



OCB MEDICAL DEPARTMENT

## **2017 – OCB SURGICAL CARE ANNUAL REPORT**

### **1. OVERVIEW**

MSF OCB Surgical Policy describes surgical care as the “**provision of quality surgery and anaesthesia**”. Surgical care provision includes: general surgery, obstetrics / gynaecology, orthopaedic, specialized surgery, and others. In order to reduce mortality, morbidity and disability, surgical care is considered as an integral part of the whole medical care. However, if a lot of progress has been done to face the burden of communicable and preventable diseases, the burden of surgical diseases remains “neglected”, and by contrary, is increasing. The inequalities in surgical care are great: overall in the world more than 75% of the health resources (human and material) are used by less than 25% of the population. In MSF contexts, these inequalities are bigger. Although surgery commonly is viewed as a costly and high demanding activity, surgical care provided in low-resourced district hospitals has proven to be cost-effective, just like other selected primary health interventions<sup>1</sup>. In projects run by Médecins Sans Frontières – Operational Centre Brussels (MSF-OCB), we ensure access to quality surgical and anaesthetic care, supporting the MSF values.

In 2017, following the trends of previous years, surgical care in OCB consisted mainly of lifesaving<sup>2</sup> and essential<sup>3</sup> surgery, requiring low technology, and it was based in district hospitals in most of the projects. OCB also continued its operational strategy of supporting maternal health through obstetric surgery<sup>4</sup> (e.g. in Khost, Afghanistan) and developing trauma-related surgery (e.g. in Bujumbura, Burundi). As well, post-operative surgical and rehabilitation care was provided to victims of the armed conflict in Al-Hamdaniya, Iraq, and outpatient wound care was offered in Kunduz, Afghanistan). Finally, support continued to be given to health staff working in Syria.

Following operational needs, surgical activities were provided by:

- Default: classical emergency interventions.
- Choice: enhancing local insufficient surgical capacity.

Surgical care was performed under the following approaches: emergencies, stable contexts, training, and specialized care. Also this care was performed at four levels of complexity to answer in an effective way the field demands: health centres with surgical capacity, district hospitals, referral hospitals, and specialized hospitals.

<sup>1</sup> Spiegel D, Gosselin R. Surgical services in low-income and middle-income countries. The Lancet, Vol 370; 1013-15, September 2007.

<sup>2</sup> Lifesaving surgery: generally performed for an acute surgical state in which the patient’s life / organ / limb is at stake and which needs to be done as soon as possible, usually within a few hours.

<sup>3</sup> Essential surgery: addresses a condition amenable to a proven surgical treatment which may not affect health / life immediately, but considerably impairs the quality of life and/or may present a serious health threat in the future.

<sup>4</sup> CEmONC: Comprehensive Emergency Obstetric and Neonatal Care.

Linked to OCB policy of Surgical Care, the following key principles were followed:

- Privacy and respect for the patient.
- The use of consent of the patient, or, if incapable, his representative.
- Surgery was intrinsically linked to anaesthesia, and vice-versa.
- Surgical and anaesthesia providers had a formal qualification or MSF validation.
- Surgery and anaesthesia arsenals (techniques, equipment and drugs) were safe, simple and effective, allowing in most of the cases a low dependence on sophisticated technology.
- Tight collaboration between the surgery and anaesthesia providers was assured.
- Before the start of new projects, a number of defined pre-requisites were already in place.
- Surgery and anaesthesia care encompassed pre-, intra- (per-) and post- operative care.
- Quality control was assured following MSF institutional policies, guidelines and protocols; and by an appropriate recordkeeping of patient files, anaesthesia / surgical records, and data collection.
- Emergency preparedness was essential, ensuring the maintenance of skills, the permanent availability of minimum material, the good functioning of the sterilisation facilities, and the regular review and update of the Multiple Casualty Plan.

The agreed definition of a surgical intervention and highlighted in OCB policy of Surgical Care is the following: **Major surgery is defined as any intervention occurring in a hospital operating room involving the incision, excision, manipulation, or suturing of tissue, requiring local, regional and/or general anaesthesia.** The term “major” is used in order to avoid mixing small interventions (such as incisions of small abscess and suture of wounds treated by medical and paramedical staff in the emergency department) and the operations performed in the operating room. The term “major” does not define the condition or the type of operation but the fact that it is done in the operating room and there is some form of anaesthesia. The performed interventions included emergent (urgent and delayed) and planned elective surgery.

If OCB supports any aspect of a surgical programme, then we consider it as a “MSF” one, and its data are included in this report. Different kinds of OCB involvement are:

- Surgical care performed only by national staff where there are expatriates in the health facility. This is met when the skills and knowledge of the national staff allow surgical care to be run without expatriates specialists, being completely supported by OCB.
- Surgical care performed only by national staff but supported by expatriates in terms of bedside training.
- Surgical care performed by national staff and by expatriates (in some specialities).
- Surgical care completely performed by expatriates (substitution).

Since 2008, reliable data from every project has been collected. The different indicators give a rough measure of quality, however, this data should be used prudently, and data between projects cannot always be compared given the differences in circumstances and resources. No data in this report is an estimation or approximation: **only data accurately collected is reported.**

This report aggregates data from each project. Individual project level data can be requested to the surgical care advisors of the Medical Department, and has already been distributed to the relevant Operational Cells, mission and field teams.

## 2. PROGRAMME ACTIVITIES

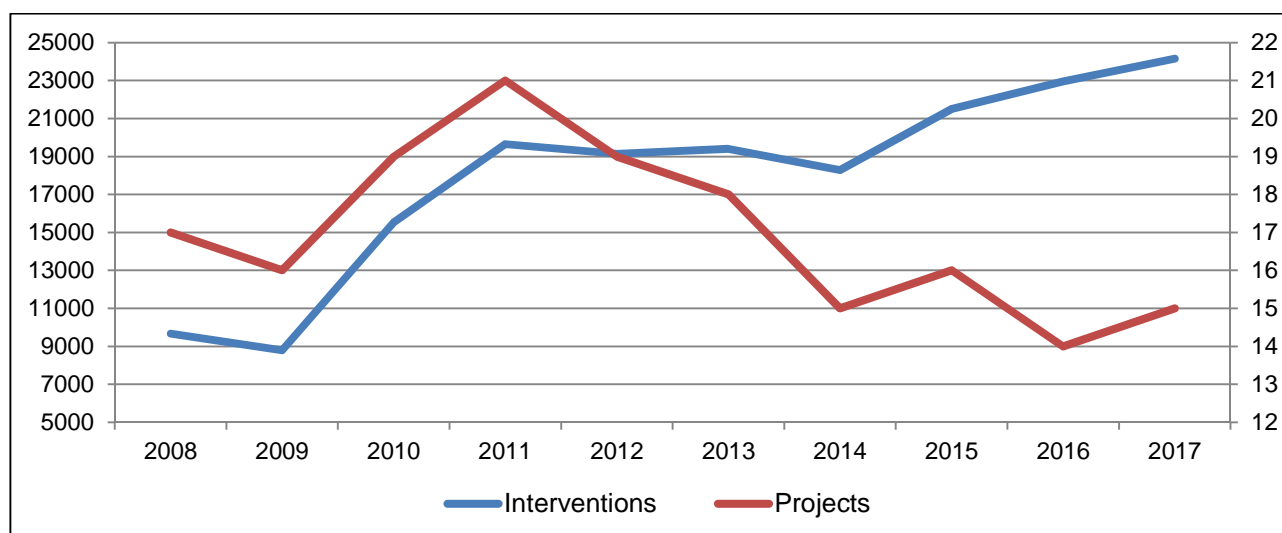
### 2.1. EXECUTIVE SUMMARY<sup>5</sup>:

In the *Table № 1* are shown the main indicators for OCB surgical activities for 2017, and in *Figure № 1* is shown the number of performed interventions as well as the number of projects that performed surgical care activities per year. A summary for each project is presented in *Table № 3*. Only data of direct surgical activities has been considered.

**Table № 1: Main indicators for 2017.**

Main Indicators	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Patients <sup>6</sup>	8923	7570	11746	16077	14583	14199	12005	13570	13446	14274
Interventions <sup>7</sup>	9670	8793	15544	19644	19145	19395	18281	21502	22958	24155
Procedures <sup>8</sup>	9953	9285	16264	20708	20865	21774	21730	25178	26579	27861
Violent trauma <sup>9</sup>	610 (7%)	635 (8%)	959 (8%)	1046 (7%)	1277 (9%)	1445 (10%)	1342 (11%)	1930 (14%)	1284 (10%)	1524 (11%)
Caesarean sections <sup>10</sup>	2400 (27%)	2717 (36%)	3890 (33%)	6225 (39%)	5296 (36%)	5030 (35%)	3877 (32%)	4589 (34%)	4742 (35%)	5017 (35%)
Number of projects <sup>11</sup>	17	16	19	21	19	18	15	16	14	15

**Picture № 1: Number of projects and performed interventions, per year.**



<sup>5</sup> It is a brief epidemiological summary of OCB surgical activities during 2017.

<sup>6</sup> It reflects the number of new cases (primary) that shows also the number of treated patients.

<sup>7</sup> It reflects the number of entrances to the Operating room, as well as the number of given anaesthetics.

<sup>8</sup> It reflects the number of surgical procedures performed during an intervention. MSF data tools allows to report up to three procedures. In this report, for data analysis, there will be taken into consideration only the first entry because not all the projects reported multiple procedures in one surgical intervention.

<sup>9</sup> Violent trauma: cases that the cause for intervention was violent related trauma (only new cases).

<sup>10</sup> The percentage of Caesarean sections uses the patients' number (new cases) as denominator.

<sup>11</sup> It reflects the number of projects that were active during 2017.

## 2.2. SURGICAL CARE ACTIVITIES AT COUNTRY AND PROJECT LEVEL

### 2.2.1. Project status

By the end of 2017, there were 11 projects offering surgical care: Kabul, Khost, Bujumbura, Bangassou, Castors, Masisi, Nyabiondo, Tabarre, Bassikounou, Timurgara and Pibor. Over the course of the year, two projects offering surgical care were opened and closed following specific operational strategies: Kananga in DRC and also Al-Hamdaniya in Iraq. Two projects were handed over to the local authorities: Bili in DRC and Bor in South Sudan.

At the same time, a post-operative centre in Hamam Al-Alil, Iraq, was opened and closed over the course of the year; and a wound care clinic (outpatient activities) in Kunduz, Afghanistan, was opened. In both projects major surgical interventions were not performed, and therefore, they are not included in the performed surgical interventions.

The status of the projects over the course of 2017 can be seen in the *Table № 2*.

**Table № 2: Project status through 2017.**

Mission	Project	Ongoing from 2016	Opened	Closed / handed over	Continuing on 2018
Afghanistan	Kabul	X			X
	Khost	X			X
	Kunduz Clinic		July 2017		X
Burundi	Bujumbura	X			X
Central African Republic	Bangassou	X			X
	Castors	X			X
DR Congo	Bili	X		June 30 <sup>th</sup>	
	Kananga		May 10 <sup>th</sup>	December 20 <sup>th</sup>	
	Masisi	X			X
	Nyabiondo	X			X
Haiti	Tabarre	X			X
Iraq	Al-Hamdaniya		March 24 <sup>th</sup>	September 14 <sup>th</sup>	
	Hamam Al-Alil		February 23 <sup>rd</sup>	July 17 <sup>th</sup>	
Mauritania	Bassikounou	X			X
Pakistan	Timurgara	X			X
South Sudan	Bor	X		February 23 <sup>rd</sup>	
	Pibor	X			X

## 2.2.2. Main surgical activities

### 2.2.2.1. Afghanistan, **KABUL**<sup>12</sup> – ongoing

OCB support to MoH Ahmad-Shah-Baba district hospital in Kabul began in October 2010. The operational strategy regarding surgical care is to manage mainly life-threatening conditions as the bed capacity is limited and as there are other health structures that can perform planned elective surgery. Anyhow, some planned elective surgery is performed. Among the offered services, CEmONC activities are highly appreciated by the population. As there are several referral health structures in the city, complex cases are referred after surgery, and therefore, high level of intensive care is not present in the project.

Surgical care activities were performed by local staff, with punctual visits of expatriate specialists.

### 2.2.2.2. Afghanistan, **KHOST** – ongoing

Khost is a hospital owned by OCB. The activities began in March 2012 as a maternity where CEmONC was offered for emergent obstetric pathologies. Due to some security incidents in April of the same year, activities were put in stand-by and they resumed from January 2013 until present. One component of the operational strategy is to perform bilateral tubal ligations not only during a Caesarean section, but also after vaginal deliveries. The last ones are performed as planned elective surgeries.

Surgical care was offered by local staff with permanent support of expatriate specialists.

### 2.2.2.3. Burundi, **BUJUMBURA**<sup>13</sup> – ongoing

Following the political unrest in the country, OCB began to support surgical care for injured patients on July 2015. This intervention at the beginning was exclusively for violent related trauma. While isolated cases of accident related trauma were treated in the hospital from the beginning (and burns from December 2015), an operational decision was taken in April 2016 to also provide surgical care to those types of injured patients. This decision was highly appreciated by the local population. The health structure is not own by OCB but all the activities are exclusively run by OCB. That is why, in order to have in place the required standards to provide safe surgery, important logistic works have been done from the beginning of the intervention.

Surgical care was offered by local staff with permanent support of expatriate specialists.

### 2.2.2.4. Central African Republic, **BANGASSOU** – ongoing (stand-by)

OCB supports the MoH hospital of Bangassou since November 2013, following the context of violence that the country is going through since 2012. The support of surgical care activities began only at the end of February 2014 when important logistic works were performed to assure basic pre-requisites to perform surgery. After a serious security incident occurred in November, it was taken the decision to evacuate all the expatriate personnel from the project and the direct support to the hospital was stop on November 20<sup>th</sup>, 2017.

Presently, the project is in stand-by and efforts are done in order to resume activities during 2018, if the context allows.

Surgical care was offered by local staff with permanent support of expatriate specialists.

<sup>12</sup> In 2015 it was opened a second MSF project in Kabul (OCP Dasht-e-Barchi). In this report, Kabul project means the OCB Ahmad Shah Baba project, and it is kept as Kabul for consistency with previous reports.

<sup>13</sup> Usually in MSF practice, projects are named after the town/city where they are located. Therefore, it is named Bujumbura, while widely is known as Arche project (after the name of the health structure).

#### 2.2.2.5. Central African Republic, **CASTORS**<sup>14</sup> – ongoing

Castors hospital is a MoH structure completely supported by OCB from June 2014. It is dedicated exclusively to maternal health and CEmONC is offered. At the same time, due to the specific context where the project is located, the health structure has an emergency preparedness plan in order to provide first aid care to injured patients; and after pre-hospital basic trauma care is offered, patients are transferred to other hospitals.

Surgical care was offered by local staff with permanent support of expatriate specialists.

#### 2.2.2.6. Congo Democratic Republic, **BILI** – handed-over

Due to the crisis in Central African Republic, in December 2014 an important quantity of refugees arrived to Bili. After an assessment done in January 2015 where health needs were identified, OCB began to support the MoH hospital, and the first surgical intervention was performed in February 17<sup>th</sup>, 2015. From the beginning of the support, important logistic works were done improving the infrastructure of the hospital to assure quality on surgical care, including ancillary services as sterilisation.

At the beginning, surgical activities were mainly focused in life-threatening conditions allowing some planned elective surgeries for capacity building of the local staff. In 2017, and following the decrease of refugees in the town, more planned elective surgeries were performed. Following an evaluation of the project, it was decided to focus the support in the treatment of malaria, and therefore a handover process to the MoH of surgical care activities was done, and the last intervention supported by OCB was performed on June 30<sup>th</sup>, 2017.

Surgical care was offered by local staff with permanent support of expatriate specialists.

#### 2.2.2.7. Congo Democratic Republic, **KANANGA** – opened and closed

The humanitarian crisis in the central region of DRC (provinces of Kasai, Kasai Central, Kasai Oriental, Lomami and Sakuru) started after an ethnic driven uprising in August 2016. While it began as a localized conflict, it quickly escalated when the Congolese army killed the leader of the militia. This situation has led to hundreds of deaths, and thousands of internally displaced people. After an exploratory mission performed in the area in February 2017, OCB took the decision to support medical activities in the MoH Kananga General Referral Hospital in April.

One of the axes of intervention of OCB in MoH Kananga Hospital was to support the provision of surgical care for conflict related injured patients, as well as other emergent surgical conditions. Therefore, important logistic works were done in a pavilion in order to have all the minimal requirements to perform quality and save surgical care. The first surgical intervention supported by OCB was performed in May 10<sup>th</sup>. As the project had a specific aim, it was taken the decision to stop supporting surgical care activities in the hospital at the end of the year, continuing the support to other medical care activities. The last intervention was performed on December 20<sup>th</sup>, 2017.

Surgical care was offered by local staff with permanent support of expatriate specialists.

#### 2.2.2.8. Congo Democratic Republic, **MASISI** – ongoing

Masisi is a MoH hospital completely supported by OCB. The activities began in September 2007 during an armed conflict in the area. At the beginning, the operational strategy was to only support surgical care for emergent surgical conditions. However, due to the health needs of the local population, it was taken the decision to support all the activities of the hospital. Through the years of the project, obstetric emergent care has become one of the most important activities, where

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<sup>14</sup> Castors: It is a neighbourhood of Bangui. Usually, the name of the project follows the location's name, but in Bangui there are several MSF projects, and therefore, to facilitate their recognition, they are called following the area.

CeM Onc is offered. Due to context needs, the operational strategy during the last years also allows to perform some elective planned surgery.

Surgical care activities were performed by local staff, with punctual visits of expatriate specialists.

#### 2.2.2.9. Congo Democratic Republic, **NYABIONDO** – ongoing

Nyabiondo is a MoH Health Centre fully supported by OCB that in normal context refers patients to Masisi project. However, due to geographical or other barriers (e.g. armed conflict in the area), sometimes it is difficult to refer patients in time for surgical care (mainly obstetric cases). This is the reason that it was decided to add a basic surgical care component to the project. The local staff has been trained and validated in Masisi to perform basic surgical / obstetric care and basic anaesthesia management.

Surgical care activities were performed by local staff.

#### 2.2.2.10. Haiti, **TABARRE**<sup>15</sup> – ongoing

Already before the devastating earthquake of January 2010, OCB planned to invest in advanced trauma care with complex orthopaedic management in Haiti. The ongoing plans were disrupted by the unprecedented natural disaster and trauma care with basic orthopaedic management was instituted in two MoH hospitals in the neighbourhoods of Cité-Soleil and Chancerelles. This care was enhanced by the opening of a third hospital in the neighbourhood of Sarthe for patients in need of further rehabilitation. During the following years, after the acute needs in trauma care following the earthquake were met, OCB closed all these three structures. At the same time, there were relaunched the plans to provide advanced trauma care with complex orthopaedic management and in February 2012 a completely owned by OCB hospital was opened in the neighbourhood of Tabarre. Importantly, almost from the beginning the project acquired the capacity to perform internal fixation procedures.

Through all these years, the hospital has been a key element providing trauma care, notably in orthopaedic management, in Port-au-Prince, and in the country as a whole during natural disasters (e.g. hurricanes). The project also provides several opportunities for training, including a program for residents in surgery and orthopaedics. Following the success of the project, the span of it was enlarged and several works have been done to maintain the structure of containers in good conditions. On March 2016 a logistical/medical team proposed a plan to improve the infrastructure matching better the medical needs, and on February 2017 a workshop was done to define the hospital activities for a time span up to the year 2022. However, due to operational constraints, in August 2017 a decision to close the project on mid 2019 was taken and there is an ongoing plan to gradually decrease the performed activities.

Surgical care was offered by local staff with permanent support of expatriate specialists.

#### 2.2.2.11. Haiti, **HAMAM AL-ALIL** – opened and closed

On October 2016, the Iraqi government began a massive offensive to retake the city of Mosul. Due to the conflict situation, more than 1 million inhabitants were trapped inside the city and the world faced a humanitarian catastrophe. After an assessment, OCB decided to perform trauma and emergency surgery in the area as the main activity, where distance of the frontline and flexibility in the location of response were important factors due to the foreseen evolution of the conflict context. Therefore it was built a mobile surgical care capability using containers on trailers that was called MUST<sup>16</sup>. It was decided to work in Hamam Al-Alil, a place where already OCP was performing trauma non-surgical care as the surgical capacity of OCB was an added value to the

<sup>15</sup> Tabarre: It is a neighbourhood of Port-au-Prince. Usually, the name of the project follows the location's name, but in Port-au-Prince there are several MSF projects, and therefore, to facilitate their recognition, they all are called following the area (e.g. Martissant, etc.).

<sup>16</sup> MUST stands for **M**obile **U**nit **S**urgical **T**railer.

setting. The first intervention was performed on February 23<sup>rd</sup> 2017. The project focused only in life-saving interventions (damage control surgery and resuscitation) for violent related trauma conditions and relied on a referral system to other health structures. Following the context in the area and the decrease of violent related trauma cases, in June it was taken the decision of closing the project, and the last surgical intervention was conducted on July 17<sup>th</sup>. The decision took in consideration also the fact that there were already present other organisations providing health care.

Surgical care was offered by local staff with permanent support of expatriate specialists.

#### 2.2.2.12. Mauritania, **BASSIKOUNOU**, ongoing

Surgical care activities are supported in the Health Centre of Bassikounou since January 2013 after big logistic works were performed in order to acquire minimal conditions for safe surgery. The project itself was already running from March 2012 as violence in the neighbouring Mali pushed the population to seek refuge in Mauritania. The operational strategy is to manage emergent surgical cases, including obstetric care, as nearby health facilities providing surgical care are located far very far from the town.

Surgical care was exclusively offered by expatriate specialists.

#### 2.2.2.13. Pakistan, **TIMURGARA**, ongoing

Timurgara DHQ is a MoH hospital where OCB supports different services, including the Maternity (since October 2010), offering CEmONC for emergent obstetric pathologies. At the beginning of the project, the support was localized in the Emergency department, and after some years it was widened to emergent visceral surgical care. When new MoH infrastructure was available for surgical care, this activity was handed over and OCB remained supporting the Maternity.

Surgical care was offered by local staff with periodical support of expatriate specialists.

#### 2.2.2.14. South Sudan, **BOR**, closed

After an OCB intervention in the Bor Civil Hospital between 2006 and 2008, a new project began in 2014 supporting mainly Paediatrics and Emergency Medicine activities. In mid-2016 activities were shifted towards surgical care, and the first surgical intervention was performed on July 2<sup>nd</sup>, 2016. At the same time, it was planned that Bor project could be the base of a flying surgical care team, deployable in different locations if needed. Unfortunately, the project faced several challenges and already after few months of activities, it was decided to end OCB intervention in Bor. The last surgical intervention was performed on February 23<sup>rd</sup>, 2017. It is important to acknowledge that important infrastructure works were performed to enhance the Operating department, the surgical ward and the sterilisation service.

Surgical care was exclusively offered by expatriate specialists.

#### 2.2.2.15. South Sudan, **PIBOR**, ongoing

Pibor project is a Health Centre completely run by OCB since 2005. Due to the isolated location of the health facility, referrals of emergent surgical and obstetrical cases is very difficult, and therefore, in 2016 it was taken the decision to implement surgical care activities in the health centre. The first intervention was performed on July 12<sup>th</sup>, 2016. Important logistic works were done in order to assure minimal conditions for quality and safe surgical care. While it is recognized the need to provide surgical care in the area, including CEmONC, it is also true that the caseload is very low, including emergent obstetrical cases.

Surgical care was exclusively offered by expatriate specialists.



### 2.2.3. OCB surgical indicators by project in 2017

In order to be able to have a quick view on the performed surgical activities in different projects, it is given in *Table № 3* a summary of the main indicators by project. The explanation for the given indicators is as follows:

- Patients: Reflects the number of primary interventions (new cases).
- Interventions: Reflects the number of entrances / interventions to the Operating department and the number of anaesthetics. This number can be higher than the number of patients because one patient can be re-intervened several times for the same pathology.
- Procedures: Reflects the number of surgical procedures. This number can be higher than the number of cases (and therefore, from patients) because the data collection tools allows to encode up to three procedures for one intervention.
- The denominator is the number of patients for: mean age, female, trauma cases (all and violent), and Caesarean sections.
- Postoperative infection: The denominator is the number of patients as it is only possible to develop it once. This indicator should carefully be analysed due to biases that can confound the reality, and **data should be carefully interpreted, since it is not 100% reliable**.
- The denominator is the number of interventions for: primary interventions, emergent cases (urgent and delayed), minor / wound surgery, spinal anaesthesia, and intraoperative mortality.
- Spinal procedures for Caesarean section: It allows analysing the quality of anaesthesia in a project since the best technique for Caesarean section is the spinal one. Here there are considered spinal and combined techniques, because the second one is a procedure that begins with a spinal anaesthesia that afterwards is converted into general.
- Occupancy rate comprises: theatre time (entrance to operating room, anaesthesia induction, surgical intervention, anaesthesia wake-up, and discharge from operating room) by the quantity of days and by the number of available operating rooms. The period in the recovery room is not recorded in this indicator.
- NA – not applicable, if the project didn't perform this activity.
- ND – non data, if the project didn't reported the needed information.

Table № 3: Summary of main indicators by project for 2017.

Mission		AFG	AFG	BDI	CAF	CAF	COD	COD	COD	COD	HTI	IRQ	MRT	PAK	SSD	SSD
Project		Kabul	Khost	Bujumbura	Bangassou	Castors	Bili	Kananga	Masisi	Nyabiondo	Tabarre	Hamam Al-Ajil	Bassikounou	Timurgara	Bor	Pibor
Patients	number	1159	982	1524	701	1238	290	308	2270	253	2777	396	403	1818	33	122
Interventions	number	1176	998	4053	1195	1358	342	1204	3912	253	6539	667	408	1856	35	159
Procedures	number	1185	1194	4477	1220	1369	361	1242	4095	253	8971	836	412	2024	36	159
Mean Age	years	25	32	23	28	25	33	28	26	23	28	25	25	32	36	20
Female	%	76,6	100,0	25,3	44,1	100,0	49,7	33,4	73,7	81,0	26,1	26,5	65,5	100,0	36,4	45,1
All trauma	%	1,9	0,0	100,0	37,4	0,1	12,8	61,7	19,2	13,0	86,2	95,2	23,3	0,3	24,3	39,3
Violent trauma	%	1,2	0,0	9,3	22,4	0,0	4,8	26,0	7,9	6,3	20,2	84,1	0,5	0,1	15,2	13,9
Caesarean section	%	43,8	53,5	0,0	14,7	75,4	15,2	0,0	46,3	48,2	0,0	0,0	30,5	87,8	9,1	9,0
Post-op infection	%	0,4	0,7	2,2	ND	1,0	ND	ND	1,5	ND	4,4	ND	ND	0,6	ND	ND
Primary interventions	%	98,6	98,4	37,6	58,7	91,2	84,8	25,6	58,0	100,0	42,5	59,4	98,8	98,0	94,3	76,7
Emergent cases	%	98,0	86,5	100,0	94,6	100,0	67,3	100,0	95,2	100,0	100,0	99,9	97,5	100,0	80,0	96,2
Minor / wound surgery	%	4,3	0,1	69,7	66,0	9,5	42,1	79,0	58,4	44,7	41,6	69,4	19,1	0,2	31,4	88,1
Spinal anaesthesia	%	81,5	78,8	18,4	21,4	73,1	37,4	13,0	30,2	40,3	22,3	2,1	45,1	79,4	54,3	4,4
Spinal procedure / C-section	%	96,5	89,5	NA	85,4	89,1	77,3	NA	92,9	89,3	NA	NA	95,1	87,8	100,0	63,6
Intra-operative mortality	%	0,1	0,4	0,2	0,4	0,2	0,0	0,1	0,2	0,0	0,2	1,8	0,0	0,3	0,0	0,0
Occupancy rate per OR	minutes/day/OR	271	90	306	77	114	111	203	291	32	360	147	57	288	50	22

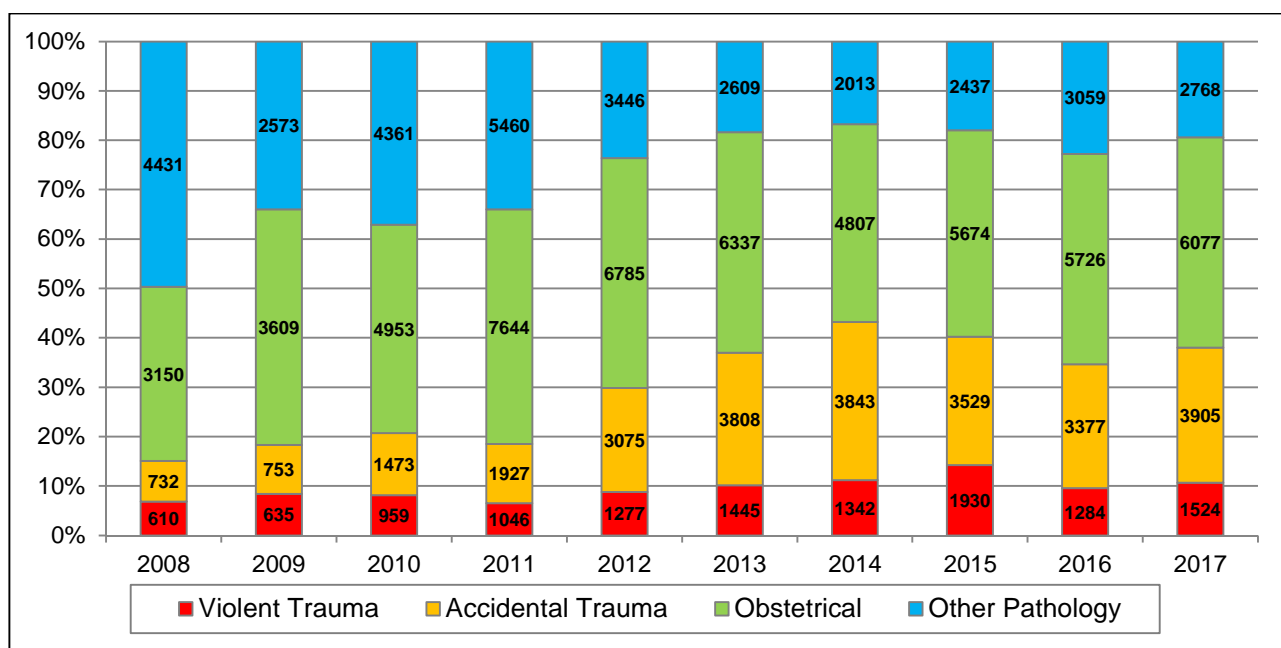
### 2.3. SURGICAL ACTIVITIES BY INDICATION

During 2017, there were 14,274 primary interventions (new cases), that shows an increase of around 5% in comparison to the previous year (n=13,446). This also reflects the number of patients (new cases) who benefited from surgical care. In *Table № 4* it can be seen their numbers and percentages, and in *Figure № 2* their annual distribution.

**Table № 4: Indications for surgery, quantity and percentage, 2017.**

Cause of Intervention	2014		2015		2016		2017	
	№	%	№	%	№	%	№	%
Violent trauma	1342	11,2	1930	14,2	1284	9,5	1524	10,7
Accidental trauma	3843	32,0	3529	26,0	3377	25,1	3905	27,4
Obstetrical	4807	40,0	5674	41,8	5726	42,6	6077	42,5
Other pathologies	2013	16,8	2437	18,0	3059	22,8	2768	19,4
Total	12005	100,0	13570	100,0	13446	100,0	14274	100,0

**Figure № 2: Indications for surgery, percentage in relative weights, 2008 – 2017.**

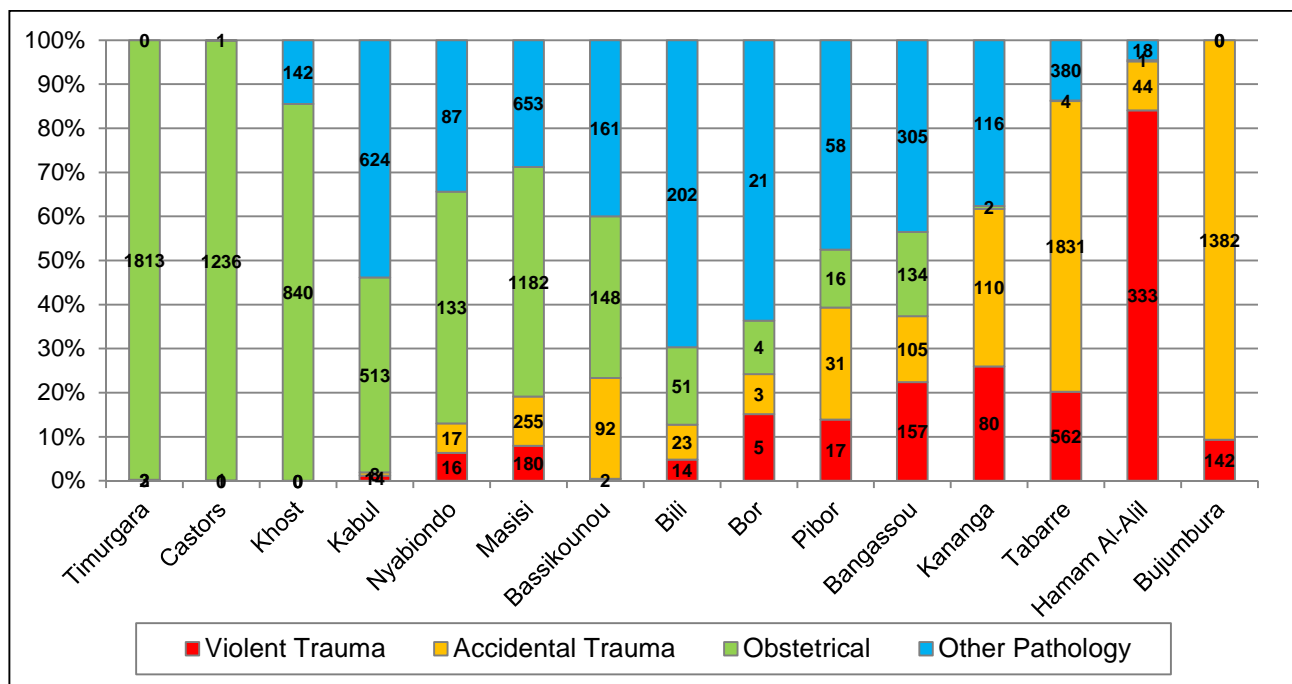


The proportions of indication for surgery have not significantly changed in the last four years. However, in 2017, accidental trauma causes showed a slight increase of 2,5% in absolute numbers and proportional share of all indicators. Obstetrical causes also increased 6% in absolute numbers and proportional share of all indicators remained similar to 2016 (43%). On the other hand, other pathologies decreased 10% in absolute numbers and 32% in proportional share of all indicators.

For a better overview, this information is given by project. *Table № 5* it is shown the detailed information, and in *Figure № 3* can be seen the relative weight of each indication for surgery by project.

**Table № 5: Indication for surgery (new cases) by project, quantity and percentage, 2017.**

Cause of intervention		Timurgara	Castors	Khost	Kabul	Nyabiondo	Masisi	Bassikounou	Bili	Bor	Pibor	Bangassou	Kananga	Tabarre	Hamam Al-Alii	Bujumbura
		Violence	№	2	0	0	14	16	180	2	14	5	17	157	80	562
	%	0,1	0,0	0,0	1,2	6,3	7,9	0,5	4,8	15,2	13,9	22,4	26,0	20,2	84,1	9,3
Accident	№	3	1	0	8	17	255	92	23	3	31	105	110	1831	44	1382
	%	0,2	0,1	0,0	0,7	6,7	11,2	22,8	8,0	9,1	25,4	15,0	35,7	66,0	11,1	90,7
Obstetrical	№	1813	1236	840	513	133	1182	148	51	4	16	134	2	4	1	0
	%	99,7	99,8	85,5	44,3	52,6	52,1	36,7	17,6	12,1	13,1	19,1	0,6	0,1	0,3	0,0
Others	№	0	1	142	624	87	653	161	202	21	58	305	116	380	18	0
	%	0,0	0,1	14,5	53,8	34,4	28,8	40,0	69,6	63,6	47,6	43,5	37,7	13,7	4,5	0,0
Total		1818	1238	982	1159	253	2270	403	290	33	122	701	308	2777	396	1524

**Figure № 3: Causes of intervention by project, percentage in relative weights, 2017.**

In summary, OCB provided different types of surgical projects in response to differing needs in various contexts. Looking to the graphic it is possible to separate the projects in different groups. All these different types of patterns are useful to predict for planning surgical activity in new OCB projects, because indirectly they show us what kind of pathology we might find, linked with the environment, type of hospital and operational strategy. Collecting data has been critical in planning for human and material resources.

The projects can be grouped as follows:

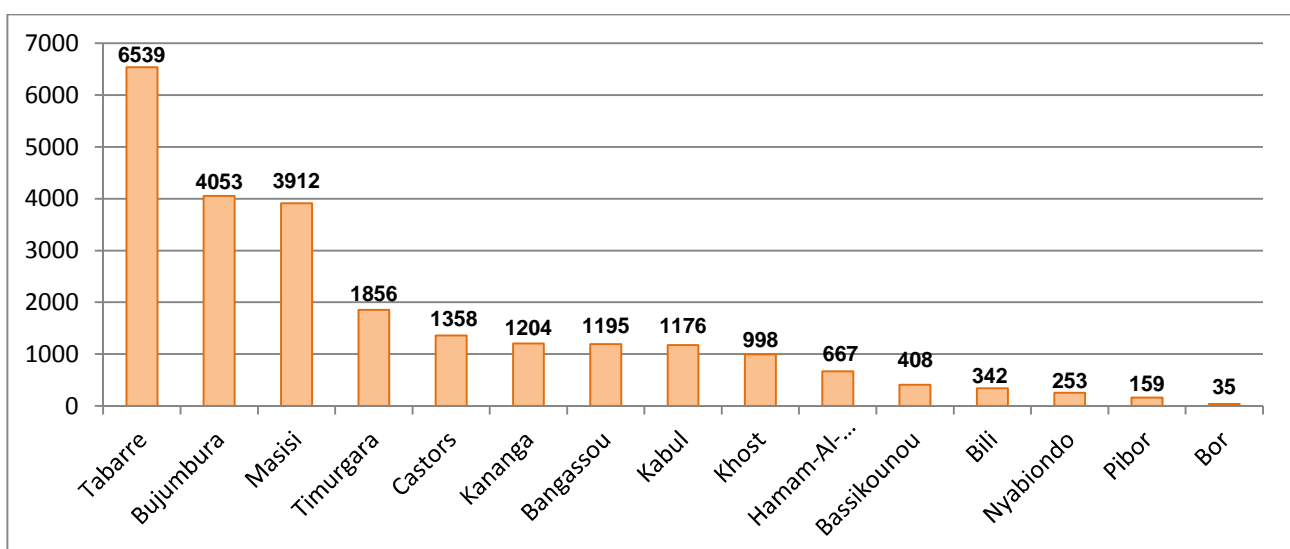
- Timurgara, Castors and Khost. All these three projects focus exclusively on reproductive health (maternities). The 15% of other pathologies in Khost is explained by the fact that there is in place a plan for elective bilateral tubal ligation after vaginal deliveries.
- Kabul, Nyabiondo, Masisi and Bassikounou. All of them are general hospitals<sup>17</sup> providing surgical care to all type of pathologies. While obstetrical care is important (between 35 - 55%), other pathologies also is present with important proportions. As general hospitals, they also dealt with trauma pathology.
- Bili, Bor, Pibor and Bangassou. They are also general hospitals<sup>18</sup> providing surgical care to all type of pathologies. However, differently to the previous group of projects, other pathologies accounts for 40 - 70% of causes of intervention, while obstetrical care accounts for <20% or them. As general hospitals, they also dealt with trauma pathology.
- Kananga, Tabarre, Hamam Al-Alil and Bujumbura. They were hospitals<sup>19</sup> mainly dealing with trauma. Hamam Al-Alil was the only one located in an active armed conflict context. Bujumbura admitted for surgical care exclusively trauma related pathologies.

## 2.4. PERFORMED ANAESTHESIA

During 2017, OCB provided anaesthesia in 24,155 interventions in 15 projects, which showed an increase of approximately 5% compared to the previous year (2016, n=22,958). The total number of anaesthetics also indicates the total number of interventions / entrances to the Operating Departments (ODs) which is higher than the numbers of primary interventions as some were re-interventions. The increase of entrances to OD correlates with the increase of new cases. This reflects the scope of surgical care activities that are in line with OCB operational strategies, and the absence of emergencies / natural disasters requiring high number of surgical activities.

It is important to analyse the quantity of interventions, in *Figure № 4*. Almost 80% of them are performed in projects where more than 1000 interventions were done. And 60% of them were done in only three projects: Tabarre, Bujumbura and Masisi.

**Figure № 4: Number of interventions by project, 2017.**



<sup>17</sup> Nyabiondo is an upgraded Health Centre with capacity to perform surgical care.

<sup>18</sup> Pibor is an upgraded Health Centre with capacity to perform surgical care.

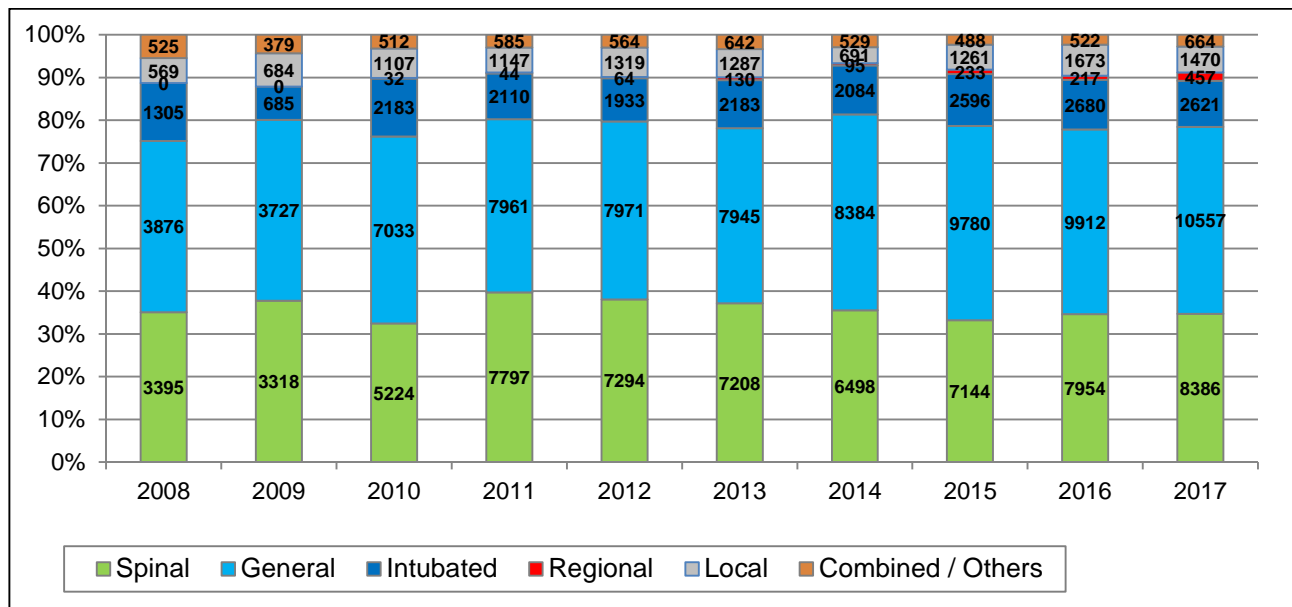
<sup>19</sup> Hamam Al-Alil was a temporary structure providing emergent surgical care for life-threatening conditions (damage control surgery), with subsequently referral.

No major differences in the anaesthesia procedures were observed in 2017, as almost all the anaesthetic procedures proportionally increased. Only general intubated anaesthetics remained as of 2016, and decreased 1% in proportional share of all indicators. Regional anaesthesia was more performed in projects providing trauma care (2017, n=457; 2016, n=217). In *Table № 6* it can be seen their numbers and percentages, and in *Figure № 5* their annual distribution.

**Table № 6: Types of anaesthesia, quantity and percentage, 2017.**

Type of anaesthesia	2014		2015		2016		2017	
	№	%	№	%	№	%	№	%
Spinal	6498	35,5	7144	33,2	7954	34,6	8386	34,7
General	8384	45,9	9780	45,5	9912	43,2	10557	43,7
Intubated	2084	11,4	2596	12,1	2680	11,7	2621	10,9
Regional (nerve blocks)	95	0,5	233	1,1	217	0,9	457	1,9
Local	691	3,8	1261	5,9	1673	7,3	1470	6,1
Combined / Others	529	2,9	488	2,2	522	2,3	664	2,7
Total	18281	100,0	21502	100,0	22958	100,0	24155	100,0
Spinal procedures for Caesarean section	3436 / 3877	88,6	3808 / 4589	83,0	4193 / 4742	88,4	4526 / 5018	90,2

**Figure № 5: Types of anaesthesia, 2008 – 2017.**

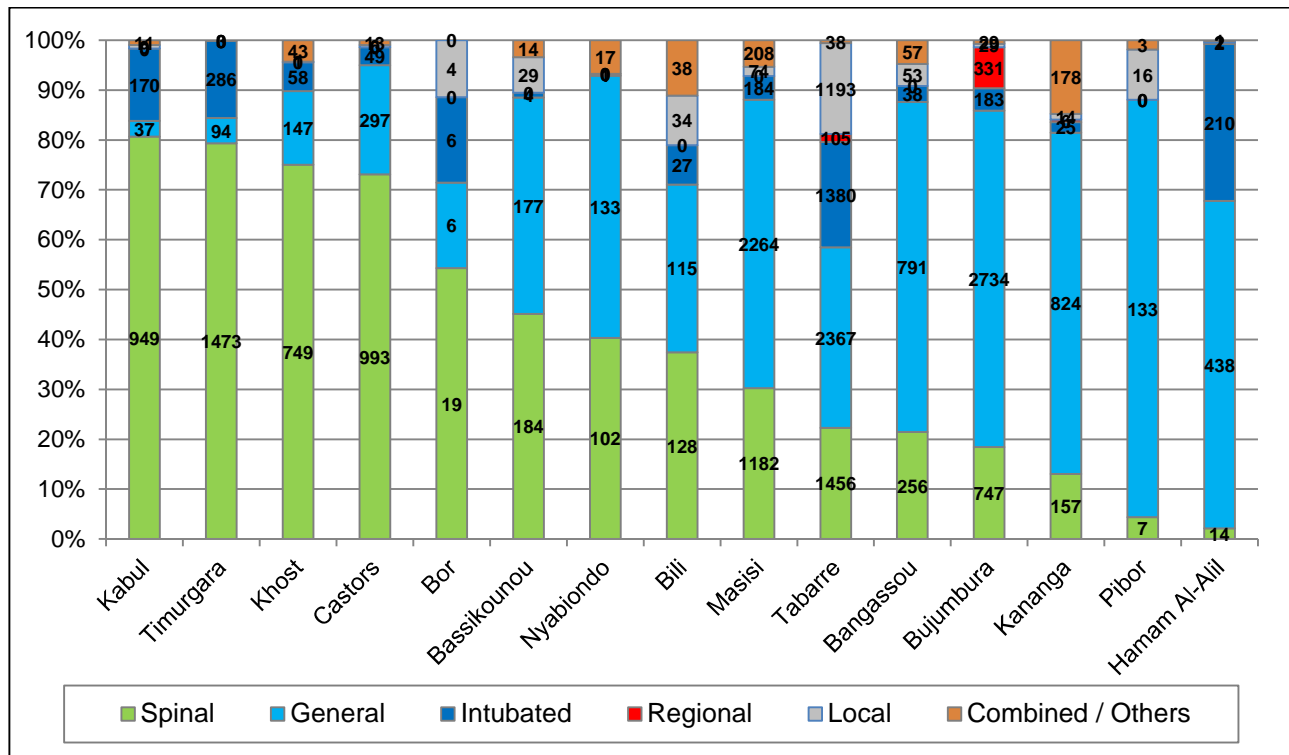


It is difficult to compare and analyse the performed anaesthetic procedures between projects because they are directly related to the type of performed procedures. It is also important to consider the skills of the anaesthesia provider and the type of available bio-medical devices. *Table № 7* shows the detailed information of the type of performed anaesthesia by project, and in *Figure № 6* can be seen their relative weights. As it was expressed previously, these data is only informative because it is impossible a faire comparison between projects.

Table № 7: Types of anaesthesia by project, quantity and percentage, 2017.

Type of anaesthesia		Kabul	Timurgara	Khost	Castors	Bor	Bassikounou	Nyabiondo	Bili	Masisi	Tabarre	Bangassou	Bujumbura	Kananga	Pibor	Hamam Al-Aili
		№	949	1473	749	993	19	184	102	128	1182	1456	256	747	157	7
	%	80,7	79,4	75,1	73,1	54,3	45,1	40,3	37,4	30,2	22,3	21,4	18,4	13,0	4,4	2,1
General	№	37	94	147	297	6	177	133	115	2264	2367	791	2734	824	133	438
	%	3,2	5,1	14,7	21,9	17,2	43,4	52,6	33,7	57,9	36,2	66,2	67,5	68,4	83,6	65,7
Intubated	№	170	286	58	49	6	4	1	27	184	1380	38	183	25	0	210
	%	14,4	15,3	5,8	3,6	17,2	1,0	0,4	7,9	4,7	21,1	3,2	4,5	2,1	0,0	31,5
Regional (nerve blocks)	№	0	0	0	0	0	0	0	0	0	105	0	331	6	0	2
	%	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,6	0,0	8,2	0,5	0,0	0,3
Local	№	9	0	1	6	4	29	0	34	74	1193	53	29	14	16	2
	%	0,8	0,0	0,1	0,4	11,4	7,1	0,0	9,9	1,9	18,2	4,4	0,7	1,2	10,1	0,3
Combined / Others	№	11	3	43	13	0	14	17	38	208	38	57	29	178	3	1
	%	0,9	0,2	4,3	1,0	0,0	3,4	6,7	11,1	5,3	0,6	4,8	0,7	14,8	1,9	0,2
Total		1176	1856	998	1358	35	408	253	342	3912	6539	1195	4053	1204	159	667

Figure № 6: Types of anaesthesia by project, percentage in relative weights, 2017.



The quality of anaesthesia care is challenging to assess at project level since the types of surgical interventions vary considerably. However, the proportion of spinal procedures for Caesarean Sections (CS) is a useful proxy quality indicator<sup>20</sup>, as spinal anaesthesia is widely recognised as the procedure of choice for this intervention<sup>21</sup>, and therefore, it is good to compare the ratios of spinal procedures<sup>22</sup> for Caesarean section. A proportion >75% is regarded as good quality of anaesthesia provision. It is encouraging to know that 90% of CSs were performed under spinal anaesthesia during 2017. This excellent level of anaesthesia provision for CS is higher than the previous year (89%).

In *Table № 8* it is given the detailed information and in *Figure № 7* it can be seen the relative weight of spinal procedures for CS by project. There are excluded the following projects:

- Bujumbura, Kananga, Tabarre and Hamam Al-Alil. They are projects offering trauma care.
- Bili, Bor and Pibor. They are projects that recorded very few CS. This low caseload makes any statistical analysis not representative. In Bili there were performed 44 CS, in Bor only 3 CS, and in Pibor 11 CS.

**Table № 8: Spinal procedures for Caesarean section by project, percentage, 2017.**

Type of anaesthesia		Kabul	Bassikounou	Masisi	Khost	Nyabiondo	Castors	Timurgara	Bangassou
Spinal procedures	№	490	117	975	470	109	831	1402	88
	%	96,5	95,1	92,9	89,5	89,3	89,1	87,8	85,4
General	№	1	4	71	31	13	91	14	11
	%	0,2	3,3	6,7	5,9	10,7	9,7	0,9	10,7
Intubated	№	17	2	4	24	0	11	180	4
	%	3,3	1,6	0,4	4,6	0,0	1,2	11,3	3,9
Total CS		1596	508	123	1050	525	122	933	103

Regarding the provision of quality anaesthesia by spinal procedures in CS, all the projects showed excellent levels (>90%) and very good levels (>75%).

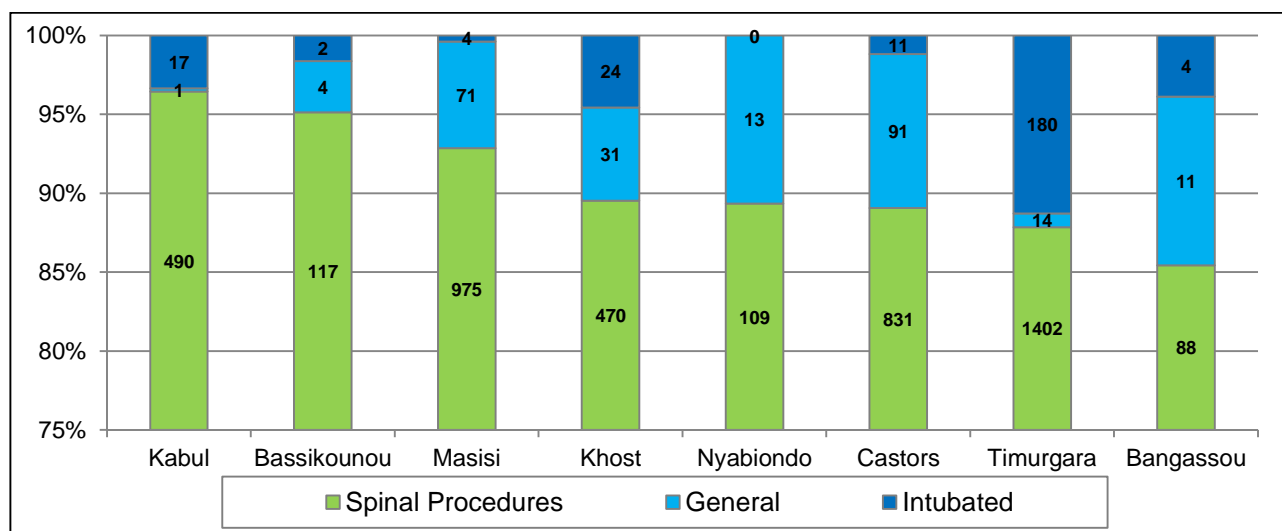
- Excellent level: In Kabul and Masisi projects, the anaesthesia provision is offered exclusively by local staff. In Bassikounou it is offered exclusively by expatriate specialists.
- Very good level: In Nyabiondo and Timurgara projects, the anaesthesia provision is offered exclusively by local staff. In Khost, Castors and Bangassou it is offered by local staff with permanent support of expatriate specialists where bedside training is in place.

<sup>20</sup> Spinal anaesthesia for Caesarean section: The general goals are the safety of the mother, the safety of the baby, the comfort of the mother and the ability to perform the surgery. General anaesthesia is reserved for a true emergency; however there are some associated risks that can be avoided with spinal anaesthesia. The fact that the mother can remain awake, see the baby and interact with the baby as soon as it is born and does not require a breathing tube are all advantages. General anaesthesia does affect the newborn, another reason why spinal anaesthesia is preferred.

<sup>21</sup> Hawkins JL (Clin Obstet Gynecol. 2011 Jan; 117 (1):69-74) reported a risk ratio between spinal and general anaesthesia of 1.7 (2,5 vs. 16,8 deaths per million).

<sup>22</sup> There is a need to add the combined techniques, where it was performed at the beginning a spinal procedure that afterwards was converted to general.



**Figure № 7: Spinal procedures for Caesarean section, project, percentage in relative weights, 2017.**

## 2.5. SURGICAL PROCEDURES BY TYPE

OCB projects performing direct surgical activities reported 27,861 surgical procedures in 2017. This number exceeded the number of entrances to the OD / performed anaesthetics because multiple surgical procedures can be performed under the same anaesthesia procedure (during the same intervention). It is an important indicator showing the work done by the surgical team and allowing appropriate monitoring of the use of material resources in the project.

As described in previous reports, not all projects were able to record more than one procedure per intervention. In order to present a systematic and unbiased analysis, only the primary ("type 1") procedures are thus reported here (n=24,155)<sup>23</sup>.

The proportions of surgical procedures (including Caesarean sections) remained similar to the two previous years. In *Table № 9* can be seen their numbers and percentages, and in *Figure № 8* their relative weight.

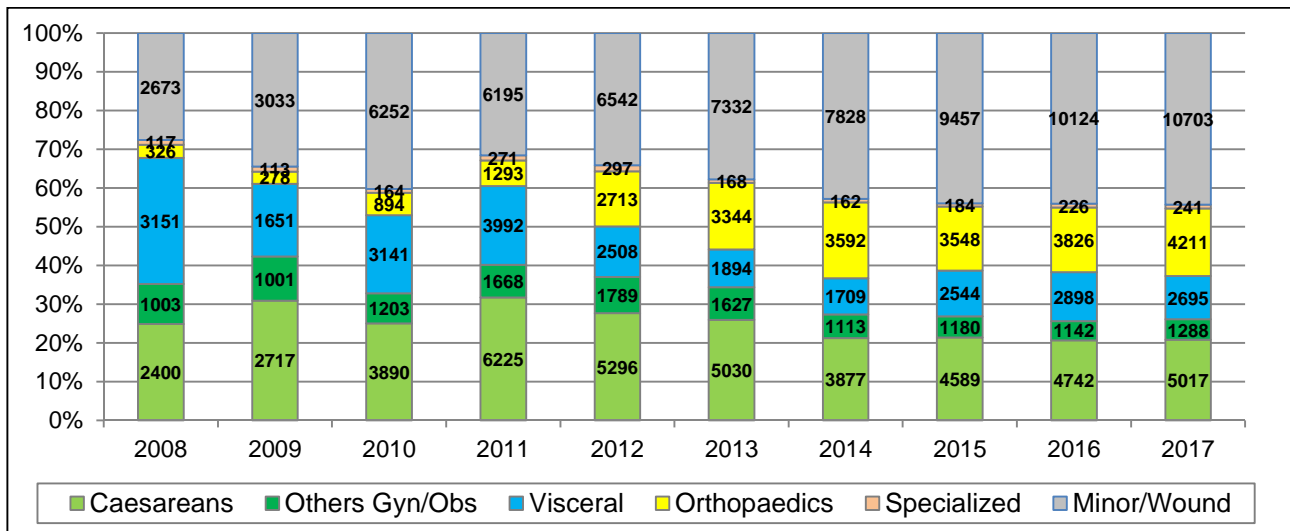
**Table № 9: Surgical procedures ("type 1"), quantity and percentage<sup>24</sup>, 2017.**

Type of procedure	2014		2015		2016		2017	
	№	%	№	%	№	%	№	%
Caesareans	3877	21,2	4589	21,3	4742	20,6	5017	20,8
Others Gyn/Obs	1113	6,1	1180	5,5	1142	5,0	1288	5,3
Visceral	1709	9,3	2544	11,8	2898	12,6	2695	11,2
Orthopaedics	3592	19,6	3548	16,5	3826	16,7	4211	17,4
Specialized	162	0,9	184	0,9	226	1,0	241	1,0
Minor/Wound	7828	42,8	9457	44,0	10124	44,1	10703	44,3
Total	18281	100,0	21502	100,0	22958	100,0	24155	100,0

<sup>23</sup> For more in-depth analysis, please refer to the specific report done for each project.

<sup>24</sup> The given percentages are slightly different to the ones given in the Executive Summary (Table № 1) because here are considered all the entrances, while in that summary are considered only the new cases / patients.

Figure № 6: Surgical procedures (“type 1”), percentage in relative weights, 2008 – 2017.



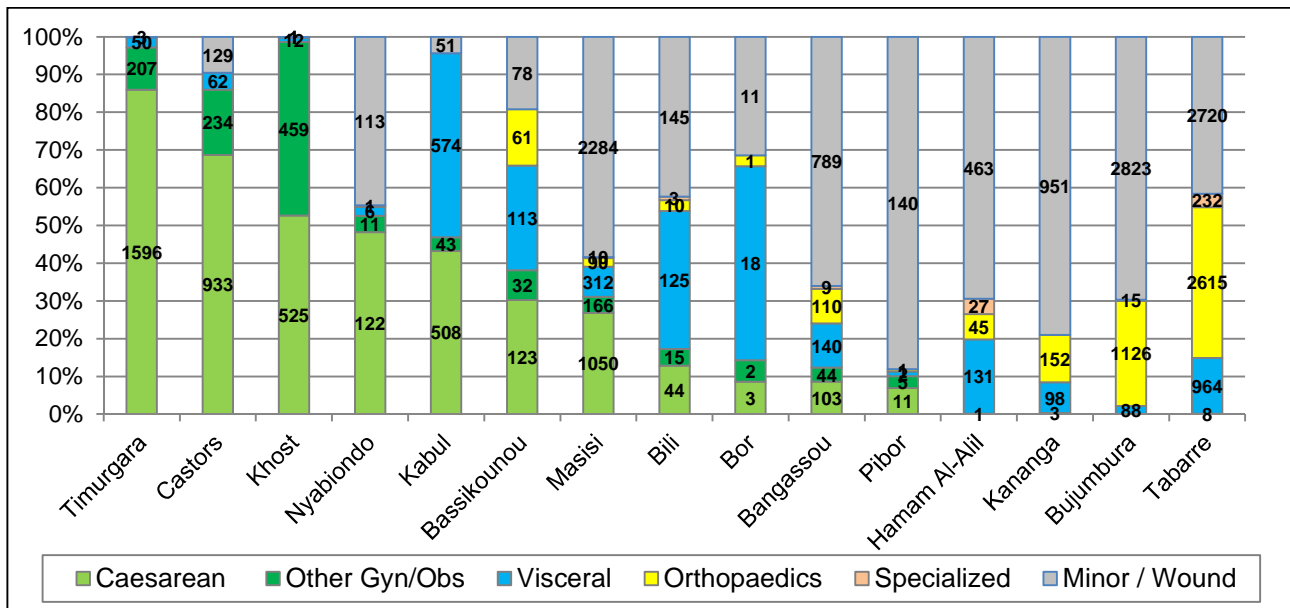
These are overall data gathered from all the projects performing surgical activities. In order to be more descriptive, it is necessary to divide this information by project. Analysing the types of performed interventions, it is possible to join the projects in groups, and also it is possible to find some differences between them. This gives a value information to foreseen the possible type of surgery that will be done depending of the context and human resources, and also, to improve the surgical care given to our patients. *Table № 10* shows the detailed information, and in *Figure № 9* can be seen the relative weight of each type of intervention. Only the primary (“type 1”) procedures are reported also here.

Table № 10: Surgical procedures by project (“type 1”), quantity and percentage, 2017<sup>25</sup>.

Surgical procedures		Timurgara	Castors	Khost	Nyabiondo	Kabul	Bassikounou	Masisi	Bili	Bor	Bangassou	Pibor	Hamam Al-Alil	Kananga	Bujumbura	Tabarre
		№	%	№	%	№	%	№	%	№	%	№	%	№	%	№
Caesarean section	№	1596	933	525	122	508	123	1050	44	3	103	11	0	0	0	0
	%	86,0	68,7	52,6	48,2	43,2	30,1	26,8	12,9	8,6	8,6	6,9	0,0	0,0	0,0	0,0
Other Gynaecology / Obstetrics	№	207	234	459	11	43	32	166	15	2	44	5	1	3	0	8
	%	11,2	17,2	46,0	4,3	3,7	7,8	4,2	4,4	5,7	3,7	3,1	0,1	0,2	0,0	0,1
Visceral	№	50	62	12	6	574	113	312	125	18	140	2	131	98	88	964
	%	2,7	4,6	1,2	2,4	48,8	27,7	8,0	36,5	51,4	11,7	1,3	19,6	8,1	2,2	14,7
Orthopaedics	№	0	0	0	0	0	61	90	10	1	110	1	45	152	1126	2615
	%	0,0	0,0	0,0	0,0	0,0	15,0	2,3	2,9	2,9	9,2	0,6	6,7	12,6	27,8	40,0
Specialized	№	0	0	1	1	0	0	10	3	0	9	0	27	0	15	232
	%	0,0	0,0	0,1	0,4	0,0	0,0	0,3	0,9	0,0	0,8	0,0	4,0	0,0	0,4	3,5
Minor / Wound	№	3	129	1	113	51	79	2284	145	11	789	140	463	951	2824	2720
	%	0,2	9,5	0,1	44,7	4,3	19,4	58,4	42,4	31,4	66,0	88,1	69,4	79,0	69,7	41,6
Total		1856	1358	998	253	1176	408	3912	342	35	1195	159	667	1204	4053	6539

<sup>25</sup> In 1017 there were reported 2 cases of deaths during the anaesthesia induction, in Bassikounou and in Bujumbura projects. These two cases were added to minor / wound procedures to keep coherence in the report.

Figure № 9: Surgical procedures by project (“type 1”), percentage in relative weights, 2017.



Analysing the types of performed interventions, it is possible to join the projects in groups, and also it is possible to find some differences between them. This gives a value information to foreseen the possible type of surgery that will be done depending of the context and human resources, and also, to improve the surgical care given to our patients.

The projects can be grouped as follows:

- Timurgara, Castors and Khost. All of them are maternities where the level of performed Caesarean sections was >50%. At the same time, there are some differences between them, and mainly regarding other gynaeco/obstetrics and minor/wound procedures. In Khost there were performed several bilateral tubal ligations after vaginal deliveries and in Castors there were performed some obstetric (e.g. curettage) and minor/wound (e.g. dressings) procedures that in other projects might be performed in the delivery room or in the ward.
- Nyabiondo, Kabul, Bassikounou, Masisi. All of them are general hospitals<sup>26</sup> where the level of Caesarean sections was between 25 – 50%. However, it is important to note that in Kabul and Bassikounou there are important level of performed visceral procedures, while in Nyabiondo and Masisi minor/wound procedures account for >50% of all the procedures. This can be linked to the incidence of trauma causes. However, in Bassikounou there are also present several causes of accidental trauma. Difference might be related to the way the surgical management is offered for wound care (bedside, dressing room or in the OD).
- Bili, Bor, Bangassou and Pibor. They are also general hospitals<sup>27</sup> where the level of Caesarean sections was <25%. In Bangassou and Pibor, minor / wound procedures accounted for more than 50% of all the procedures. The important number of visceral procedures in Bili is mainly related to planed elective surgery. In the other hand, Bor is difficult to analyse as the quantity of procedures was low.
- Hamam Al-Alil<sup>28</sup>, Kananga, Bujumbura and Tabarre. All these projects were dealing with trauma care. Hamam Al-Alil, Kananga and Tabarre performed several visceral procedures to patients with violent abdominal trauma, while was not the case in Bujumbura. As projects

<sup>26</sup> Nyabiondo, a health centre, offered surgical care in emergent cases when referral to Masisi project was not possible.

<sup>27</sup> Pibor, a health centre, offered surgical care in emergent cases as referrals are very difficult.

<sup>28</sup> Hamam Al-Alil was a temporary health structure performing damage control surgery and further referral.

dealing with trauma, it is understood the high amount of minor / wound procedures. Importantly, in Tabarre there was available a procedure room where several minor / wound procedures were done and not were considered as major interventions. Therefore, the level of minor / wound procedures in Tabarre is less in comparison to the other projects. It should also be considered that in Bujumbura and Tabarre there were present orthopaedic surgeons, giving specialized care in orthopaedics, as an important number of these procedures were performed.

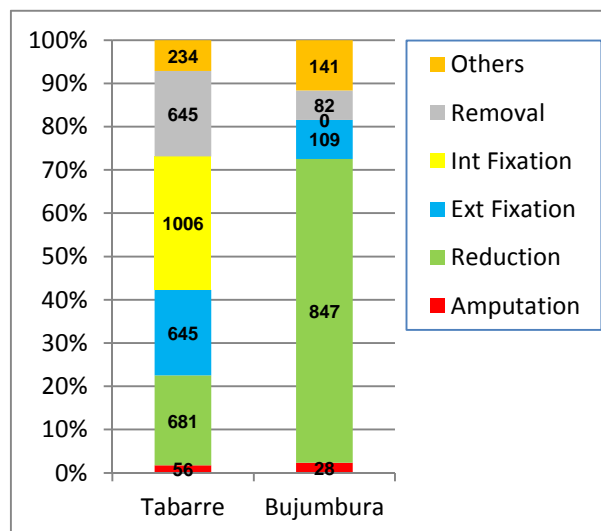
## 2.6. ORTHOPAEDIC CARE

During 2017 OCB run two projects where trauma care was the main activity: Tabarre (Haiti) and Bujumbura (Burundi). In Tabarre, specialized orthopaedic care was offered by local and expatriate orthopaedic specialists, while in Bujumbura it was assured exclusively by expatriate orthopaedic specialists.

As trauma centres, it is necessary to go more in detail in orthopaedic care<sup>29</sup>: in Tabarre there were performed 3267 orthopaedic procedures and in Bujumbura, 1207. In *Figure № 10* it can be seen their proportions and in *Table № 11* is given detailed information.

It should be acknowledged that due to several concerns, internal fixation procedures in Bujumbura project were not offered.

**Figure № 10: Orthopaedic procedures, by project, proportions, 2017.**



**Table № 11: Orthopaedic procedures by project, quantity and percentage, 2017.**

	Tabarre		Bujumbura	
	№	%	№	%
Amputation <sup>30</sup>	56	1,7	28	2,3
Reduction	681	20,8	847	70,2
External fixation	645	19,7	109	9,0
Internal fixation	1006	30,8	0	0,0
Removal of fixators	645	19,7	82	6,8
Others <sup>31</sup>	234	7,2	141	11,7
TOTAL	3267	100,0	1207	100,0

From 2015, a detailed data collection system was introduced in OCB trauma centres. The system allows to also knowing the type of performed internal fixation procedures.

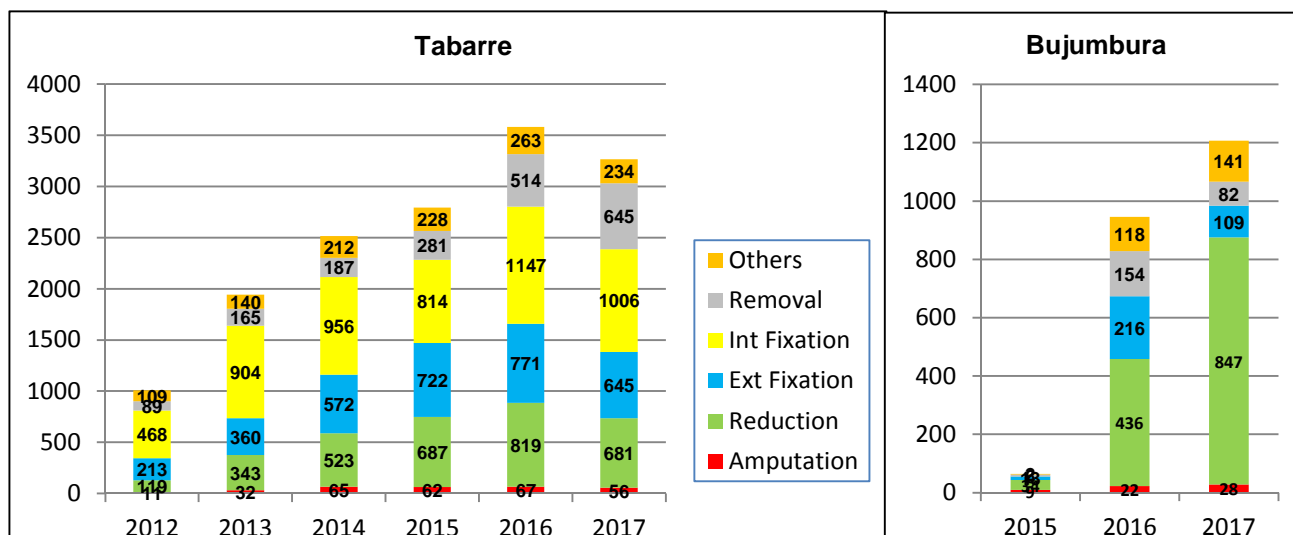
<sup>29</sup> There are considered all the performed orthopaedic procedures (including “types 1”, “2” and “3”). In polytrauma, the leading surgical procedure in most of the cases is visceral, that is reported as “type 1”. This way of recording hides important number of orthopaedic procedures that were performed during the same intervention.

<sup>30</sup> For MSF purposes it refers to a limb. There are excludes amputation of fingers or toes.

<sup>31</sup> Other procedures: For reporting purposes it refers to other type of orthopaedic procedures such as bone grafting, curettage for osteomyelitis, joint or nerve surgery, corrective procedures, etc.

In *Figure № 11*, the evolution of the activities through the last years is given. In Tabarre project, there was a 10% decrease of performed procedures that reflects the operational strategy in place of downsizing activities. In the other hand, in Bujumbura project, there was a 25% increase of performed procedures.

**Figure № 11: Orthopaedic procedures, 2017.**



## 2.7. EMERGENT SURGERY

Emergent surgery is defined as urgent (life-saving and acute emergencies) or delayed (with a wait of no more than a few days without significant morbidity) cases, as opposed to elective surgery. In MSF, certain planned procedures are considered essential and address conditions amenable to a proven surgical treatment. The conditions may not affect the patient's health or life immediately but may result in suffering, handicap and/or disability. Surgical activities can thus be classified into three degrees of urgency<sup>32</sup>: urgent, delayed and planned elective. As urgent versus delayed surgery is a relatively subjective classification, emergent surgery as a whole is a more appropriate indicator across different projects.

In 2017, 23,609 emergent cases were reported representing 98% of all surgeries and remaining similar in proportions to that of the previous year (97%). The analysis of emergent versus planned elective cases is important in programmatic planning. The knowledge of the performed types of surgical cases assists in human resource planning (type and number of specialists) and influences the type of infrastructure, medical equipment and supply needed. Additionally, it can help guiding operational strategies: e.g. if a surgical programme in a conflict area has many non-trauma and non-emergent cases, it may be too distant from the active conflict.

It is important to look to the trends of emergent surgery through the last years. Urgent surgery has been accounting for around 50% of all interventions, while delayed surgery has notably increased since 2012 (in 2010 there is also an isolated increase of delayed surgery due to the earthquake in Haiti). At the same time, during the last three years the number of urgent surgery has remained almost in the same level (around 11000 interventions), while there is recorded an increase of the

<sup>32</sup> Degrees of urgency:

- **Urgent.** Acute emergency (e.g. haemostatic hysterectomy, peritonitis, open fracture, etc.).
- **Delayed,** moderately urgent surgery that may be postponed for a few days but must imperatively be performed: The patient cannot be sent back home (e.g. secondary closure, skin graft, dressing under general anaesthetic, etc.).
- **Planned elective,** non-urgent and programmed surgery. The patient may be sent home (e.g. non-complicated hernia, varicose veins, etc.).

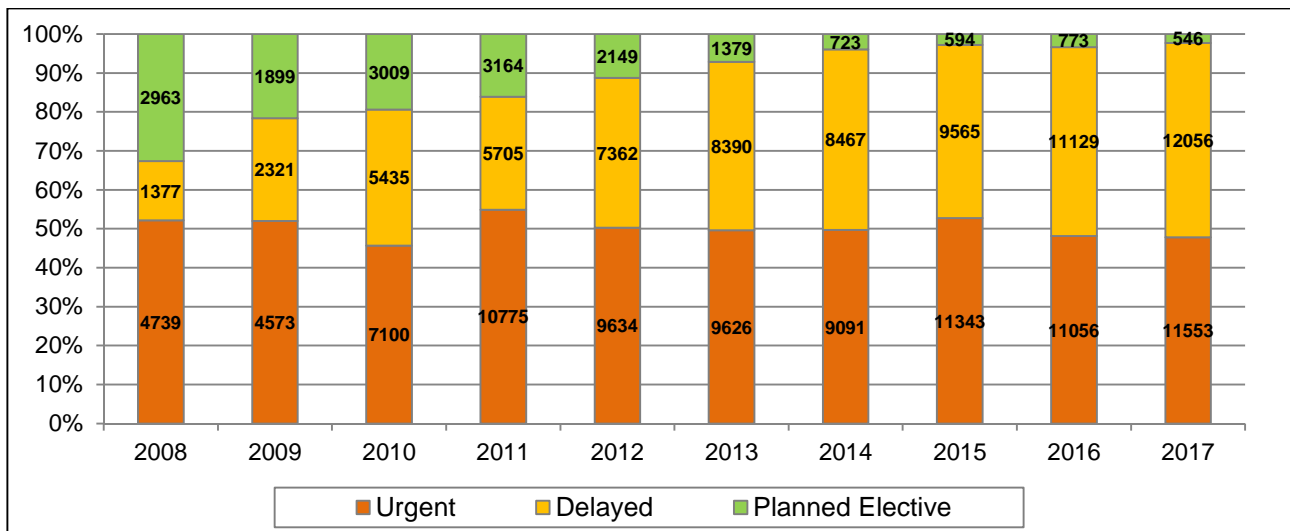
total number of interventions. This can be linked to the OCB operational strategy of developing trauma care.

In *Table № 12* and *Figure № 12* and *Figure № 13* can be seen the detailed information of emergent surgery within OCB activities.

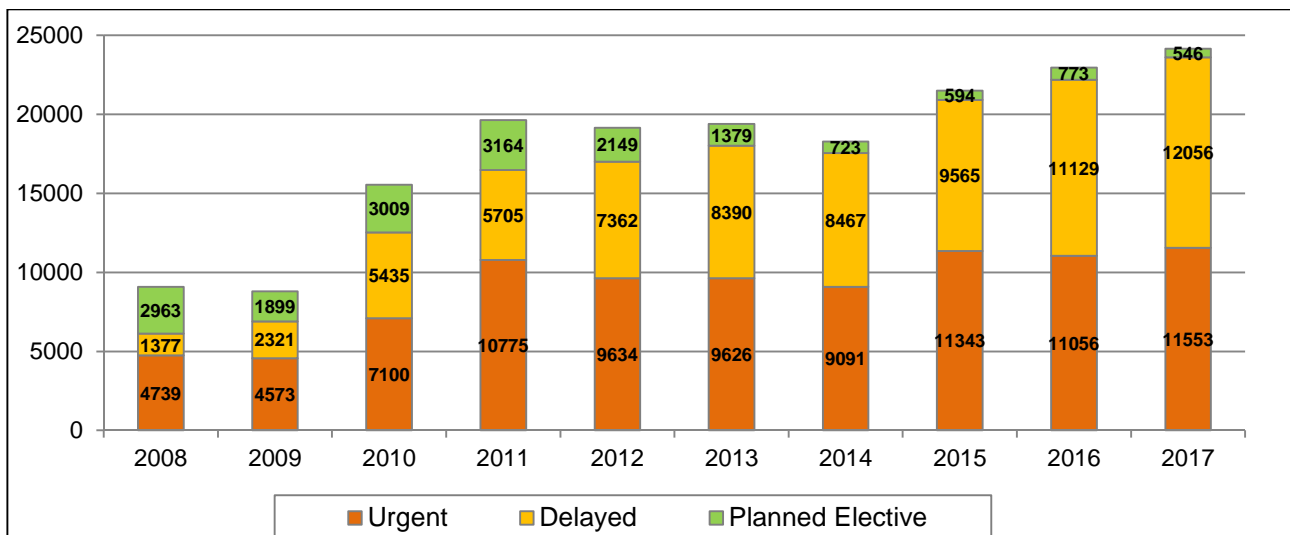
**Table № 12: Emergent surgery and planned surgery, quantity and percentage, 2017.**

Degree of Urgency	2014		2015		2016		2017	
	№	%	№	%	№	%	№	%
Urgent	9091	49,7	11343	52,7	11056	48,1	11553	47,8
Delayed	8467	46,3	9565	44,5	11129	48,5	12056	49,9
Planned elective	723	4,0	594	2,8	773	3,4	546	2,3
Total	18281	100,0	21502	100,0	22958	100,0	24155	100,0

**Figure № 12: Emergent surgery and planned surgery, percentage in relative weights, 2008 – 2017.**



**Figure № 13: Emergent surgery and planned surgery, absolute numbers, 2008 – 2017.**



It is important to clarify that all type of re-interventions are considered or urgent, or delayed. At the same time, all interventions which cause is trauma also are considered or urgent, or delayed. This is linked to the fact that such kind of interventions should be performed anyway, and patient cannot be sent home without it.

For better analysis, it is necessary to discriminate this data by project, what it is shown in *Table № 13* and in *Figure № 14*. While transversally comparing projects, it is interesting to take into account the percentage of emergent surgery, and within it, the level of delayed one. Following this comparison, the projects can be grouped in the following way:

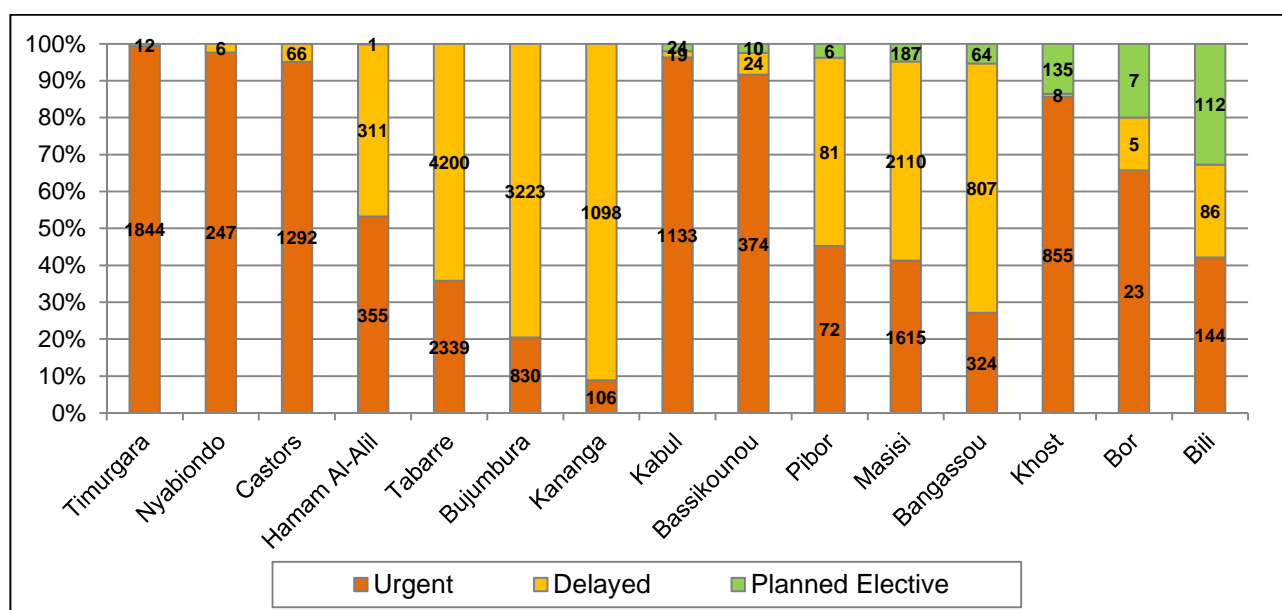
- Timurgara, Nyabiondo and Castors. These three projects performed exclusively emergent surgery, and almost all of them were urgent. Timurgara and Castors where maternities, while Nyabiondo was performing surgery when referrals to Masisi were not possible.
- Hamam Al-Alil, Tabarre, Bujumbura and Kananga. All these projects also performed exclusively emergent surgery but with different levels of delayed surgery. As these projects were dealing mainly with trauma, thus, there were performed several delayed primary interventions and re-interventions.
- Kabul and Bassikounou. Both projects performed all type of surgeries, were some planned elective surgery was offered. The reduce proportion of delayed surgery is linked to the low incidence of trauma cases.
- Pibor, Masisi and Bangassou. There are also projects were all type of surgeries were performed and some planned elective surgery was offered. However, delayed surgery shows important proportion due to the fact that they managed several trauma cases.
- Khost, Bor and Bili. In these projects there were performed more than 10% of planned elective surgery. Khost, as a maternity, offered planned bilateral tubal ligation for women after vaginal deliveries. Bor and Bili performed all type of surgery and following the operational strategy, there were allowed to perform some planned elective surgery.

**Table № 13: Emergent and planned surgery, by project, 2017.**

Degree of urgency		Timurgara	Nyabiondo	Castors	Hamam Al-Alil	Tabarre	Bujumbura	Kananga	Kabul	Bassikounou	Pibor	Masisi	Bangassou	Khost	Bor	Bili
	Urgent	Nº	1844	247	1292	355	2339	830	106	1133	374	72	1615	324	855	23
	%	99,4	97,6	95,1	53,2	35,8	20,5	8,8	96,3	91,7	45,3	41,3	27,1	85,7	65,7	42,1
Delayed	Nº	12	6	66	311	4200	3223	1098	19	24	81	2110	807	8	5	86
	%	0,6	2,4	4,9	46,7	64,2	79,5	91,2	1,7	5,9	50,9	53,9	67,5	0,8	14,3	25,3
Planned elective	Nº	0	0	0	1	0	0	0	24	10	6	187	64	135	7	112
	%	0,0	0,0	0,0	0,1	0,0	0,0	0,0	2,0	2,5	3,8	4,8	5,4	13,5	20,0	32,7
Total	Nº	1856	253	1358	667	6539	4053	1204	1176	408	159	3912	1195	998	35	342
Emergent	%	100,0	100,0	100,0	99,9	100,0	100,0	100,0	98,0	97,5	96,2	95,2	94,6	86,5	80,0	67,4



Figure № 14: Emergent and planned surgery, by project, percentage by relative weight, 2017.



## 2.8. ORDER OF THE INTERVENTION

Surgical interventions can be performed as first/primary, planned re-intervention, and unplanned re-intervention. This indicator is important, as some projects can have a large volume of planned re-interventions, indirectly indicating the type of patients they are managing (e.g. wounded, burn victims). Unplanned re-interventions can be a quality indicator, as they represent post-operative complications of the surgical procedure that can be linked to professional performance (inadequate experience or skills), lack of medical materials and supply, unavailability of a post-operative recovery room, or lack of nursing follow-up of the patient in the hospitalisation ward. Unfortunately, several unplanned re-interventions are not reported as such and therefore, in the analysis all the re-interventions will be merged<sup>33</sup>.

In 2017, 59% of the interventions were primary interventions and it remains at the same level to the previous year (59%), reflecting the important proportions of surgery related to trauma, as these morbidities require several re-interventions during the treatment period. In *Table № 14*, *Figure № 15* and *Figure № 16* it can be seen the detailed information of order of intervention within OCB activities.

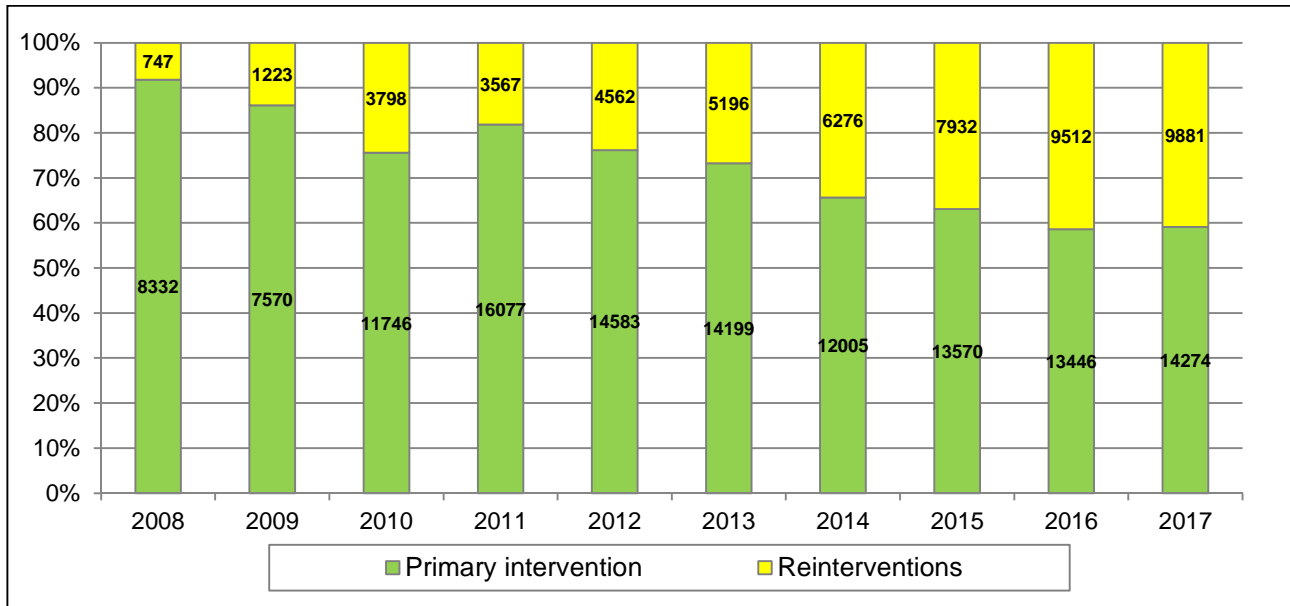
Table № 14: Order of intervention, quantity and percentage, 201è.

Order of intervention	2014		2015		2016		2017	
	Nº	%	Nº	%	Nº	%	Nº	%
Primary intervention	12005	65,7	13570	63,1	13446	58,6	14274	59,1
Re-intervention	6276	34,3	7932	36,9	9512	41,4	9881	40,9
Total	18281	100,0	21502	100,0	22958	100,0	24155	100,0

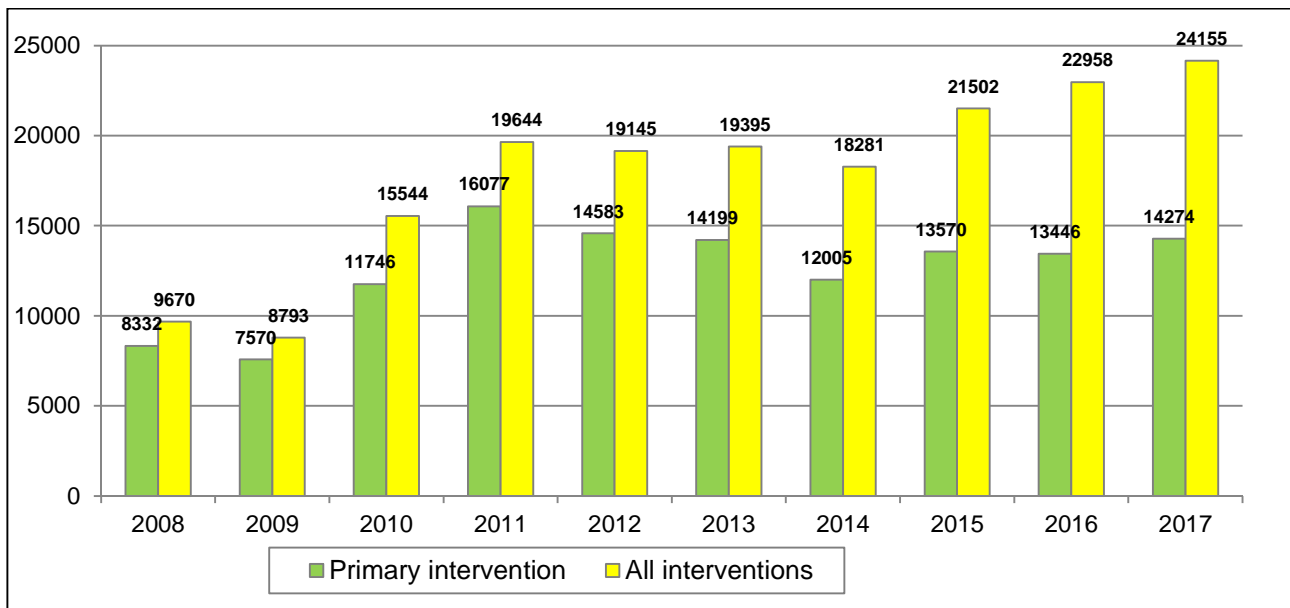
<sup>33</sup> Due to the high number of reporting persons and the differences between projects, even though the indicator is valuable, it is not possible to make any analysis because there might be present high level of biases in the reported data.



**Figure № 15: Order of intervention, percentage in relative weights, 2008 – 2017.**



**Figure № 16: Order of intervention, primary and all interventions, absolute numbers, 2008 – 2017.**



It is relevant to analyse the relationship between primary interventions and the total number of them. In the years 2008 and 2009, primary interventions accounted for around 85% of the interventions. A decrease of this proportion is seen already in 2010 (to around 75%) when OCB implemented several surgical projects in Haiti, in the aftermath of the earthquake where trauma care was the main activity. During 2011 it is recorded also an important growth in number of patients due to the opening of new projects. However, the proportion didn't return to the levels of 2008 – 2009 perhaps due to the intervention of MSF in Côte d'Ivoire, following the conflict situation that took place in the country.

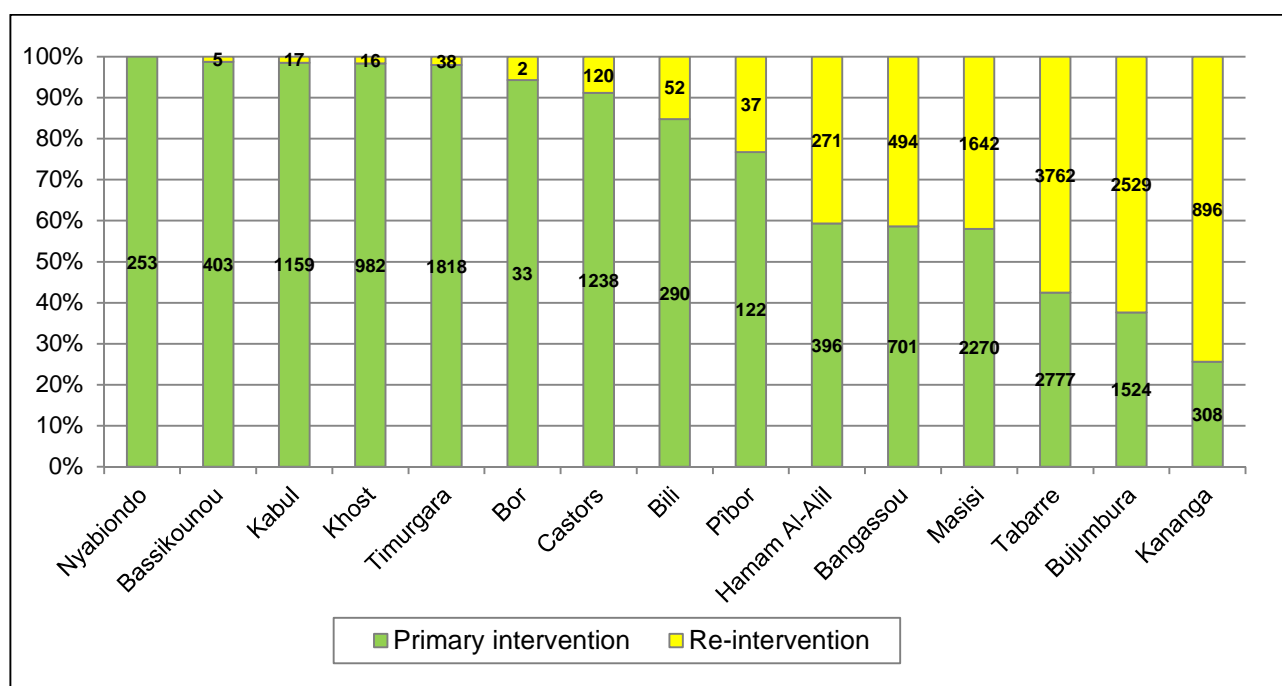
From 2012 it is seen that the number of primary interventions is not increasing (even there is a slight decrease) but the total number of interventions has been increasing, with a clear trend since 2014. Nowadays, the proportion of primary intervention is around 60%. This is linked to the investment OCB is doing in trauma care, where patients need several re-interventions during the treatment period.

For better understanding of the information, it is necessary to discriminate this data by project, what it is shown in *Table № 15* and in *Figure № 17*. However, it is not correct to attempt to directly compare projects between them because the level of primary interventions are linked to the type of activities each project performs, therefore, it is given only the information<sup>34</sup>. At the same time, it is possible to make some links between the order of intervention and the degree of urgency.

**Table № 15: Order of intervention, by project, 2017.**

Degree of urgency		Nyabiondo	Bassikounou	Kabul	Khost	Timurgara	Bor	Castors	Bili	Pibor	Hamam Al-Alil	Bangassou	Masisi	Tabarre	Bujumbura	Kananga	
Primary intervention	№	253	403	1159	982	1818	33	1238	290	122	396	701	2270	2777	1524	308	
	%	100,0	98,8	98,6	98,4	98,0	94,3	91,2	84,8	76,7	59,4	58,7	58,0	42,5	37,6	25,6	
Re-intervention	№	0	5	17	16	38	2	120	52	37	271	494	1642	3762	2529	896	
	%	0,0	1,2	1,4	1,6	2,0	5,7	8,8	15,2	23,3	40,6	41,3	42,0	57,5	62,4	74,4	
Total		№	253	408	1176	998	1856	35	1358	342	159	667	1195	3912	6539	4053	1204

**Figure № 17: Order of intervention, by project, percentage by relative weight, 2017.**



<sup>34</sup> High levels of planned re-interventions are directly linked to the surgical management of trauma morbidities. This characteristic should be taken into consideration because in projects with trauma cases, the quantity of patients (new cases) can be low, but the workload can be very high (e.g. Bujumbura).

## 2.9. SURGICAL WORKLOAD BY PROJECTS

The surgical workload differs from project to project because of various factors such as the number of staff and Operating rooms (OR)<sup>35</sup> inside the Operating department (OD)<sup>36</sup>, as well the type of surgical interventions, the technology available, and the skills of the providers.

Two indicators are used to measure the surgical workload<sup>37</sup>:

- Operating theatre occupancy: Describes the time (in minutes) a patient is inside the operating room. This includes the time to perform the anaesthesia as well as the surgical intervention. The ratio is the average of minutes per day per operating room.
- Caseload: The number of interventions performed in one project in one month per operating room. This is used to compare projects to each other as well as to compare a single project to itself over time.

These surgical workload indicators are useful for programme planning to assess the need to improve infrastructure and supply. At the same time, it should be seen as average numbers, because each project has specific trends (that are individually explained in each project report). For example, if there is a high caseload and occupancy rate in the operating room, then an additional one may be needed. If the caseload is high, then this could justify the request for more human resources. These data need to be examined with other surgical indicators such as the mortality and post-operative site infection rates. Each project must be assessed individually, there is no “magical” number for case load or occupancy rate as some projects perform a few long and complicated interventions while others do many shorter, simpler cases a day. It might be the case that surgical care is not available in the area where MSF project is located, and thus, surgical care is provided even if the caseload is not high. And it also should be consider the urgency of the performed interventions (e.g. Caesarean section vs. wound debridement)

In Table № 16 and in Figure № 18 it can be seen the detailed information by project. Some projects are not considered as they were closed / handed-over (Bili, Kananga, Hamam Al-Alil and Bor) or they had a low caseload (Nyabiondo and Pibor) that is justified following the operational strategy in place.

**Table № 16: Caseload and occupancy rate, by project, 2017.**

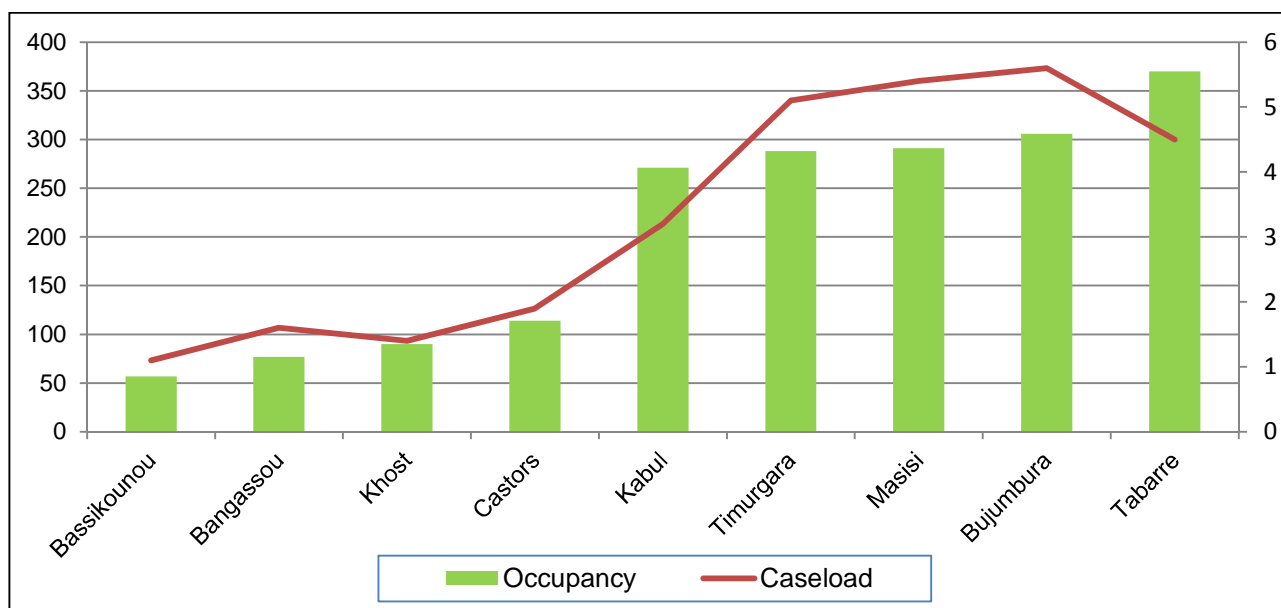
Surgical workload indicators		Bassikounou	Bangassou	Khost	Castors	Kabul	Timurgara	Masisi	Bujumbura	Tabarre
Cases per year		408	1195	998	1358	1176	1856	3912	4053	6539
Operating rooms		1	2	2	2	1	1	2	2	4
Caseload	cases / day / OR	1,1	1,6	1,4	1,9	3,2	5,1	5,4	5,6	4,5
Occupancy rate (min)	minutes / day /OR	57	77	90	114	271	288	291	306	370

<sup>35</sup> OR – Operating room (Operating Theatre): place where surgical activities / interventions are performed.

<sup>36</sup> OD – Operating department: building or complex of structures where are performed surgical interventions.

<sup>37</sup> It can be the case that the number of operating rooms increased or decreased during the year. In the report, it is considered the available operating rooms at the beginning of the year, thus, in January 2017. Only for Tabarre it is considered the reduction of available operating rooms to be coherent with the overall reduction of activities.

Figure № 18: Caseload and occupancy rate, by day and operating room, by project, monthly, 2017.



The specificities of these indicators are the following:

- Bassikounou, Bangassou, Khost and Castors. All these projects had an occupancy rate between 50 and 100 minutes per day and a caseload of <2 cases per day. These projects were characterized in performing mainly obstetric and visceral procedures (Bassikounou), wound care (Bangassou) and obstetrics (Khost and Castors). The procedures demanded short theatre time, around 50 – 60 minutes.
- Kabul. This project had a higher occupancy rate (around 250 minutes) but a caseload of around 3 cases per day, which is less than other projects with similar occupancy rates. This might be explained by the fact that almost half of the procedures were visceral, that in average are longer than a standard obstetric one (e.g. Caesarean section). In this project, the procedures demanded around 60 – 90 minutes.
- Timurgara, Masisi and Bujumbura. These projects had similar occupancy rates between 250 and 300 minutes per day and similar caseloads between 5 – 6 cases per day. Interestingly, they all have different profiles. Timurgara manage several complicated obstetric cases (e.g. several Caesarean sections needed an additional hysterectomy). Masisi not only managed complicated obstetric cases but also trauma (visceral surgeries demanded lengthy theatre times, while wound care short theatre times). And finally, Bujumbura, a project dealing with trauma, performed a big proportion of orthopaedic procedures that demanded lengthy theatre times, that were combined with wound care that demanded short theatre times. The procedures demanded around 50 – 60 minutes, similar to Bassikounou, Bangassou, Khost and Castors.
- Tabarre. This project managed mainly trauma cases and it was the only one where complex orthopaedic procedures were performed<sup>38</sup>. With an occupancy rate >350 minutes per day and a caseload of 4 – 5 patients, Tabarre project is different to the others. In average, the length of interventions was around 80 minutes, but it should be considered that orthopaedic procedures demanded lengthy theatre times, that were also combined with wound care, that demanded short theatre times.

<sup>38</sup> In Tabarre were performed internal fixation techniques. Internal fixation is the surgical implantation of mechanical devices inside the human body for the purpose of repairing a bone after fracture. In MSF, internal fixators include the application of metal plates with screws and intramedullary devices such as rods and nails, with or without interlocking bolts. For monitoring purposes, other implants (e.g. pins or Kirschner wires) are not considered.

## 2.10. INTRAOPERATIVE MORTALITY

Out of the 24,155 entries into the OD of the 15 projects providing direct surgical activities, 51 intra-operative deaths were reported. This represents an overall mortality rate of 0.2% which remains at the same level to the previous year (0.2%). Intra-operative deaths are defined as any death occurring between the induction of anaesthesia and the patient's discharge from the recovery room. While mortality rates are reported per project, data should not be compared across programmes since intra-operative mortality is associated with patient condition, emergency status, indication for surgery, etc., and is thus a factor of the project objectives as well as the quality of care. Data can however be compared within projects over time to assess changes in their performance.

In Table № 17 it is shown the quantity and percentages of intraoperative mortality for 2017, and the ones of previous years, for comparison within a specific project, and not between them.

**Table № 17: Intraoperative mortality, by project, 2013 – 2017.**

Intraoperative mortality		Kabul	Khost	Bujumbura	Bangassou	Castors	Bili	Kananga	Masisi	Nyabiondo	Tabarre	Hamam Al-Ailil	Bassikounou	Timurgara	Bor	Pibor
2013	№	1	0	---	---	---	---	---	5	---	10	---	1	1	---	---
	%	0,1	0,0	---	---	---	---	---	0,2	---	0,3	---	0,6	0,1	---	---
2014	№	2	1	---	4	3	---	---	5	---	17	---	0	3	---	---
	%	0,2	0,2	---	0,4	0,6	---	---	0,2	---	0,4	---	0,0	0,2	---	---
2015	№	2	4	5	1	1	1	---	2	---	21	---	0	6	---	---
	%	0,2	0,5	0,6	0,1	0,1	0,3	---	0,1	---	0,3	---	0,0	0,5	---	---
2016	№	1	1	4	3	4	1	---	1	---	24	---	0	7	0	0
	%	0,1	0,1	0,1	0,2	0,3	0,1	---	0,1	---	0,3	---	0,0	0,5	0,0	0,0
2017	№	1	4	9	5	3	0	1	6	0	10	7	0	5	0	0
	%	0,1	0,4	0,2	0,4	0,2	0,0	0,1	0,2	0,0	0,2	1,0	0,0	0,3	0,0	0,0

## 2.11. POSTOPERATIVE SITE INFECTION

As for what said for intraoperative mortality, this indicator also can be used to measure the quality of care in a surgical programme. The reported data should be interpreted with caution: data should not be compared across programmes because there are notable differences between them. All the presented data should be very carefully analysed. This indicator is very difficult to follow up and there might be a lot of biases while reporting it, even from year to year within the same project. That is why it is understandable that not all the projects reported this indicator.

A postoperative site infection is understood as an infection that occurs within 30 days after the operation if no implant is left in place; or within 1 year if implant is in place and the infection appears to be related to the operation. In our OCB settings, it's very difficult to know what occurred with a patient after discharge from the hospital, and that is why infection are mostly detected during the immediate postoperative period before discharge, or eventually, when a patient returns to the hospital with complaints. There is a big constraint in collecting this indicator, but anyway, it gives an insight of the surgical quality the surgical teams are giving in the field.

In Table № 18 can be seen the detailed information by project. It should be considered, as explained before, that this data should be analysed carefully as the reporting is different from project to project, and from year to year within a project. However, it is fair to include the reported data to support the projects that are trying to collect it (even if the results are not reflecting the project reality) and to motivate and encourage the others to try to collect it. There are not included the projects of Kananga and Hamam Al-Alil as they were short interventions and where the follow up of this indicator was difficult due to context constraints.

**Table № 18: Postoperative site infection, by project, 2013 – 2017.**

Postoperative site infection		Kabul	Khost	Bujumbura	Bangassou	Castors	Bili	Masisi	Nyabiondo	Tabarre	Bassikounou	Timurgara	Bor	Pibor
<b>2013</b>	%	1,4	0,4					0,4		2,8	ND	ND		
<b>2014</b>	%	1,7	ND		ND	ND		0,8		2,9	ND	ND		
<b>2015</b>	%	0,9	0,7	ND	ND	ND	ND	1,4		4,2	ND	0,5		
<b>2016</b>	%	0,8	1,5	1,6	2,0	1,7	ND	0,2		3,5	0,0	ND	ND	ND
<b>2017</b>	%	0,4	0,7	2,2	ND	1,0	ND	1,5	ND	4,4	ND	0,6	ND	ND

It should be acknowledged that due to several biases in data collection and case definitions, an increase of postoperative site infections in a project might not mean necessarily that the performance of the project was worst than the previous year, but it might be a sign that the monitoring of this indicator was done better.

Since some years ago, the data collection allows recording the post-operative infection risk. In OCB is used the NNIS risk index<sup>39</sup> (0 to 3). It is obtained by combining the three principal factors of infection risk for the surgical site:

- The contamination class of the intervention (the so-called Altemeier classification).
- The ASA score of the American Society of Anaesthesiologists.
- The length of the intervention.

By reporting the NNIS risk index it is possible to segregate the infections that occurred in a project by their risk severity and have a better understanding of them.

During 2017 Bujumbura and Tabarre projects followed properly the NNIS allowing to have proper denominators:

- Bujumbura. The overall ratio was of 2,2%. Infections with low risk had a ratio of 0,1%, with moderate risk had a ratio of 9,2%, and the ones with significant risk had a ratio of 17,6%.
- Tabarre. The overall ratio was of 4,4%. Infections with low risk had a ratio of 1,6%, with moderate risk had a ratio of 8,8%, with significant risk had a ratio of 11,9%, and the ones with very significant risk had a ratio of 12,0%.

<sup>39</sup> The National Nosocomial Infections Surveillance (NNIS) is an American programme for monitoring postoperative infections at a surgical site and constitutes a method of self-evaluation. It is accepted that low risk (0) might have a ratio up to 1% of infection, moderate risk (1) up to 3%, significant risk (2) up to 7%, and very significant risk (3) up to 15%.

## 2.12. PATIENT DEMOGRAPHICS

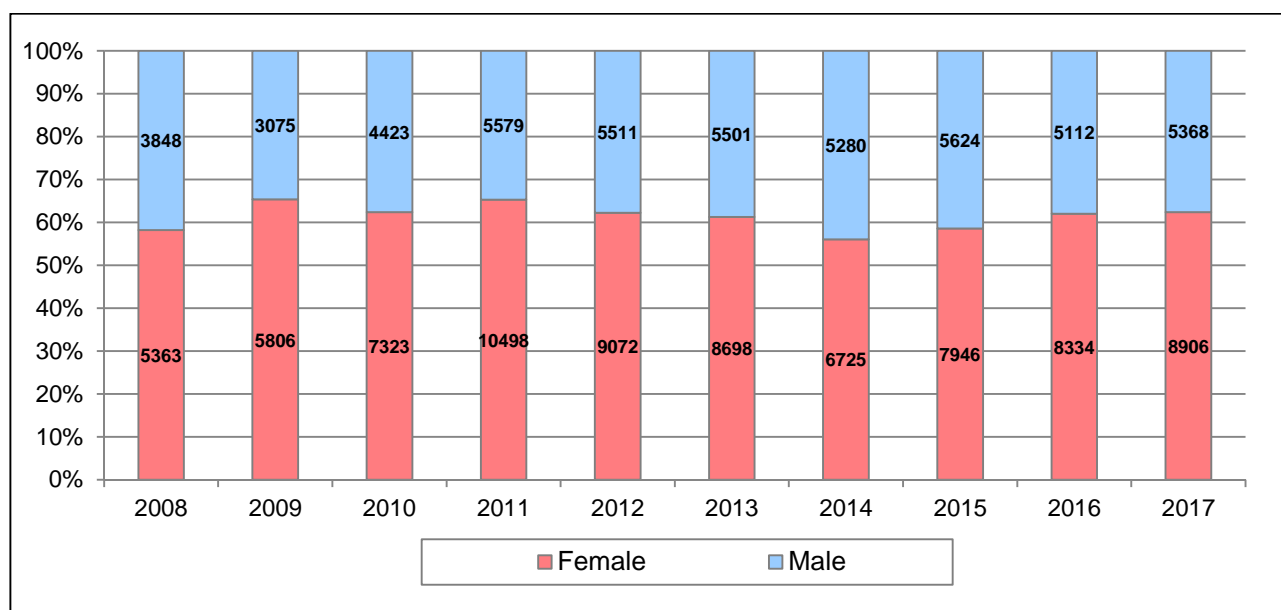
Knowing the gender and age of our patient population is useful in programme planning. These variables give us an overview of the kind of patients that our health services are taking care. However, it is not correct to compare this variable between projects because each of them has a different specificity, a different target population and are in different contexts. At the same time, to present aggregated data for our report is not statistically correct. However, these data give us the type of patients OCB projects are treating.

In *Table № 19* and *Figure № 19* it is shown the gender distribution of patients treated. From the reported data it is possible to state that mainly, as for the precedent years, the beneficiary of surgical activities were women, 62%, being the same as the previous year.

**Table № 19: Gender distribution of patients, quantity and percentage, 2017.**

Gender	2014		2015		2016		2017	
	№	%	№	%	№	%	№	%
Female	6725	56,0	7946	58,6	8334	62,0	8906	62,4
Male	5280	44,0	5624	41,4	5112	38,0	5368	37,6
Total	12005	100,0	13570	100,0	13446	100,0	14274	100,0

**Figure № 19: Gender distribution of patients, percentage in relative weights, 2008 – 2017.**



In *Figure № 20* it is given the distribution by age. For 2017 the main age of the patients was of 27 (2016, n=28). Specifically for women it was of 28 (2016, n=28), and for men 26 (2016, n=28). As for previous years, it is also possible to state that mainly the patients that underwent surgical interventions were young. And in order to understand better each project, in *Table № 21* it is shown the main age by project and in *Figure № 21* the gender distribution by project in relative weight.

Figure № 20: Age distribution of patients, by gender, 2017.

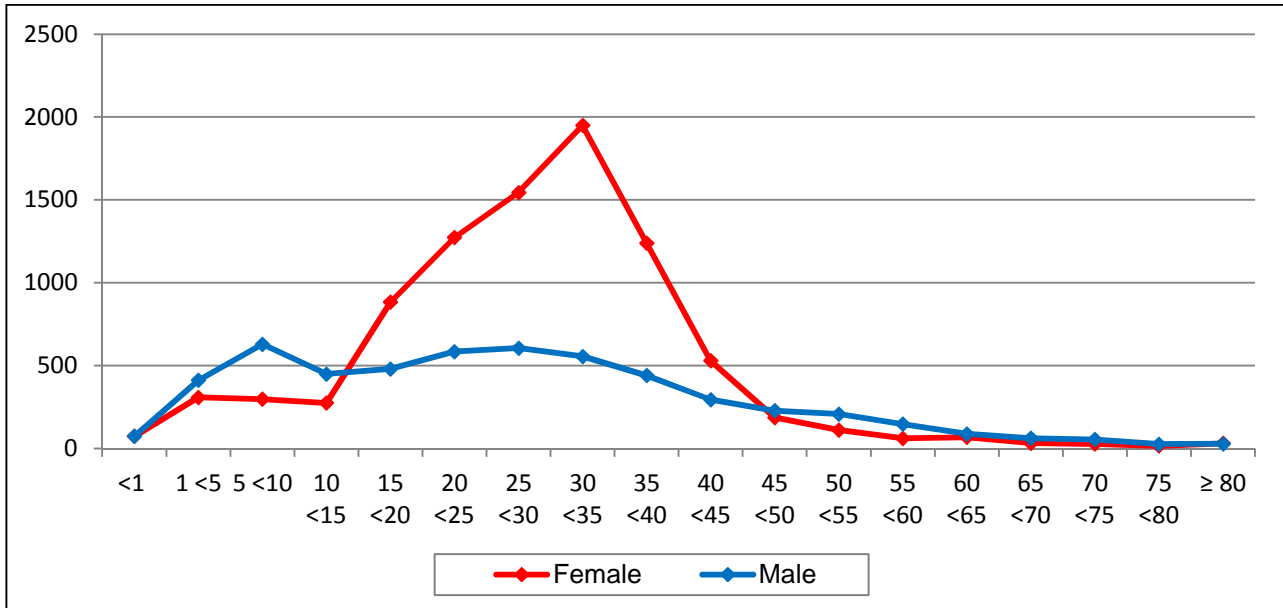
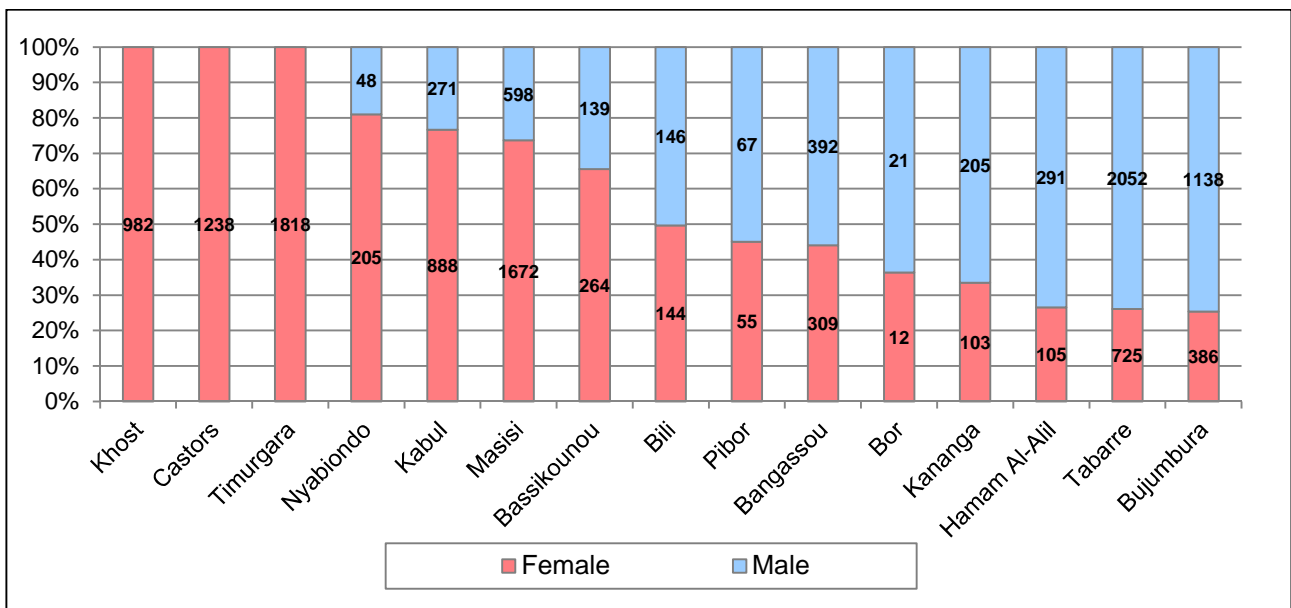


Table № 20: Main age of patients, in years, by project 2017.

	Khost	Castors	Timurgara	Nyabiondo	Kabul	Masisi	Bassikounou	Bili	Pibor	Bangassou	Bor	Kananga	Hamam Al-Ailil	Tabarre	Bujumbura
Female	32	25	32	22	21	25	26	28	19	26	34	26	24	29	23
Male	NA	NA	NA	24	27	26	25	37	20	29	37	29	25	28	23
Project	32	25	32	23	25	26	25	33	20	28	36	28	25	28	23

Figure № 21: Gender distribution, by percentage, by project 2017.





### 2.13. ASA SCORE – PATIENT PHYSICAL STATUS

This ASA score<sup>40</sup> subjectively categorises patients into subgroups by pre-operative physical fitness. It makes no adjustment for age, sex, weight, or for pregnancy, nor does it reflect the nature of the planned surgery, the skill of the anaesthetist or surgeon, the degree of pre-operative preparation or facilities for post-operative care. The reporting of the ASA score is a proxy for the preoperative anaesthesia visit (no ASA can be assigned if no pre-Op visit was done). The ASA score is also a good predictor of perioperative morbidity and mortality. If it is  $\geq 3$ , it is considered as a risk factor for anaesthesia and for the development of postoperative surgical site infections.

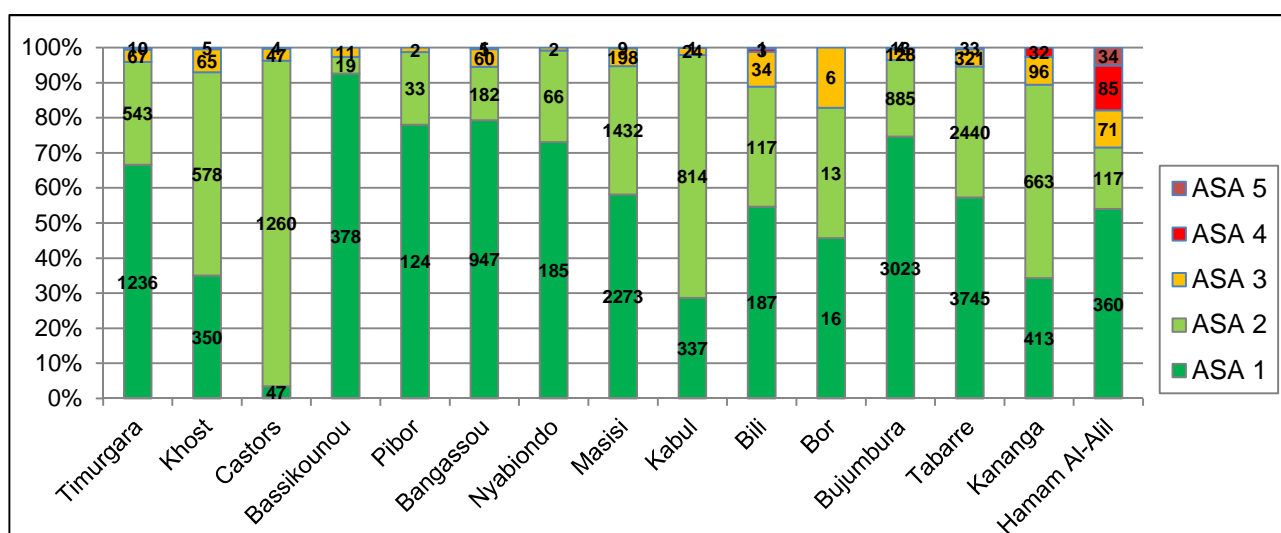
Overall, from the 24155 entrances to the operating room, around 94% (2016, %=96%) of the patients arrived with an ASA score of 1 or 2. That means that only around 6% of patients had a severe systemic disease, or a severe incapacitating disease threatening his/her life. The proportions were similar to the previous year. In *Table № 21* it is shown their percentages.

**Table № 21: Patients' ASA score, 2016 – 2017.**

ASA		1	2	3	4	5	Total
2016	№	14456	7521	878	90	13	22958
	%	63,0	32,7	3,8	0,4	0,1	100,0
2017	№	13621	9162	1132	200	40	24155
	%	56,4	37,9	4,7	0,8	0,2	100,0

As each project has different characteristics, this is not a variable that can be compared between them. Also, it should be considered certain bias in this type of reporting since the anaesthesia provider can have different opinion in this score (e.g. high proportion of ASA 2 in Castors, while other maternities don't have the same trend). In *Figure № 22* it can be seen the relative weight of the ASA scoring by project.

**Figure № 22: ASA score in percentage, by project, 2017.**



<sup>40</sup> The ASA (American Society of Anaesthesiologists) scoring system is as follows:

- ASA 1 – Patient in apparent good health notwithstanding his surgical problem.
- ASA 2 – Patient with mild systemic disease: e.g. mild hypertension, mild to moderate anaemia, etc.
- ASA 3 – Patient with systemic disease severe enough to limit activity but not incapacitating.
- ASA 4 – Patient with severe incapacitating disease that is a constant threat to life.
- ASA 5 – Moribund patient not expected to survive 24 hours with or without surgery.

## 2.14. NEONATAL DEATHS

All death newborns at the end of the Caesarean section were recorded as neonatal deaths regardless if they died during the procedure or before (it is not possible to always have the capacity to differentiate them with our limited foetal monitoring). In *Table № 22* it can be seen the ratio of death newborns. There are excluded from the analysis the projects performing mainly trauma care: Bujumbura, Kananga, Tabarre, and Hamam Al-Alil.

Here are only given the proportions without any analysis as there are several factors, context dependent, which can directly influence in: qualification of the staff, accessibility to the health facility, iatrogenic misuse of uterine stimulants, the project acts as a referral centre, etc. Also, it remains always the bias of good reporting when recording the activities in the logbooks.

**Table № 22: Newborn outcome, by project, 2113 – 2017.**

Neonatal deaths		Kabul	Khost	Bangassou <sup>41</sup>	Castors	Bili	Masisi	Nyabiondo	Bassikounou	Timurgara	Bor <sup>42</sup>	Pibor
<b>2013</b>	%	5,2	16,9				4,7	2,7	16,2	16,8		
<b>2014</b>	%	6,0	12,9	9,8	10,2		4,3	3,2	12,1	17,3		
<b>2015</b>	%	4,1	16,9	16,9	10,0	23,1	4,2	4,1	4,8	17,7		
<b>2016</b>	%	5,7	12,9	6,8	6,9	31,4	4,9	4,7	7,2	16,6	0,0	0,0
<b>2017</b>	Caesarean sections	508	525	103	933	44	1050	122	123	1596	3	11
	Newborns	511	540	77	957	45	1058	122	123	1683	3	11
	Death newborns	31	71	12	65	7	55	11	16	220	2	3
	%	6,1	13,1	15,6	6,8	15,6	5,2	9,0	13,0	13,1	66,7	27,3

## 3. IN-PATIENT ACTIVITIES

Surgical inpatient wards were available in OCB projects where surgical care was offered. During 2017, 9543 patients were admitted. In this count and in the further analysis there are not considered the following projects:

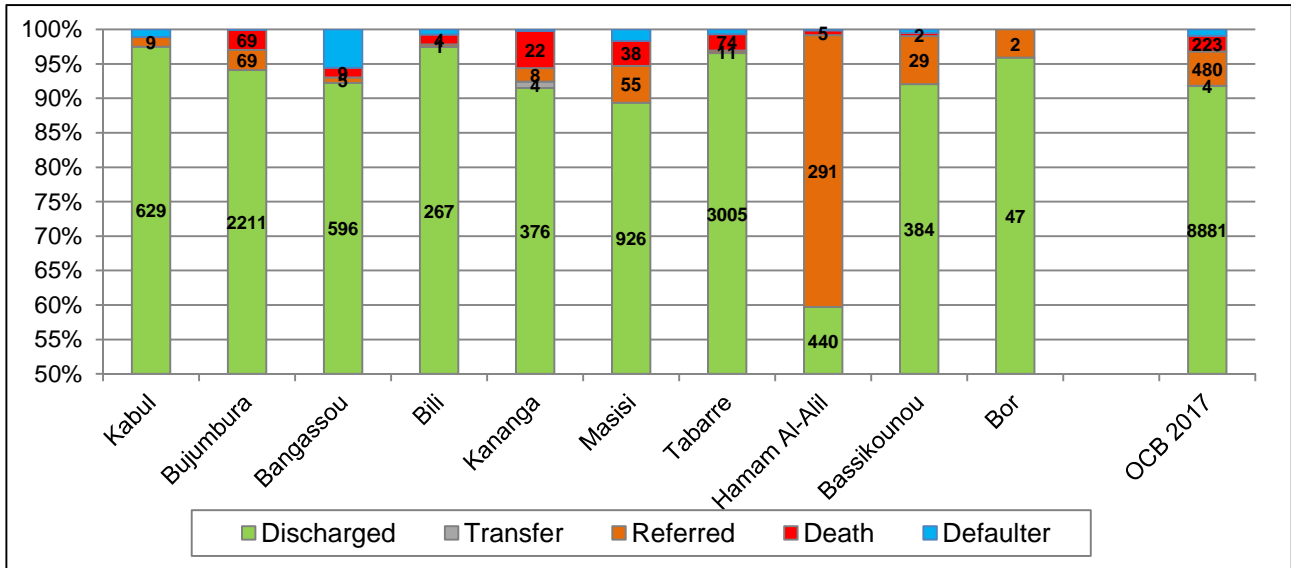
- Maternities: Khost, Castors and Timurgara. The information regarding inpatients can be found in the SRH reports.
- Health Centres: Nyabiondo and Pibor. In these cases, the patients were hospitalized in common inpatient wards and it is difficult to segregate the surgical patients.

<sup>41</sup> Bangassou. There were not recorded the newborn outcomes for all the performed Caesarean sections. From 130 interventions, there were only notified 77 outcomes.

<sup>42</sup> Bor. Considering the low amount of cases, this is an indicator that is not statistical valid.

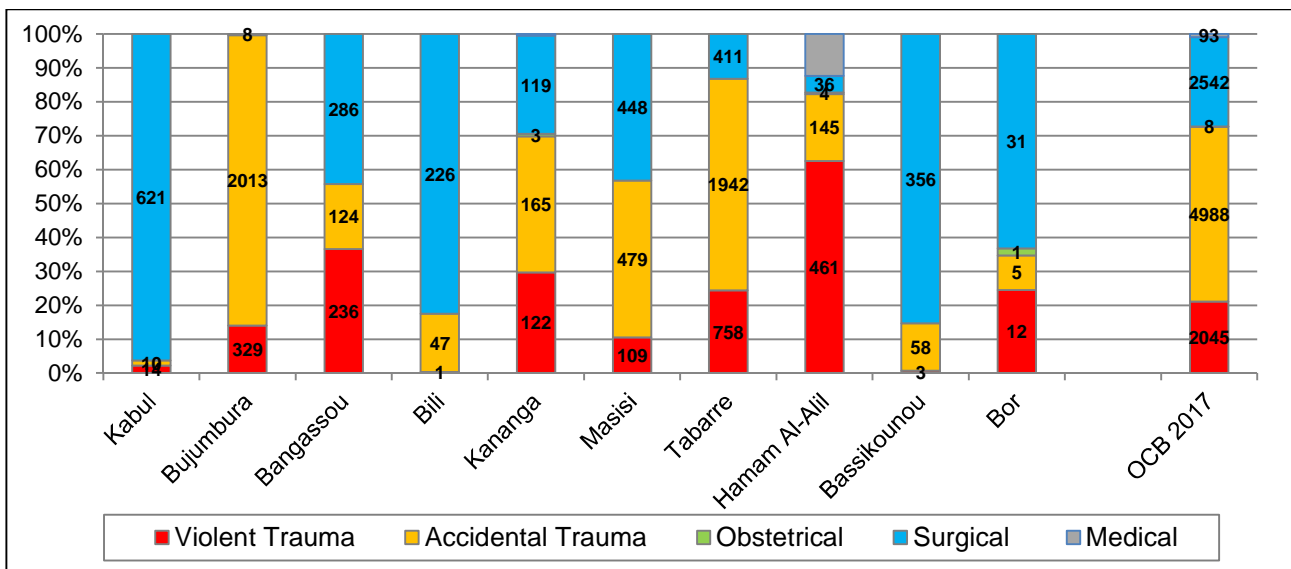
After treatment, 9676 exited OCB surgical wards. From them, 8881 (91,7%) were discharged, 4 (0,1%) were transferred to other wards in the same health structure, 480 (5,0%) were referred to other health structures, 223 (2,3%) died, and 88 (0,9%) abandoned the hospital against medical advise. This is an average, and their proportions by projects are shown in *Figure № 23*.

**Figure № 23: IPD exits, by project, 2017.**



Regarding the causes of hospitalisation / interventions <sup>43</sup> at exit, from the 9676 patients that exited OCB surgical wards, 2045 (21,1%) were of violent trauma, 4988 (51,5%) from accidental trauma, 8 (0,1%) obstetrics, 2542 (26,3%) from other surgical pathology, and 93 (1,0%) from medical causes. Also, this is an average, and their proportions by project are shown in *Figure № 24*.

**Figure № 24: Causes of hospitalisation / intervention, at exit, by project, 2017.**



<sup>43</sup> In MSF surgical care data collection there are recorded the causes for hospitalisation / intervention, rather than the diagnoses. This goes in line with MSF overall data collection purposes. It is more valuable if the patient was hospitalised due to a road traffic accident or due to a bomb blast, rather than to know which type of fracture and its location was. Data collection also allows collecting diagnoses, but it is done in projects where the Emergency department has electronic databases.

In *Table № 23* are given all the indicators related to OCB surgical wards. There are not included the maternities (Khost, Castors and Timurgara), nor the health centres (Nyabiondo and Pibor).

**Table № 23: In-patient activities, by project, 2017.**

	Kabul	Bujumbura	Bangassou	Bili	Kananga	Masisi	Tabarre	Hamam Al-Alil	Bassikou ou	Bor	Bor	OCB 2017
Admissions (total):	652	2341	644	293	430	1067	2817	827	417	55	55	9543
Exits (total):	645	2350	646	274	411	1036	3111	737 <sup>44</sup>	417	49	49	9676
→ Discharged	629	2211	596	267	376	926	3005	440	384	47	47	8881
	97,5%	94,1%	92,2%	97,4%	91,5%	89,4%	96,6%	59,7%	92,1%	95,9%	95,9%	91,7%
→ Transfer	0	0	0	0	4	0	0	0	0	0	0	4
	0,0%	0,0%	0,0%	0,0%	1,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,1%
→ Referred	9	69	5	1	8	55	11	291	29	2	2	480
	1,4%	2,9	0,8%	0,4%	2,0%	5,3%	0,3%	39,5%	6,9%	4,1%	4,1%	5,0%
→ Death	0	69	9	4	22	38	74	5	2	0	0	223
	0,0%	2,9%	1,4%	1,5%	5,3%	3,7%	2,4%	0,7%	0,5%	0,0%	0,0%	2,3%
→ Defaulter	7	1	36	2	1	17	21	1	2	0	0	88
	1,1%	0,1%	5,6%	0,7%	0,2%	1,6%	0,7%	0,1%	0,5%	0,0%	0,0%	0,9%
Causes at exit:	645	2350	646	274	411	1036	3111 <sup>45</sup>	737 <sup>46</sup>	417	49	49	9676
→ Violent trauma	14	329	236	1	122	109	758	461	3	12	12	2045
	2,2%	14,0%	36,5%	0,4%	29,7%	10,5%	24,4%	62,5%	0,7%	24,5%	24,5%	21,1%
→ Accidental trauma	10	2013	124	47	165	479	1942	145	58	5	5	4988
	1,6%	85,7%	19,2%	17,2%	40,1%	46,2%	62,4%	19,7%	13,9%	10,2%	10,2%	51,5%
→ Obstetrics	0	0	0	0	3	0	0	4	0	1	1	8
	0,0%	0,0%	0,0%	0,0%	0,7%	0,0%	0,0%	0,6%	0,0%	2,0	2,0	0,1%
→ Other surgical pathology	621	8	286	226	119	448	411	36	356	31	31	2542
	96,2%	0,3%	44,3%	82,4%	29,0	43,3%	13,2%	4,9%	85,4%	63,3%	63,3%	26,3%
→ Medical	0	0	0	0	2	0	0	91	0	0	0	93
	0,0%	0,0%	0,0%	0,0%	0,5	0,0%	0,0%	12,3%	0,0%	0,0%	0,0%	1,0%
Bed capacity	9	75 <sup>47</sup>	20 <sup>48</sup>	9 <sup>49</sup>	70 <sup>50</sup>	44	130 <sup>51</sup>	46 <sup>52</sup>	8	28	28	---
Length of stay	3	11	10	5	20	11	12	2	3	10	10	---
Bed occupancy	61%	85%	87%	111%	69%	147% <sup>53</sup>	104%	NA	48%	26%	26%	---

<sup>44</sup> Hamam Al-Alil exits. Data was seriously collected in the project, but unfortunately, around 10% of the records do not have encoded the exit criteria, and therefore, here we can talk only of approximate ratios for 737 patients.

<sup>45</sup> Tabarre discrepancy between admissions and exits can be explained by the sharp decrease of the number of beds.

<sup>46</sup> Hamam Al-Alil causes of hospitalisation / intervention at exit are not clearly recorded. Here it is done an approximatively count following the diagnoses that were written in the IPD database.

<sup>47</sup> Bujumbura overall bed capacity was reduced from 75 to 68 from the month of October.

<sup>48</sup> Bangassou bed capacity only accounts for adult patients. If needed, paediatric patients (<5 years-old) were hosted in the paediatric ward, and this may distort the indicators for surgical IPD. Due to the big amount of patients with trauma that needed long hospitalisation days, there were conditioned at one moment 2 tents with a capacity of 12 patients each.

<sup>49</sup> Bili bed capacity of the overall IPD was of 14 beds from which 9 beds were assigned to surgical care, but this could change according to the demand. Also it was possible to enlarge the bed capacity inside three large tents.

<sup>50</sup> Kananga bed capacity at the beginning, in May 10<sup>th</sup> was of 25 beds. Afterwards, from June 5<sup>th</sup>, they were increased to 49, and on July 17<sup>th</sup> to 56. Finally, on July 24<sup>th</sup> the available beds were 70.

<sup>51</sup> Tabarre bed capacity, at the beginning of the year was of 130, and from November it was reduced to 56.

<sup>52</sup> Hamam Al-Alil bed capacity is difficult to determine because at the beginning there were only few for early referral. As the project stabilized and the context allowed, more beds were allocated arriving to a maximum of 46. However, not all these beds were used for surgical cases, as several medical and malnutrition cases were admitted.

<sup>53</sup> Masisi bed occupancy rate was very high because for reporting there were considered only 32 beds.

While reviewing the aggregated data of the projects reporting surgical IPD activities, it was noticed a very wide range of entries: from causes of intervention / hospitalisation (what is called surgical surveillance), to specific diagnoses, and in some cases, conditions that can be referable to different types of causes or diagnoses.

Due to the complexity of surgical conditions and morbidities, several years ago in MSF it was decided to report the causes for hospitalisation / intervention (surgical surveillance). This also reflects the operational needs of the organisation: e.g. it is better to know that a patient was intervened following a bomb blast or a road traffic accident, rather than that the patient had a broken leg. However, the data collection tools also allow writing the specific diagnosis.

We strongly recommend all the projects with surgical IPD to follow the agreed standard, following the surgical surveillance list that is the same one used in the emergency and operating departments. By standardising the data across all the hospital services makes it comparable with data from other projects and it can be used to show trends over time. In *Table № 24* are given the standard (summarized) standardized entries (including MINOS):

**Table № 24:**

Cause for hospitalisation / intervention	Case definition
Trauma, violent	Physical injury to one or more body parts caused by the intentional action of another person produced by the transfer of external energy (kinetic, thermal, chemical, electrical, or radiant).
Trauma, accidental	Physical injury to one or more body parts produced by the transfer of external energy (kinetic, thermal, chemical, electrical, or radiant) that is not caused by the intentional action of another person.
Surgical obstetrical - foetal-maternal	Indication due to children or mother (e.g. foetal distress, placenta praevia, placental abruption, extra-uterine gravidity, former Caesarean section, uterine rupture, etc.).
Surgical obstetrical - post-partum complications	Postpartum haemorrhage and other complications becoming manifest postpartum and are of infectious or tumour origin (e.g. endometritis, vesico-vaginal fistula, uterine perforation, etc.). Includes also cervical / vaginal tears.
Non-trauma surgical pathologies - infection, inflammation, suppuration	-
Non-trauma surgical pathologies – tumours	Tumours of benign cause (includes cysts), malignant cause, and unknown cause.
Non-trauma surgical pathologies – haemorrhage	Internal or external bleeding not due to traumatology or obstetrical (e.g. gastric bleeding, aneurism rupture, etc.).
Non-trauma surgical pathologies – various, others	Any non-trauma surgical pathologies not present elsewhere on the surveillance list (e.g. obstruction, bladder & kidney stones, hernia, unknown diagnosis, traditional circumcision, ligature of Fallopiian tubes, etc.). Including tropical disease (e.g. Typhoid fever, Echinococcosis cyst, Schistosomiasis, Guinea worm, Ulcus Buruli, etc.), vascular (e.g. ischemia, gangrene, thrombosis of vascular origin, vasculopathies, etc.), iatrogenic (e.g. includes traditional and clandestine medicine, etc.), and congenital (e.g. imperforate anus, cleft palate, congenital hernia, etc.).
Other	Patient has a condition not under epidemiologic surveillance - i.e. one not present elsewhere on the surveillance list.

In the case the project is responding to a natural disaster, an additional entry should be instituted: trauma, accidental – natural disaster (**TND**)

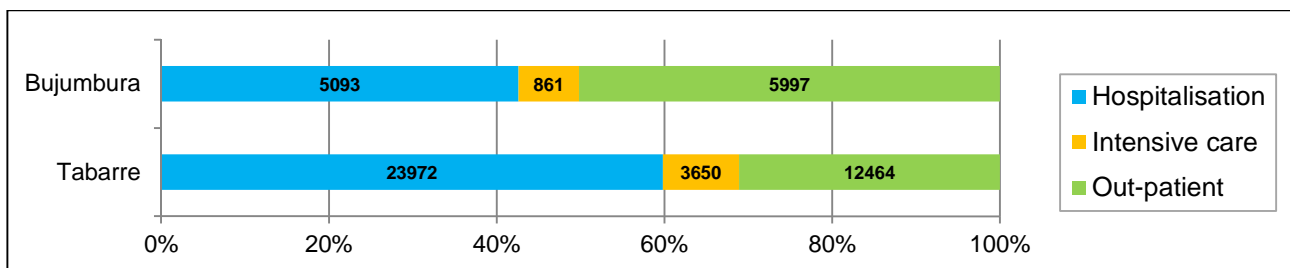
#### 4. PHYSICAL THERAPY

In low- and middle-income countries, “the integration of physiotherapists within any trauma medical team is a necessity. Raising the awareness of medical teams on the importance of physiotherapy and the criteria for prescribing physiotherapy is essential to ensure a good quality of care, allowing patients’ optimal functional recovery. Due to different barriers experienced by patients to access the OPD, physiotherapists should adjust their treatment goals accordingly, emphasizing education of patients and caregivers on basic rehabilitation. Moreover, a link with community based rehabilitation services is essential and, if appropriate, building up of their capacities to provide specialised physiotherapy to trauma patients is strongly recommended”.<sup>54</sup> OCB projects more and more are implementing physiotherapy as a standard activity when care for trauma related morbidities is offered. Physiotherapy is provided to in-patient (hospitalisation and intensive care units) and outpatient (ambulatory) patients. This activity is implemented and supported in most of the cases by Handicap International (HI).

While physiotherapy activities were performed in different projects, the two OCB projects offering surgical trauma care (Bujumbura and Tabarre) reported their activities following the standard OCB-HI data collection tools. In Bujumbura there were performed 11951 consultations and in Tabarre, 40086. The distribution of them and their proportions are shown in *Figure № 25* and in *Table № 25* it is given detailed information per project.

There are clear differences between both projects and it can be explained partially. The project in Bujumbura worked closely with a HI structure in the city that was receiving patients for further inpatient treatment, and the project in Tabarre had the referral possibility for ambulatory follow-up to other health structures with physical therapy capacities.

**Figure № 25: Physical therapy consultations, proportions, by service, by project, 2017;**



In order to have an idea of the coverage of physiotherapy activities, it is important to analyse the quantity of new patients in each specific location among the total number of new cases for each location. And by knowing the proportion of new cases among all the performed consultations, it is possible to get the average of performed consultations per patient per location. Thus:

- For hospitalized patients:
  - In Tabarre it was offered to 97% of the admitted patients, with an average of 8–9 consultations per patient.
  - In Bujumbura it was offered to 99% of the admitted patients, with an average of 2 consultations per patient.
- For patients in Intensive Care Unit:
  - In Tabarre it was offered to 99% of the patients with an average of 6 consultations per patient.
  - In Bujumbura it was offered to 42% of the patients, with an average of 5 consultations per patient.

<sup>54</sup> Gohy B et al. Early physical and functional rehabilitation of trauma patients in the MSF trauma centre in Kunduz, Afghanistan: luxury or necessity?; *International Health* 2016; 8: 381–389



- For patients in out-patient follow-up:
  - In Tabarre it was offered to 22% of patients with an average of 11 – 12 consultations per patient.
  - In Bujumbura it was offered to 24% of patients with an average of 5 consultations per patient.

**Table № 25: Physical therapy activities, by projects, 2017**

	Bujumbura		Tabarre	
	№	%	№	%
Consultations	11951	100,0%	40086	100,0%
→ Hospitalisation	5093	42,6%	23972	59,8%
→ Intensive Care	861	7,2%	3650	9,1%
→ Out-patient	5997	50,2%	12464	31,1%
New cases				
→ Hospitalisation	2325	45,7% *	2750	11,5% *
→ Intensive Care	180	20,9% *	578	15,8% *
→ Out-patient	1193	19,9% *	1088	8,7% *

(\*). The given percentages are the proportion of the new cases among the total number of consultations per service.

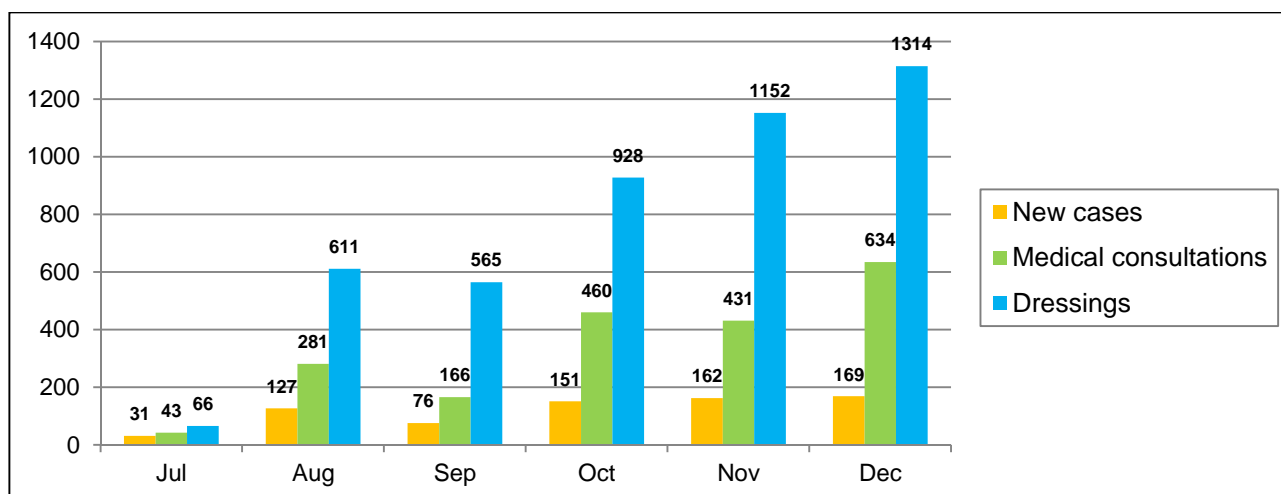
Functional (in) dependence was assessed through a scoring system where 20 items are included, and are divided into upper and lower limb function. Every item is rated 1-5, giving a score of 5-50 per limb, and 10-100 for the patient. The evolution of pain was also assessed through the Face Rating Scale (FRS), where 0 is no pain, and 5 is unbearable pain. However, the data collection tools don't allow to directly evaluating the evolution of both indicators and it should be done manually. During the year, in collaboration with HI, efforts will be done to find a way of routinely evaluating both indicators helping the projects to assess the quality of the offered physiotherapy care. The results that will be obtained for both projects will be added to their specific annual report.

## 5. OTHER SURGICAL CARE RELATED ACTIVITIES

### 5.1. AFGHANISTAN – Kunduz Clinic

The OCB wound care clinic in Kunduz city opened its doors on July 22<sup>nd</sup>, 2017 and its activities are ongoing. After triage is performed for new cases, the clinic treats all stable patients with surgical, traumatic, burn and pathologic wounds (acute or chronic) that could be managed in an outpatient way (day care clinic). For wound management the project is following the new 2017 OCB Wound Care Protocol. Only local and ring block anaesthetics are allowed in the clinic, as it is not possible to perform any type of general anaesthesia, including Ketamine. In the case a patient needs a more complex procedure under general anaesthesia; he is referred to the Kunduz Regional Hospital (KRH) under MSF follow-up and dressings.

During 2017, 1248 patients presented to Kunduz Clinic. The majority of patients were male and >15 years old. From them, 959 (76,9%) were green cases, 256 (20,5%) yellow, 30 (2,4%) orange, and 3 (0,2%) red cases. There were admitted for treatment 716 patients (new cases), and there were performed 2015 medical consultations and 4636 dressings. These are yearly averages. However, as the project is dealing with patients in need of follow-up, there is a cumulative effect through the following months, a project characteristic that should be considered when planning activities. This is shown in *Figure № 26*.

**Figure № 26: Kunduz Clinic, new cases, medical consultations and dressings, monthly, 2017**

Linked to the project context, outpatient surgical care for wounds was offered exclusively by local staff.

Triage (SATS) is done for all patients arriving to the Clinic. In case of a Multiple / Mass Casualty Incident a specific triage (START) is done. In both cases, the same criteria for care are followed.

- Green cases are accepted for treatment.
- Yellow / Orange cases are advised to go the KRH.
- Red cases are referred to the KRH by a MSF ambulance.

## 5.2. IRAQ – Al-Hamdaniya

Due to the conflict situation around Mosul and the needs in long-term hospitalisation / rehabilitation for trauma cases, OCB decided to offer post-operative care in Al-Hamdaniya hospital (around 32 km southeast of Mosul and around 60 km west of Erbil). The operational strategy was to provide a holistic care (including physical therapy and psychosocial support) to patients that were injured in Mosul. In March 2017 it was open a 43 bed health structure as a hospital ward, where surgical procedures were performed in other health structures. This hospital was closed on September 14<sup>th</sup>, 2017. OCB has plans to continue offering post-trauma care to patients in the area in another location<sup>55</sup>.

Surgical care was provided by local medical and paramedical teams with the constant support of expatriate specialists.

During the time the project was open, there were admitted 416 patients. From them, 251 (60,3%) were new admissions, and 165 (39,7%) re-admissions. 85 (33,9%) new admitted patients were female and 166 (66,1%) male. The patients' age average was of 29 years (female was of 30 and male was of 28 years)/

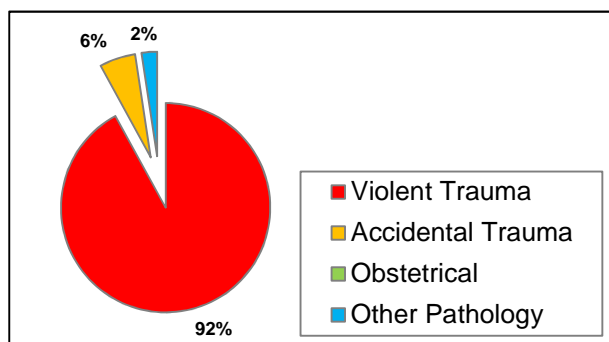
From the 251 new admissions, 231 (92,0%) were from violent trauma, 14 (5,6%) from accidental trauma, and 6 (2,4%) non-trauma surgical pathologies, that is shown in *Figure № 27*. From these 251 patient, only 12 (4,8%) were self-referred and all the others arrived through the instituted referral system. 241 (96,0%) patients were injured in Mosul West, 8 (3,2%) in Mosul East, and 2 (0,8%) in other locations.

<sup>55</sup> Presently, OCB is currently implementing surgical care activities in Al-Sheefa, in an area adjacent to the MoH hospital.

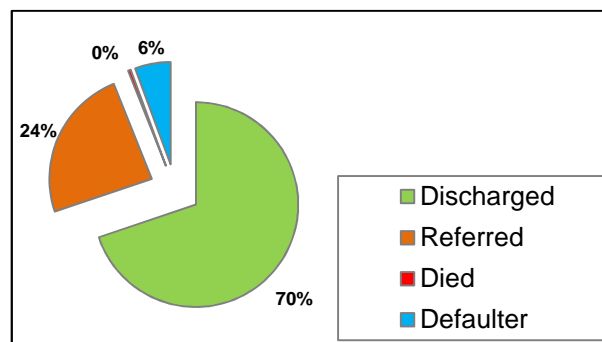


Finally, 232 patients exited the hospital. From them, 162 (69,9%) were discharged, 56 (24,1%) were referred to other health structures, 1 (0,4%) died, and 13 (5,6%) abandoned the hospital against medical advise, that is shown in *Figure № 28*. The only case of death in the hospital was related to a severe brain injury. To note that at the end of the project there still were hospitalized 19 patients that were referred to other health structures.

**Figure № 27: Al-Hamdaniya, causes, 2017**



**Figure № 28: Al-Hamdaniya, outcomes, 2017**



### 5.3. SYRIA

During 2017 MSF has continued supporting medical and surgical teams inside Syria. In this period, OCB made a better focus on quality of care and monitoring of the provided support. In north Homs, besieged since long time, OCB supported 8 field hospitals, 3 primary health centres and the only Intensive Care Unit of the area. A warehouse fully stocked was available in case of worsening of the besiege situation. In north Hama and Idleb, where access of goods was allowed, OCB supplied 9 field hospitals and 4 primary health centres through international orders. As all these health facilities are not MSF and the support was partially, OCB fully support several mobile clinics that covered 5 IDP camps in the border with Turkey.

All the supported health facilities reported 194,965 presentations to emergency services, 74686 hospitalized patients (all services), 5607 Caesarean sections, 20919 major surgeries, and 92143 minor / wound surgery

OCB also continued the partnership with Qunaya Hospital that was fully supported. Here, MSF national staff, backed up by expat team in remote control, worked side by side with Syrian colleagues to upgrade the hospital to MSF standards. During 2017, the structure was fully rehabilitated and a new maternity and outpatient department were added to the offered services. In the hospital there were hospitalised 7402 patients (all services), and there were performed 193 Caesarean sections and 2923 major surgeries.

## 6. TRAINING

Training is an important core activity in MSF and particularly for specialists in surgery/orthopaedics, anaesthesia/reanimation, gynaecology/obstetrics, and emergency/intensive care. Specialist doctors such as surgeons and anaesthesiologists are scarce and those who are willing to operate in resource-limited settings are even more so. The different training schemes targeted different types of specialists, taking into consideration their skills and knowledge, and the expected skills and knowledge in relation to the operational strategies and needs.

The trainings included:

- Training of expatriate surgeons / gynaecologists in developing specific skills.
  - Trauma and orthopaedic surgery: during the OCB MSF GAS weeks (Hong Kong and Frascati, Italy) and in OCA MSF Germany Surgical Workshop (Dusseldorf, Germany).
  - Obstetric surgery: during the OCB MSF GAS weeks (Hong Kong and Frascati, Italy) and in OCA MSF Germany Surgical Workshop (Dusseldorf, Germany).
  - ALSO (Advanced life support in Obstetrics) training in Denmark for gynaecologists.
  - War surgery: International Committee of the Red Cross seminar (Geneva, Switzerland).
- Training of national medical doctors performing surgery in developing specific skills.
  - Basic orthopaedic surgery: during the OCA MSF Germany Surgical Workshop (Dusseldorf, Germany), through bedside training with expatriate general surgeons.
  - Advanced orthopaedic surgery: in OCB trauma centres through bedside training with expatriate orthopaedic surgeons.
  - General surgery: bedside training with expatriate general surgeons.
  - Advanced general surgery: in OCB trauma centres through bedside training with expatriate subspecialized surgeons (e.g. vascular, paediatric).
  - Obstetric surgery: bedside training with expatriate gynaeco-obstetricians.
  - Management: during the OCB MSF GAS weeks (Hong Kong and Frascati, Italy) and during the OCB Hospital Management Team Training (HMTT).
- Training of nurses in anaesthesia management.
  - OCB MSF GAS weeks (Hong Kong and Frascati, Italy).
  - Bedside training with expatriate anaesthesiologists.
- Specific training cycles.
  - Specialized orthopaedic care and general surgery in Tabarre, Haiti: This is a joint venture with the Haitian University, and consists of rotations of Haitian residents in orthopaedics and general surgery in Tabarre hospital.
  - Advanced Life Support in Obstetrics (ALSO) offered in several projects for national staff.
  - Basic Assessment and Support in Intensive Care for Developing Healthcare Systems (BASIC-DHS) offered in several projects.
  - Primary Trauma Care (PTC) offered in several projects.

## 7. OPERATIONAL RESEARCH

During 2017, the SAGE unit published several peer-reviewed articles in scientific journals. There are the following:

- Anesthesia Provision in Disasters and Armed Conflicts. Trelles M, Van den Bergh, Gray H. *Curr Anesthesiol Rep* (2017) 7:1–7; doi: 10.1007/s40140-017-0190-0
- Is the South African Triage Scale valid for us in Afghanistan, Haiti and Sierra Leone? Dalwai M, Valles P, Twomey M. *BMJ Glob Health*, 2017;2:e000160. doi:10.1136/bmjgh-2016-000160
- Sex disparities among persons receiving operative care during armed conflicts. Forrester JD, Forrester JA, Basimouneye JP, et al. *Surgery*, <http://dx.doi.org/10.1016/j.surg.2017.03.001>

- Are American Surgical Residents Prepared for Humanitarian Deployment?: A Comparative Analysis of Resident and Humanitarian Case Logs. Lin Y, Dahm J, Kushner A, et al. World J Surg, 2017; doi:10.1007/s00268-017-4137-x

Also, members of the unit collaborated with other units and institutions in the following publications:

- Emergency obstetric care in a rural district of Burundi: What are the surgical needs? De Plecker E, Zachariah R, Kumar AMV, et al. PLoS ONE 12(2): e0170882; doi:10.1371/journal.pone.0170882
- Closing the Médecins Sans Frontières Maternity in Sierra Leone. Caluwaerts S. Operation Ebola: Surgical Care during the West African Outbreak. Johns Hopkins University Press, edited by Wren S, Kushner A. 25-29.
- Before the bombing: High burden of traumatic injuries in Kunduz Trauma Center, Kunduz, Afghanistan. Hemat H, Shah S, Isaakidis P, et al. PLoS ONE 12(3): e0165270. doi:10.1371/journal.pone.0165270
- Nubia's mother: being pregnant in the time of experimental vaccines and therapeutics for Ebola. Caluwaerts S. Reproductive Health 2017, 14(Suppl 3):157 ;43-45 ; doi:10.1186/s12978-017-0429-8

## **8. LOOKING BACK AND AHEAD**

### **8.1. LESSONS LEARNED IN 2017**

- There was important collaboration between the medical and Operational Department in the planning and set-up of new projects, and in the reorientation of operational strategies.
- Good data (statistics) were obtained in surgical care in compliance with OD databases and development of the hospitalisation one. However, almost all available indicators are quantitative and few are qualitative outcome indicators. This hampers proper insight into surgical processes. Moreover, appropriate data collection tools in large hospitals were still under development.
- The lack of HQ briefings of some GAS specialists, resulting in some staff not being completely prepared for the challenges of the mission, came with difficult consequences.
- The high turnover of specialists posed a risk to the quality of surgical care.
- Some expatriates working in MSF field settings lacked technical skills, which in some cases was coupled with a lack of management and training skills.
- Satisfactory follow-up of surgical care activities was assured across all projects. Good communication was maintained between projects, missions and headquarters.

### **5.2. PROSPECTS FOR 2018**

- Improve the skills of expatriate and local specialists: orthopaedic surgeons in performing external and internal fixation; general surgeons in neuro-thoracic, vascular and plastic surgery.

- Set up appropriate orthopaedic conservative treatment including state of the art plaster usage by general practitioners and/or general surgeons in hospitals run or assisted by MSF.
- Initiate new orthopaedic, anaesthesia and general surgery techniques and programmes, and refresh knowledge and skills. Also ensure proper distant follow-up by using telemedicine, including tele-education, tele-monitoring and tele-mentoring.
- Monitor the quality of surgical care through postoperative site infection databases.
- Follow up the curriculum of all levels of national staff specialists when possible and available.
- Ensure consistent and routine monitoring of activities like surgery/anaesthesia through good quality indicators.
- Strengthen the response in cases of mass disaster through good coordination between all actors including, emergency medicine doctors, anaesthetists, orthopaedic surgeons, other surgeons, nurses and logisticians.
- Continue publication of operational research studies.
- Continue to foster good collaboration within OCB and other sections, as well as with other external platforms.

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