yes
Depression on medication	○ No	○ Yes
Musculo-skeletal pain on medication	○ No	○ Yes
Confirmed sleep apnea	○ No	○ Yes
Dyslipidemia on medication	○ No	○ Yes
GERD	○ No	○ Yes
Clinical evidence of malnutrition	○ No	○ Yes
Patient status	○ Alive	○ Deceased

Powered by
Dendrite Clinical Systems

IFSO GLOBAL REGISTRY

The Second IFSO Global Registry Report 2016

This is the second international analysis of outcomes from bariatric (obesity) and metabolic surgery, gathered under the auspices of IFSO (the International Federation for the Surgery of Obesity and Metabolic Disorders).

The epidemic of obesity can no longer be ignored. Once perceived as penance for the sins of economically developed countries, it has attacked poorer, less advanced cultures with the same level of aggression. Treatment of this disease is surprisingly difficult given the obvious, naive answer: eat less, exercise more. Despite evidence for the futility of this dictum and for the effectiveness of our surgical interventions, universal acceptance of surgical treatment has been elusive. Perhaps understandable, as we, ourselves, have incomplete evidence as to the patho-physiology of our interventions or precise long-term outcomes - and even less insight as to which operations will give the best performance in a given patient. The IFSO Global Registry is an important step towards providing improved information on which are the best treatments. Every surgeon who performs a bariatric / metabolic procedure should consider participation a mandatory part of this specialty.

Kelvin Higa

The Second IFSO Global Registry Report 2016 is the beginning of a process of continuous data collection in the field of bariatric surgery, the surgery of obesity, from all over the world. In the future more and more national data registries will be established and included in the global database. Independent from national characteristics, the fundamental effect of bariatric surgery on weight and weight-related diseases can be demonstrated. Bariatric surgery is the most powerful treatment for the chronic disease of obesity. Therefore, this document should be read widely by decision makers in health systems worldwide. It gives readers, including policy-makers, politicians, public health specialists and journalists, a vital snapshot of obesity surgery treatment internationally and progress towards health and well-being for all.

Rudolf Weiner

The (WHO) data indicate a global, inexorable increase in the number of people with obesity and severe obesity, especially in the female population, between 1975 and 2014. Bariatric-metabolic surgery is one of the few highly effective tools to manage this growing burden of chronic disease. It is important that we understand the delivery of bariatric-metabolic surgery on a global basis and the IFSO international registry provides a vital component in monitoring the response to this epidemic.

John Dixon

IFSO
GLOBAL REGISTRY

Dendrite Clinical Systems
Dr Peter K H Walton
Managing Director
The Hub, Station Road
Henley-on-Thames
Oxfordshire RG9 1AY
United Kingdom

phone **+44 (0) 1491 411 288**
fax **+44 (0) 1491 411 377**
e-mail **ifsoregistry@e-dendrite.com**

www.e-dendrite.com