SYRIAN HOSPITALS SURVEILLANCE STUDY

March 2017

UNION OF MEDICAL CARE AND RELIEF ORGANIZATIONS

"After six years of ongoing war, destruction and targeting of health care facilities, we hope this Syrian Hospitals Surveillance Study will contribute to a better need assessment of the hospitals, and lead to a more in-depth study of the infrastructure and capacity of the health care facilities which are still thriving. Our goal is to better support these hospitals with the appropriate equipment and provide millions of internally displaced Syrians with the best possible medical care that they so greatly deserve."

UOSSM Data Team

Acknowledgments:

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EXECUTIVE SUMMARY

In April and October 2015, two hospitals surveys were completed in Syria by the Union of Medical Care and Relief Organizations (UOSSM) and Physicians Across Continents (PAC). With significant changes during the sixth year of the Syrian war, a new study was necessary because of:

1. Repeated airstrikes and systematic attacks on hospitals and health clinics.
2. The continuous construction of new hospitals and destruction of others.
3. Demographic changes of internally displaced people and the shifting health needs of the population.

This National Hospitals Study in Syria was conducted by the Union of Medical Care and Relief Organizations (UOSSM) with the support of Physicians Across Continents (PAC), and with the collaboration of the operational health directorates in the areas of the conducted study. The first two surveys were completed in April 2015 and October 2015, when 113 hospitals were accessed. In the current December 2016 study, 107 hospitals (63 in the northern region and 44 in the southern region) were accessed out of 130 hospitals documented in the two regions. The survey questions included basic information about the hospital services, hospital protection measures, available medical equipment, working condition of hospital equipment, and level of staff support. The UOSSM data team verified the answers and applied auditing measures when needed, increasing the validity of this study.

This national study has indicated a need to fortify Syrian hospitals against airstrikes.

The survey showed that all hospitals have been targeted at least once with a direct or indirect airstrike, and some have been targeted 25 times. Three quarters of the current hospitals are field hospitals established in pre-existing buildings which were not originally designed as hospitals. Unlike previous surveys, this study demonstrates that security measures are urgently needed to protect the hospitals.

Under the Protection category of the survey, a set of questions inquired about the documentation of attacks and the measures taken to protect the occupational safety of both health care workers and their beneficiaries. The results showed that more than half of the hospitals' staff did not undergo any kind of training for attacks or airstrike documentation, and one third of hospitals' staff had no experience in occupational safety and risk management.

The services provided in all hospitals have not changed much from last year's survey. Again, this study revealed that specialties such as vascular surgery, neurosurgery, and plastic surgery were scarce or unavailable, and that a significant number of machines and medical equipment need repair or maintenance. For example, out of 240 X-ray machines, 66 needed immediate maintenance to become functional, and of 13 computerized axial tomography (CT) scanners only 4 were functional in all surveyed hospitals.

A large number of health professionals share their services with multiple hospitals. In fact, more than 40% of the doctors, regardless of their specialty, work in more than one hospital. Moreover, we noticed that the number of medical residents was scarce in comparison to the number of specialists; the ratio of resident to specialist doctors was 1:5. The ratio of non-certified to certified health care staff was 3:7. The latter ratio could be due to an increase in nursing institutions created recently.

Despite the deteriorating war conditions, we were able to survey a large number of hospitals due to collaboration between health facilities operated by different NGOs and health directorates. Such collaboration showed a growing appreciation for the importance of such data to fulfill the needs of the collapsed health care system. A need to reinforce the structure of hospitals was highlighted in the study.

The number of training centers and programs to train health care workers in a variety of specialties has increased to cover the shortage of health professionals. Therefore, to standardize the programs and ensure their validity, enhanced communication and coordination between existing and new health facilities, and among the various NGOs and health care directorates in the regions, must be facilitated.

INTRODUCTION

Studies of national hospitals in Syria were undertaken in April and October 2015. Since then, many changes have taken place in Syria due to the ongoing war. The loss of some hospitals and the establishment of new ones made a new national study necessary. Demographic shifts and escalation of the six-year war have led to significant changes in the health care needs of the displaced and vulnerable population.

This study was implemented by the Union of Medical Care and Relief Organizations (UOSSM) with the support of Physicians Across Continents (PAC), and in collaboration with health directorates in opposition- controlled areas. The collapse of the governmental health care system, particularly in areas exposed to ongoing airstrikes, created a vacuum in national patient care services. Thus there was a need to identify the true representation of health care authority in the area of study. The following policies were adopted to govern this collaboration.

1. Information collected in this study is national data that can be shared with any non-governmental or governmental agencies that are willing to improve or contribute to the health care sector in Syria.
2. The UOSSM reserves all publication rights.
3. The recently created health directorates are considered essential partners in the data collection

Objectives of the Syrian National Hospitals Study

1. To quantify the continuously changing health care situation in Syria.
2. To assess the level of structural integrity in hospitals, and the need for hospital fortification against attacks.
3. To determine the functionality of medical equipment and assess medical equipment maintenance needs.
4. To assess the need for the hospitals' financial support.
5. To evaluate the shortage of human resources in the hospitals.

MATERIAL AND METHODOLOGY

Data preparation

The data department in UOSSM prepared the study questions. Feedback regarding the questions was obtained from four doctors with different specialties from UOSSM and one civil engineer from SAEA (Syrian American Engineers Association). To make the study more specific, questions were divided into six focused categories:

1. Type of hospital building and its structural integrity

Questions were asked about: the original design and function of the building being utilized as a hospital to what extent structural reinforcement against airstrikes was implemented, if any, and whether airstrikes occurred directly on or around the hospital. The physical space available and the location and accessibility of the hospital were also surveyed.

2. Medical services provided

Questions were directed to quantify the surgical and non-surgical services provided in the hospital. The range of services available—from emergency and intensive care to more specialized services like rehabilitation and laboratory services—were queried.

3. Medical equipment available

Questions were structured to assess the quantity and functionality of available equipment. Medical equipment was divided into groups based on function:

a. Radiology machines: X-rays, echo ultrasound imaging, CT scanners
b. Operating room (OR) equipment: OR lights, anesthesia machines, electric diathermy
c. Intensive care unit (ICU) machines: intravenous (IV) pumps, blood gas machines, mechanical ventilators
d. Laboratory machines: microscopes, incubators, biochemistry and hematology analyzers
e. Dialysis machines
f. Shared equipment: suctions, monitors, oxygen concentrators, oxygen and power generators

4. Protection

Questions were asked to assess the readiness of the medical staff to deal with unconventional weapons and to document abuses/torture, and to ensure patient safety.

5. Hospital financial support

The level of financial support received by the hospital (partial vs. full support vs. no financial support) and the duration of this support were addressed in three categories:

a. Staff salaries
b. Running costs
c. Consumable expenses.

6. Human resources

Medical staff status was studied; no statistics were obtained on administrative and supportive hospital staff. The survey of medical staff was divided into three categories:

a. Doctors, specialists and residents, including medical students
b. Technicians: certified vs. non-certified
c. Nurses: certified vs. non-certified.

Medical staff that claimed to work in more than one hospital were counted. We corrected their numbers assuming they work in two hospitals only, which is the most common scenario. The exception was in rural Damascus, where the local health authority corrected the number of staff working in multiple locations.

Data grouping

The hospitals we were able to access were divided into the following regions based on accessibility and current communication status between regions.

Northern region

This region is divided further to the east and west

The east consists of land northeast of Aleppo, while the west consists of land west of Aleppo—Idlib, Latakia, and Hama suburbs. In the eastern area we were able to capture the results of only 2 out of 10 hospitals. Therefore, we decided to dismiss the results from the eastern area of the northern region. The northern region is the largest, with border access to Turkey, where most of the medical supplies to Syria are delivered. In the northern region 63 of the 82 hospitals were surveyed.

Southern region

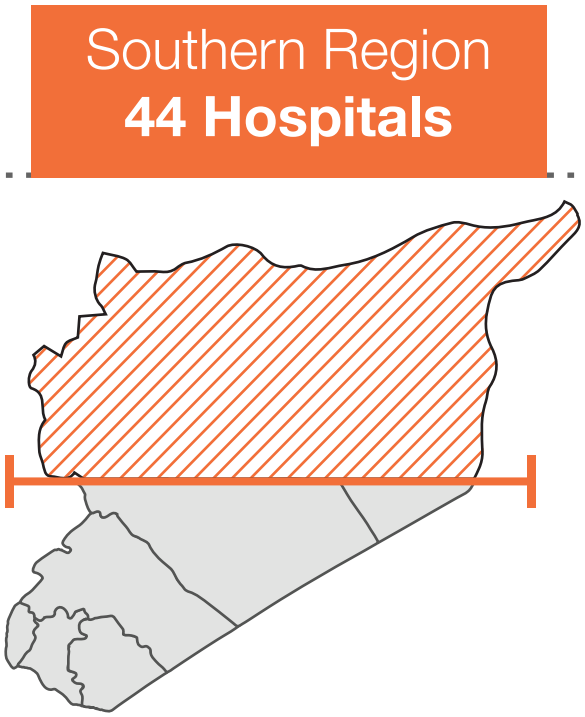
The southern region consists of three major areas:

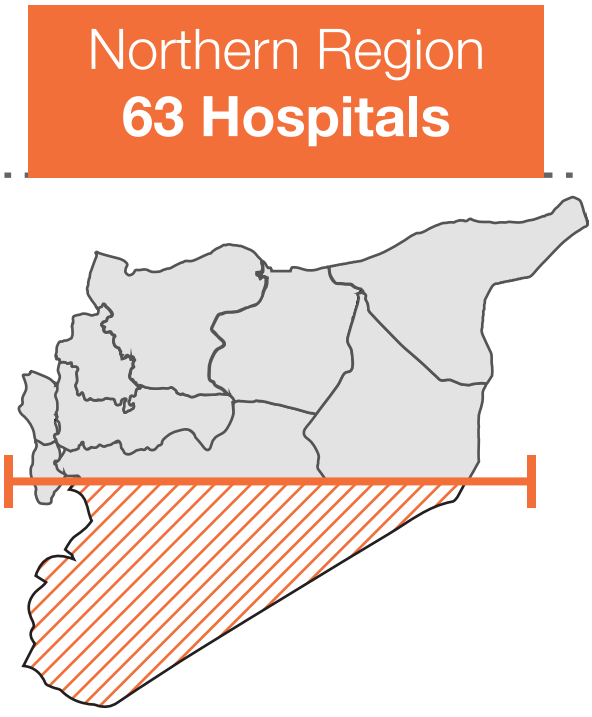
a. Dara and Quneitra, which have access to the Jordanian border, the main aid-line for this region. In this area, 20 out of 24 hospitals were surveyed.

b. Ghouta in rural Damascus is a besieged area. In this area all 16 hospitals were surveyed.

c. Homs suburb is a besieged area. In this area all eight hospitals were surveyed.

Each geographic area had several data collectors who reported to the national data coordinator at the UOSSM office in northern Syria, and subsequently to the UOSSM data department in Turkey.





Data team and data collection process

The questions in the Syrian National Hospitals Study were verified and validated by doctors in the hospitals in the study area. The questions were adjusted according to feedback received from frontline doctors to ensure the questions reflected the reality of the health conditions in the communities. After these initial steps, a pilot survey was corducted in seven hospitals to verify and refine the process of data collection and data entry, and to review the feasibility of the study. A KoBo Toolbox Platform was used to enter all questions and to collect data.

A team of 19 staff from UOSSM, previously trained for the 2015 Syrian hospital surveys, received one day of extra training to collect medical data using the KoBo Toolbox, to evaluate patient charts, and to audit health records data with the hospitals' staff. These "data collectors" were shown how to present the study questions and how to collect the data.

In collecting the data directly from the field, data collectors helped hospital staff to interpret the questions, verified the data obtained, transferred the data to excel sheets, and sent the data sheets to the data collection assistant. The data collection assistant verified the data further and transferred it to the central database in the UOSSM office in northern Syria and to the Department of Research and Data in Turkey. This step took 23 days in December 2016. The final statistical analyses were conducted in four weeks at the Department of Research and Data in Turkey. Further validation took place to check for any significant discrepancy with previous surveys.

Data validation

Data validation was done in three steps:

Step 1: Data collectors reviewed the data collected and performed an appropriate audit with the hospital's staff in charge.

Step 2: The centralized data coordinator reviewed a random sample of data for verification.

Step 3: The UOSSM data department reviewed a random sample of data and compared it with the data obtained in the 2015 surveys. Any vague figure was audited with the relevant hospital.

Statistical analysis methodology

Data was analyzed to identify missing values or outlier values. The database was then transformed and statistical analysis was conducted (541 variables overall) using SPSS (Statistical Package for the Social Sciences). Following this process, a descriptive analysis and a geographic projection of the results were conducted.

The survey data outcome was analyzed on two levels:

A general overview of all hospitals and an in depth review of each region and area was conducted according to the region and area categories above.

RESULTS

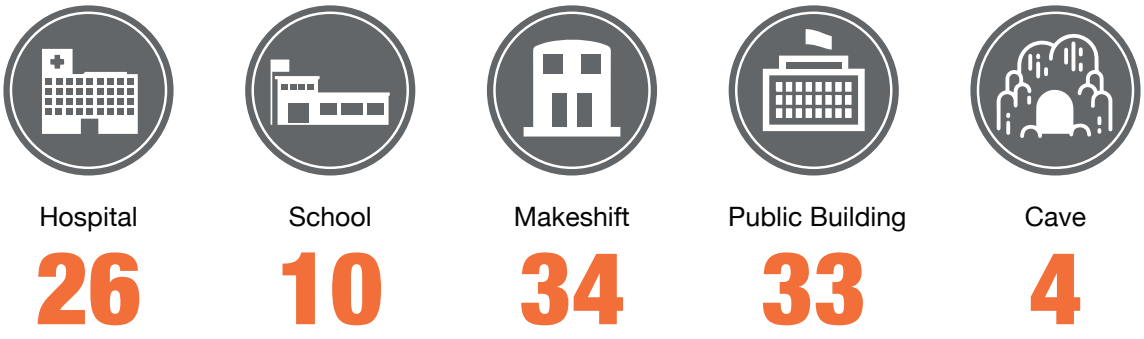
The results are presented as a whole and according to region by dividing the country into its two accessible regions. Nearly 6.1 million people receive medical treatment in these regions according to the Office for the Coordination of Humanitarian Affairs (OCHA) assessment for the northern region and the local councils assessment for the southern region.

Whole of Syria

Hospital Structural Analysis

a. Hospital buildings: We specifically questioned the type of building being utilized as a hospital. We found that only 26 buildings were originally designed to be hospitals, ten buildings were previously schools, and the rest were either government or residential buildings transformed into hospitals. Four hospitals were established in caves to add extra protection from airstrikes.

TYPES OF HOSPITAL BUILDINGS



PATIENT ACCESSIBILITY

56 Accessible Hospitals

51 Hard-to-Reach Hospitals

STAFF ACCESSIBILITY

55 Accessible Hospitals

52 Hard-to-Reach Hospitals

b. Access to supplies: 83 hospitals had access to medical supplies, whereas 24 hospitals were impossible to reach in besieged areas.

c. Accessibility to patients and staff: Transportation safety for both staff and patients was a major concern (life threatening) for about half of the hospitals surveyed.

d. Level of security: 21 hospitals were underground and nearly half of the hospitals had no measures of reinforcement despite the exposure to at least one airstrike. Sand bags were the only method of protection in 38 hospitals.

e. Hospital attacks: In 2016, most hospitals were targeted directly by airstrikes at least twice, with an average of three attacks per hospital. Some hospitals, e.g., the ones in rural Damascus, were targeted 25 times. Aerial bombardment of a hospital's surroundings was documented at an average of seven times per hospital. In some areas the number of airstrikes near to hospitals exceeded 100. A total of 1000 direct and indirect attacks on hospitals occurred in 2016.

HOSPITAL ATTACKS

Indirect Airstrikes

715

With an average of **7** attacks per hospital

Direct Airstrikes

289

With an average of **3** attacks per hospital

f. Building age: The mean age of foundations used as hospitals was close to 10 years; some were newly built and others were 50 years old.

g. Number of floors used: and the use of basements. The mean number of used floors was three, since higher floors were widely unused due to airstrike risk. Two thirds of the buildings utilized basements for major medical services.

h. Building square footage and availability of a floor map: Hospital spaces ranged from 200–6000 m2 with an average of 1200 m2. A floor map of the building was available in only 35 hospitals.

Protection

Questions on this topic were divided into two groups:

1. Were blood bags subjected to testing for hepatitis B, C, and HIV infections before a blood transfusion? 84 out of 107 hospitals were found to have this basic testing available.
2. Human rights violations. Questions in this group were further divided into two streams:
   i. Were medical staff trained to report physical abuse or to document injury sustained by internationally prohibited weapons? Only 43 out of 107 hospitals received this training.
   ii. Did medical staff receive sufficient training to deal with, document, and report signs and symptoms of chemical attacks? Only 48 hospitals were found to offer their staff with this sophisticated training.

Medical staff trained to deal with document and report chemical attacks

48 Hospitals out of 107

Medical staff trained to report physical abuse or document injury sustained by internationally prohibited weapons

43 Hospitals out of 107

Blood bags subjected to basic testing

84 Hospitals out of 107

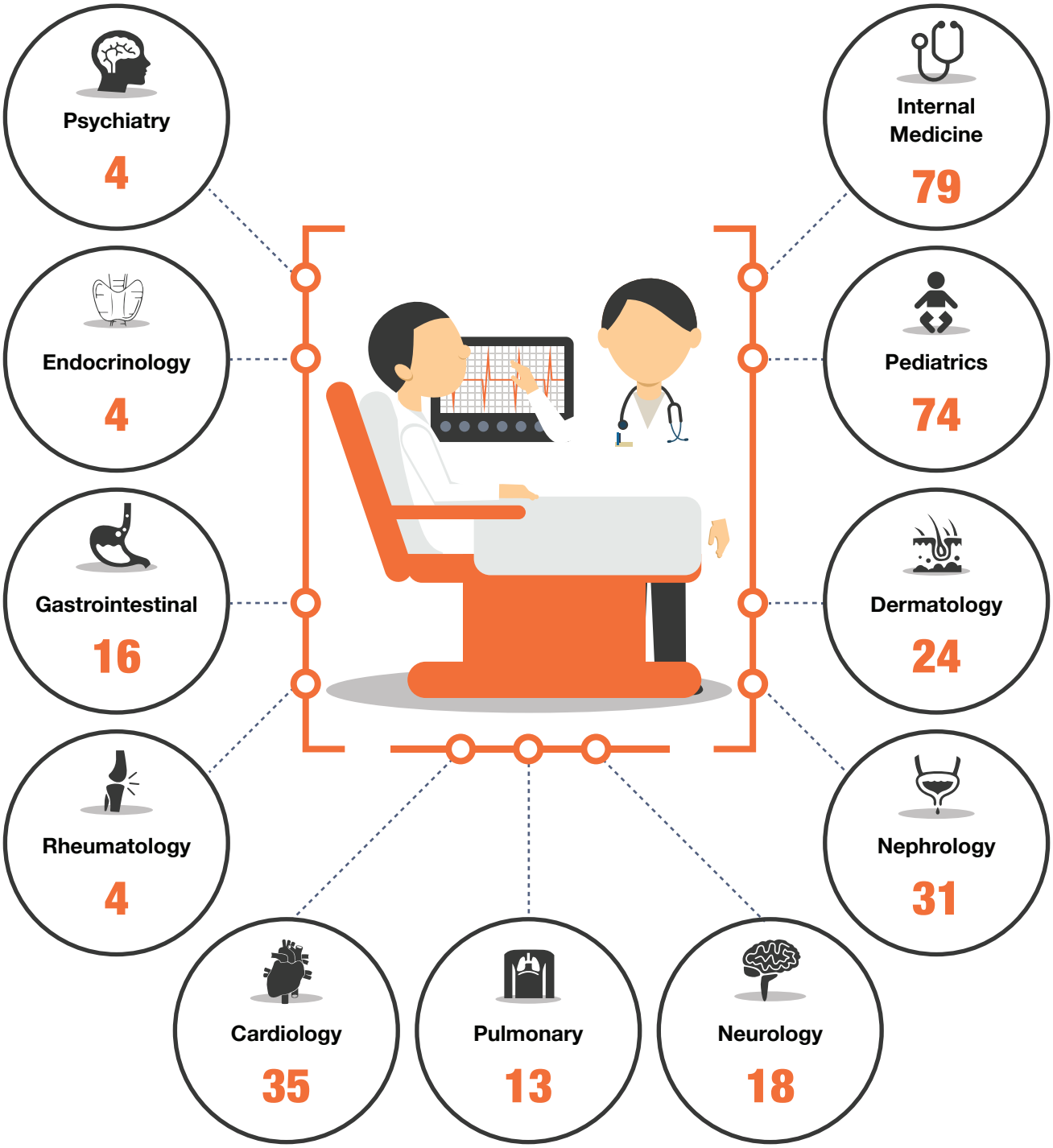
Available services

a. Outpatient services

These included surgical, medical, emergency, and physiotherapy clinics. These clinics were provided by all but three hospitals. Physiotherapy clinics were available in 37 of 107 hospitals.

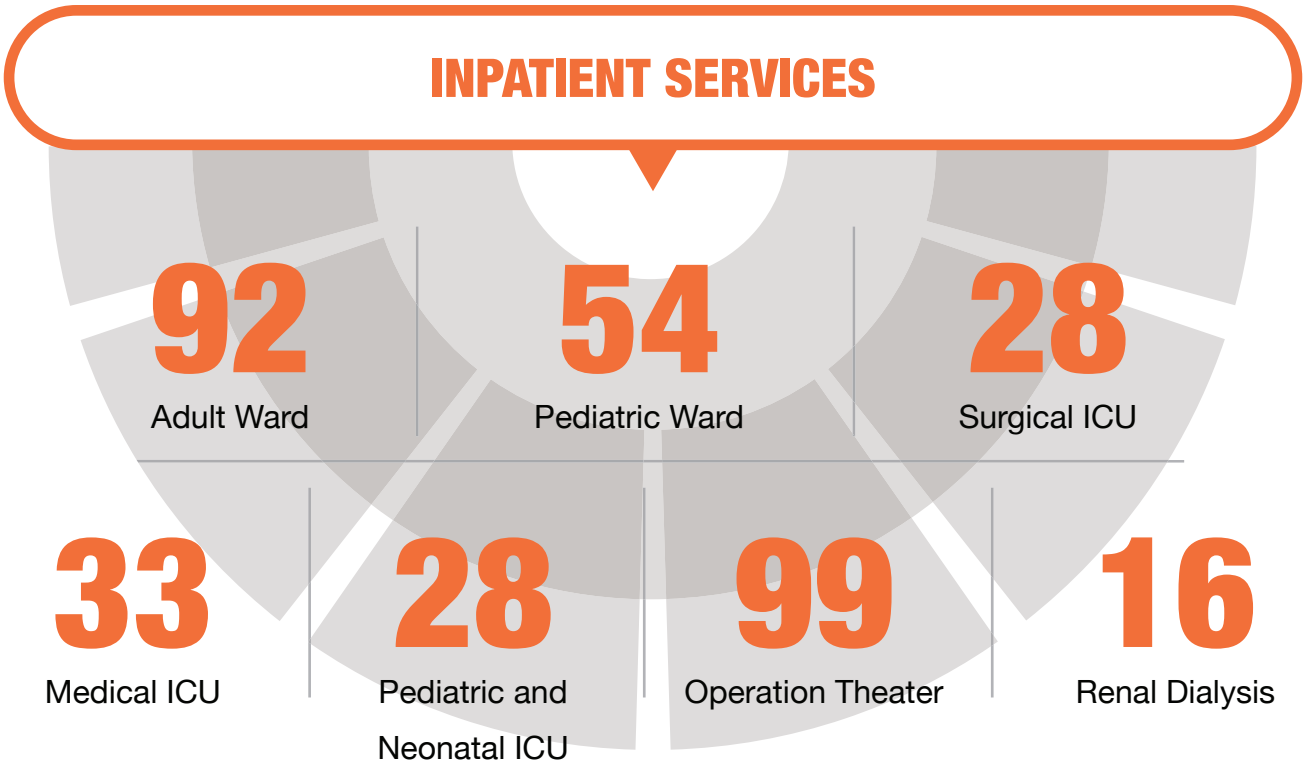
SURGICAL OUTPATIENT DEPARTMENTS

MEDICAL OUTPATIENT DEPARTMENTS

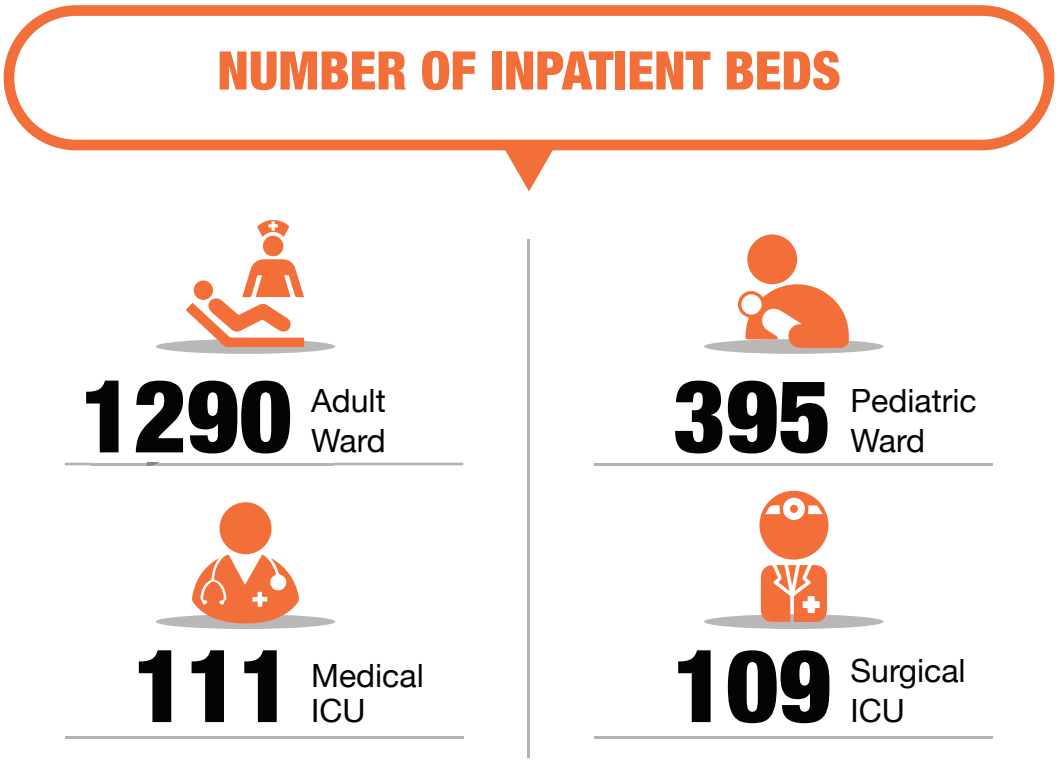


b. Inpatient services

These included emergency services, major surgeries, intensive care units, and dialysis units.



The total number of inpatient beds approached 1,905 , divided into 220 ICUs, 395 pediatric, and 1,290 adult beds. 99 out of 107 hospitals had operating theaters readily available for surgeries.



c. Adjunct services and equipment

These included X-ray machines, laboratories, intensive care units (ICUs), operating theatre equipment, and blood bank services.

X-ray machines

91 out of 107 hospitals had X-ray services with either portable to fixed machines, 36 X-ray machines needed maintenance. There were 13 computerized axial tomography machines (CT scanners), but only four were functioning. All hospitals had regular or hand-held ultrasound machines. Only one mammography machine was found in all regions.

AVAILABLE RADIOLOGY MACHINES

Portable X-Ray	82	21
Fixed X-Ray	49	15
C arm	43	30
Panorama	5	1
CT	4	9
Doppler	40	5
Handheld US	82	21
Ultrasound	76	10
Mammography	0	1

- Number of Functionong Units
- Number of Non-Functionong Units

Laboratory machines

There was a wide availability of machines for basic lab work like hematology. However, chemistry analysis was available in only one-third of the hospitals. 107 laboratory machines out of 756 were found to be out of order.

AVAILABLE LABORATORY MACHINES

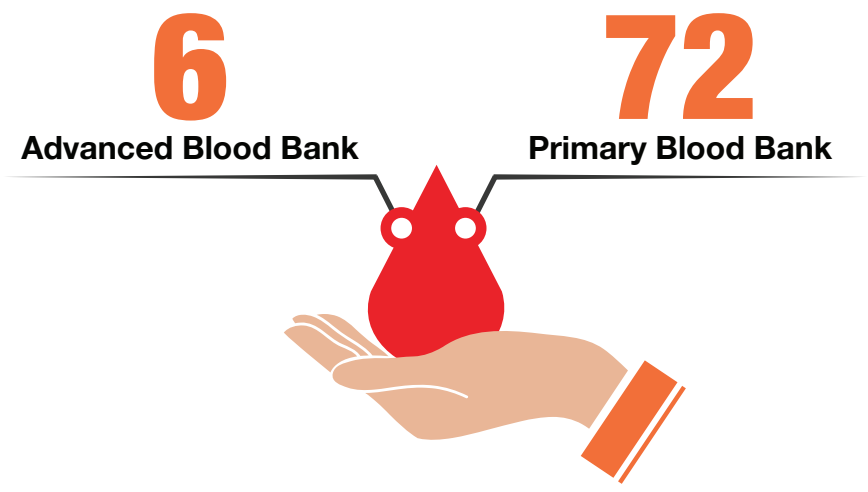
Electrolytes	37	19
Chemical Tests	89	22
Hematological Tests	48	8
Microscopy	118	19
Rapid HB	63	7
Hemoglobin Centrifuges	102	17
Laboratory Centrifuges	96	8
Wet Laboratory Incubator	59	5
Dry Laboratory Incubator	37	2

- Number of Functionong Units
- Number of Non-Functionong Units

Blood bank

Blood collection was possible in 78 hospitals out of 107 hospitals surveyed. Only six hospitals had advanced blood centrifuge machines, equivalent to the number of advanced blood centrifuge machines in the 2015 surveys. The rest of the hospitals could only store complete blood bags.

BLOOD BANKS



Operating room (OR) equipment

All operating rooms were equipped with the necessary equipment for anesthesia and surgery (mainly OR tables and lights, anesthesia machines, and surgery diathermies), although over 200 machines were out of service in 99 hospitals that had operating rooms.

AVAILABLE OPERATING ROOM EQUIPMENT

Fixed Lamp	**Portable Lamp**	**Anesthesia Machine**
168 37	119 29	189 46
Operating Table	**Traction Table**	**Diathermy**
235 38	43 8	188 53

- Number of Functionong Units
- Number of Non-Functionong Units

Intensive care unit (ICU) equipment

220 ICU beds were distributed over 50 hospitals with only 176 mechanical ventilators; 34 ventilators were nonfunctional. Only 24 blood gas analyzers were found in all 107 hospitals.

AVAILABLE INTENSIVE CARE EQUIPMENT

Adult Ventilator	**Pediatric Ventilator**	**Neonatal Ventilator**
100 31	25 3	17 0
ABGs Machine	**Pumps**	
18 6	125 23	

- Number of Functionong Units
- Number of Non-Functionong Units

Dialysis machines

16 hospitals out of 107 had a total of 64 beds providing full dialysis services. There were 74 dialysis machines, and most were the Fresenius brand. 16 dialysis machines were not functioning.

RENAL DIALYSIS MACHINES

Non-Functioning
16

16
Hospitals

Functioning
58

Note: Most machines are "Fresenius 4008S"

Shared equipment

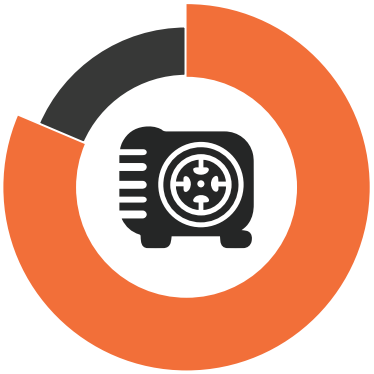
641 of the machines used in more than one department (e.g., ECG, cardiac monitors, oxygen and electric generators) needed maintenance, including defibrillators, monitors, and suctions. Only 31 central oxygen generators were available; thus, not every hospital equipped with an ICU had an oxygen generator. Seven oxygen generators needed maintenance. Only 50 hospitals had ICU services.

There were about three electric generators in each hospital, with about 60 generators in need of maintenance.

AVAILABLE SHARED EQUIPMENT

Defibrillator	**Monitors**	**Dry Sterilization**
172 / 47	346 / 111	215 / 26
Autoclave	**Suction**	**Crash Cart**
129 / 45	379 / 80	50 / 4
Nebulizer	**ECG**	**Audiometer**
341 / 125	146 / 54	11 / 0
O2 Central Generators	**O2 Concentrator**	**Electric Generators**
24 / 7	221 / 81	270 / 61

- Number of Functionong Units
- Number of Non-Functionong Units

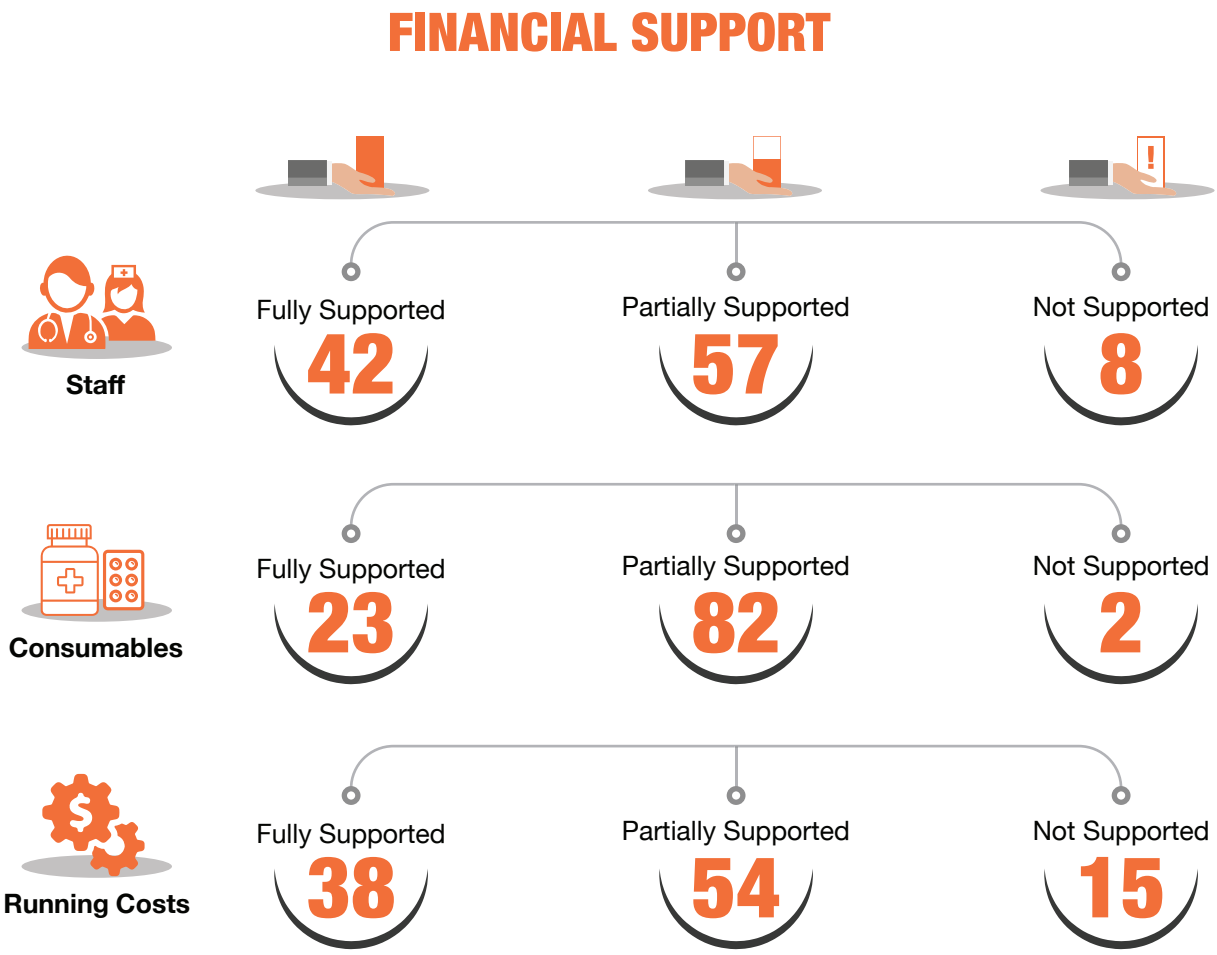


270 Functionoing

61 Non-Functionoing

Financial support

Financial support was divided into three categories: full, partial, or none for each hospital's staff, consumables, and running cost. Most hospitals had received support either fully (32%) or partially (60%); a few hospitals received no support (8%).



Human resources

Medical staff

The table below shows the number of doctors and their specialties in all hospitals. Overall, there was a shortage in unique specialties crucial in warzones, like vascular surgery (14 surgeons, 5 residents) and neurosurgery (13 surgeons, 2 residents). Other rare crucial specialties were available, such as pediatric surgery (3 surgeons, 1 resident). 29 anesthetists with four residents were distributed over one-third of the hospitals; two-thirds of the hospitals relied on anesthesia technicians for surgery support.

SURGICAL STAFF

	Specialist	Resident
General Surgery	120	38
Orthopedic Surgery	90	26
Vascular Surgery	14	5
Urology	35	4
Neurosurgery	13	2
Gynecology	88	18
Ear-Nose- Throat	39	4
Ophthalmology	22	2
Thoracic Surgery	10	2
Reconstructive Surgery	7	0
Maxillofacial Surgery	14	7
Pediatric Surgery	3	1

In terms of internal medicine, there were 19 cardiologists with three residents and 88 pediatricians with 17 residents. Over 35% of the doctors worked in more than one hospital to make up for the shortage.

MEDICAL, NON-SURGICAL STAFF

	Specialist	Resident
Internal Medicine	61	11
Pediatric	88	17
Dermatology	12	1
Nephrology	8	0
Neurology	16	0
Respiratory Diseases	1	0
Cardiology	19	3
Rheumatology	1	0
Gastroenterology	9	1
Endocrinology	2	0
Laboratory Medicine	10	2
Emergency Medicine	17	2
Intensive Care	9	3
Psychiatry	2	0
Anesthesiology	29	4
Rehabilitation	5	0
Pharmacy	77	11
Oncology	1	0
Radiology	17	3
Pathology	0	0


148
98

Technicians

The table below shows the distribution of technicians over the surveyed hospitals; significantly, 19% of the technicians did not have a license or a certificate. 119 ICU technicians were distributed over 50 hospital ICUs (220 beds). Anesthesia technicians who have worked in ICUs covered the ICU technician deficiency. 13% of all technicians worked in more than one facility. 37 dialysis technicians worked in 16 hospitals that offer that service.

TECHNICAL STAFF

	Certified	Not Certified
Laboratory Technician	**238**	**38**
Radiology Technician	**158**	**30**
OR Technician	**279**	**118**
Anesthesia Technician	**269**	**37**
Renal Dialysis Technician	**34**	**3**
ICU Technician	**112**	**7**
Pharmacy Technician	**82**	**36**
Physiotherapy Technician	**59**	**16**

Nurses

We surveyed 2,000 nurses. About 800 of those nurses were not fully trained and had not yet graduated from a nursing program. There were 227 midwives available for natal deliveries. 705 ward nurses, 365 pediatric and neonatal nurses were distributed over 58 hospitals offering obstetric services. About 13% of the nurses worked in more than one hospital.

NURSING STAFF

	Certified	Not Certified
Ward Nurse	**408**	**297**
Pediatric Nurse	**145**	**72**
Neonatal Nurse	**119**	**30**
ER Nurse	**335**	**270**
Out-Patient Clinic Nurse	**152**	**146**
Midwife	**195**	**33**

Regional Results

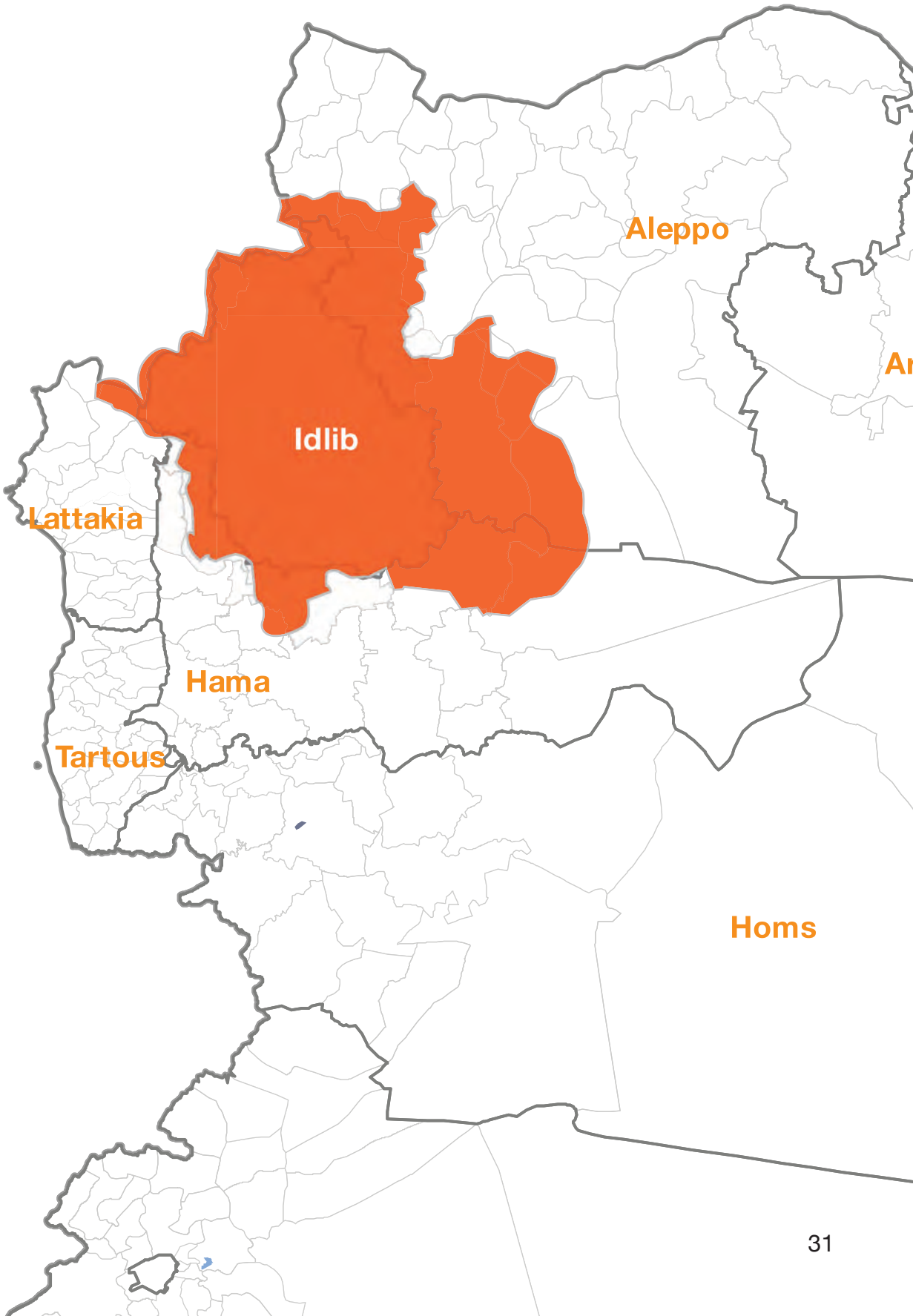
Northen Region:

The northern region is the largest. Its population approaches 4,100,000. There are 82 hospitals functioning in this region and the Turkish border is the main access for aid supply. This region is divided into east and west sectors with no transportation between the two sectors.

- **The east sector** consists of terrain northeast of Aleppo, with a population of nearly 600,000 and 10 active hospitals. We were able to survey only two hospitals in this sector (8 out of 10 hospitals declined to provide data), therefore, the data for this sector was not incorporated into the data for the whole of Syria.
- **The west sector** consists of land west of Aleppo—Idlib, Latakia, and Hama suburbs. This area is the largest, with a population approaching 3.5 million. It has 72 active hospitals, and we were able to survey 61 of them. The data of this area was as follows:
  a. The total number of inpatient beds was 1,173, including 132 ICU beds (11% of the total), with ratios of three hospital beds for every 10,000 people and four ICU beds for every 100,000 people.
  b. The total number of doctors was 644, with a ratio of two doctors for every 10,000 people.
  c. Available major services relied on four advanced blood banks and two functioning CT scanners. Five CT machines were out of service.

Northern Region
West Sector

61 Hospitals



AVAILABLE SERVICES

52 Surgical OPDs

55 Medical OPDs

52 ER

8 Physiotherapy

SURGICAL OUTPATIENT DEPARTMENTS

19 Urology

13 Vascular Surgery

33 Orthopedic Surgery

37 General Surgery

7 Ophthalmology

17 ENT

29 Gynecology

5 Neurosurgery

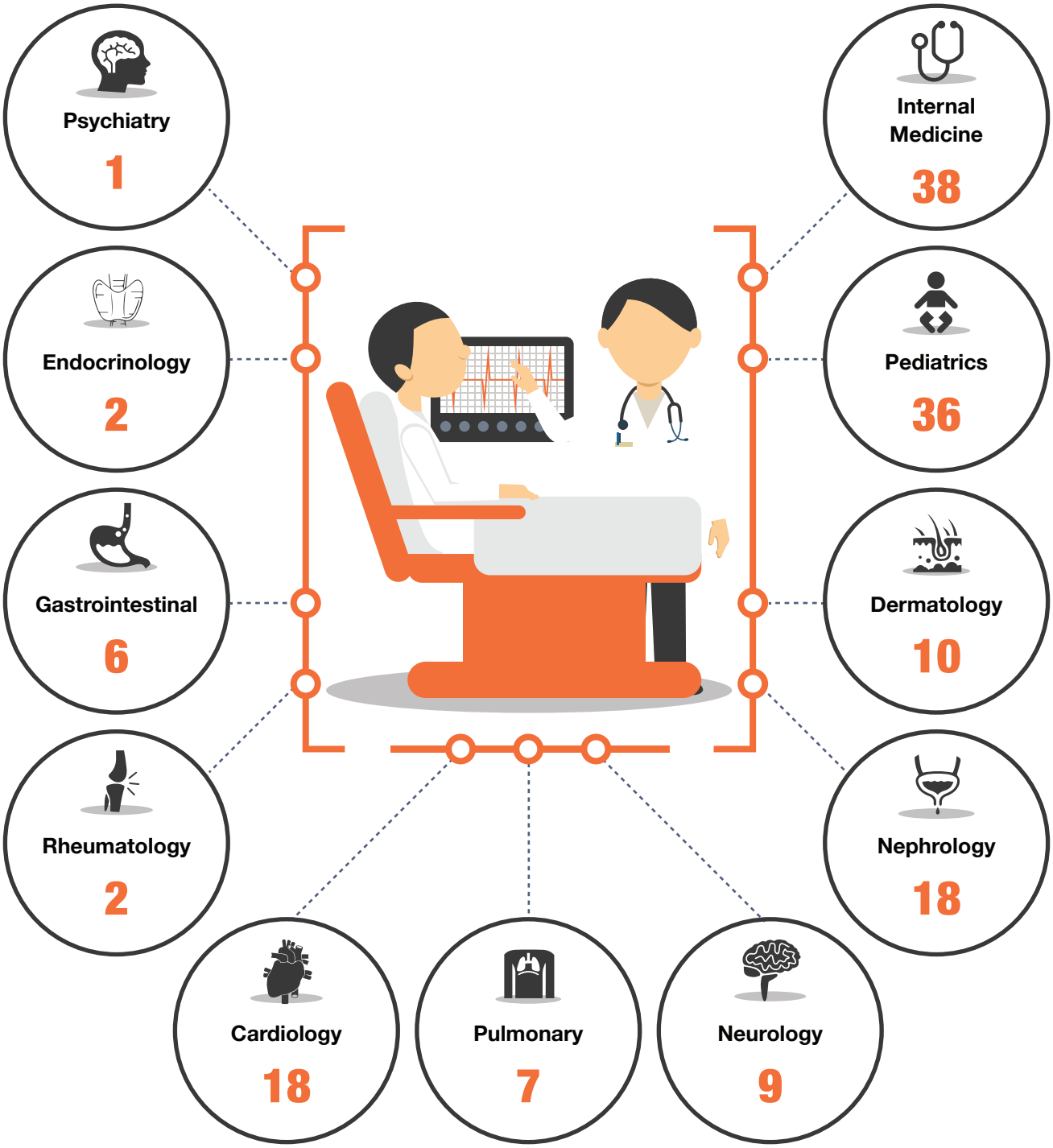
2 Pediatric Surgery

6 Maxillofacial Surgery

6 Reconstructive Surgery

7 Thoracic Surgery

MEDICAL OUTPATIENT DEPARTMENTS



INPATIENT SERVICES

52 Adult Ward	**31** Pediatric Ward	**15** Surgical ICU

16 Medical ICU	**14** Pediatric and Neonatal ICU	**53** Operation Theater	**9** Renal Dialysis

NUMBER OF INPATIENT BEDS

763 Adult Ward

278 Pediatric Ward

67 Medical ICU

65 Surgical ICU

AVAILABLE RADIOLOGY MACHINES

Portable X-Ray	34	12
Fixed X-Ray	31	8
C arm	28	20
Panorama	1	1
CT	2	5
Doppler	17	4
Handheld US	38	7
Ultrasound	31	4
Mammography	0	0

AVAILABLE INTENSIVE CARE EQUIPMENT

Adult Ventilator	56	16
Pediatric Ventilator	14	3
Neonatal Ventilator	12	0
ABGs Machine	12	4
Pumps	70	14

- Number of Functionong Units
- Number of Non-Functionong Units

AVAILABLE OPERATING ROOM EQUIPMENT

Fixed Lamp	90	25
Portable Lamp	62	17
Anesthesia Machine	127	27
Operating Table	126	26
Traction Table	22	7
Diathermy	99	30

AVAILABLE LABORATORY MACHINES

Electrolytes	23	12
Chemical Tests	44	10
Hematological Tests	28	5
Microscopy	57	11
Rapid HB	33	3
Hemoglobin Centrifuges	46	10
Laboratory Centrifuges	52	4
Wet Laboratory Incubator	36	5
Dry Laboratory Incubator	14	1

- Number of Functionong Units
- Number of Non-Functionong Units

AVAILABLE SHARED EQUIPMENT

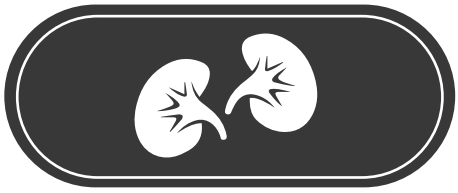
Defibrillator	94	27
Autoclave	61	28
Nebulizer	181	68
O2 Central Generators	23	5
Monitors	181	65
Suction	195	54
ECG	70	30
O2 Concentrator	78	38
Dry Sterilization	87	10
Crash Cart	13	0
Audiometer	7	0
Electric Generators	135	32

- Number of Functionong Units
- Number of Non-Functionong Units

RENAL DIALYSIS MACHINES

Non-Functioning

5



Functioning

32

Note: Most machines are "Fresenius 4008S"

BLOOD BANKS

4
Advanced Blood Bank

34
Primary Blood Bank

FINANCIAL SUPPORT

	Fully Supported	Partially Supported	Not Supported
Staff	35	22	4
Consumables	15	45	1
Running Costs	30	26	5

HOSPITAL ATTACKS

Indirect Airstrikes

429

with an average of **7** attacks per hospital

Direct Airstrikes

148

with an average of **2** attacks per hospital

PATIENT ACCESSIBILITY

34 Accessible Hospitals

27 Hard-to-Reach Hospitals

STAFF ACCESSIBILITY

32 Accessible Hospitals

29 Hard-to-Reach Hospitals

TYPES OF HOSPITAL BUILDINGS

Hospital	School	Makeshift	Public Building	Cave
16	**9**	**12**	**20**	**4**

SURGICAL STAFF

	Specialist	Resident
General Surgery	**78**	**24**
Orthopedic Surgery	**59**	**18**
Vascular Surgery	**10**	**3**
Urology	**21**	**2**
Neurosurgery	**8**	**2**
Gynecology	**68**	**12**
Ear-Nose- Throat	**18**	**1**
Ophthalmology	**14**	**2**
Thoracic Surgery	**6**	**1**
Reconstructive Surgery	**5**	**0**
Maxillofacial Surgery	**5**	**4**
Pediatric Surgery	**2**	**0**

MEDICAL, NON-SURGICAL STAFF

	Specialist	Resident
Internal Medicine	32	10
Pediatric	59	11
Dermatology	7	1
Nephrology	6	0
Neurology	11	0
Respiratory Diseases	1	0
Cardiology	13	2
Rheumatology	1	0
Gastroenterology	4	1
Endocrinology	2	0
Laboratory Medicine	7	2
Emergency Medicine	9	2
Intensive Care	8	3
Psychiatry	2	0
Anesthesiology	23	2
Rehabilitation	2	0
Pharmacy	48	5
Oncology	0	0
Radiology	4	2
Pathology	0	0

NURSING STAFF

	Certified	Not Certified
Ward Nurse	**262**	**72**
Pediatric Nurse	**84**	**38**
Neonatal Nurse	**71**	**13**
ER Nurse	**188**	**70**
Out-Patient Clinic Nurse	**91**	**61**
Midwife	**115**	**13**

TECHNICAL STAFF

	Certified	Not Certified
Laboratory Technician	**121**	**17**
Radiology Technician	**87**	**15**
OR Technician	**215**	**46**
Anesthesia Technician	**169**	**15**
Renal Dialysis Technician	**22**	**1**
ICU Technician	**81**	**1**
Pharmacy Technician	**49**	**12**
Physiotherapy Technician	**8**	**5**

Southerrn Region

In the southern region the estimated total population was 1,900,000. The Jordanian border is the main access for aid supply in this area, However, the middle part of this region is totally besieged, and medical aid accessibility is possible only via the Syrian Government in Damascus. In this region, we surveyed 44 hospitals out of 48. Four hospitals denied data access.

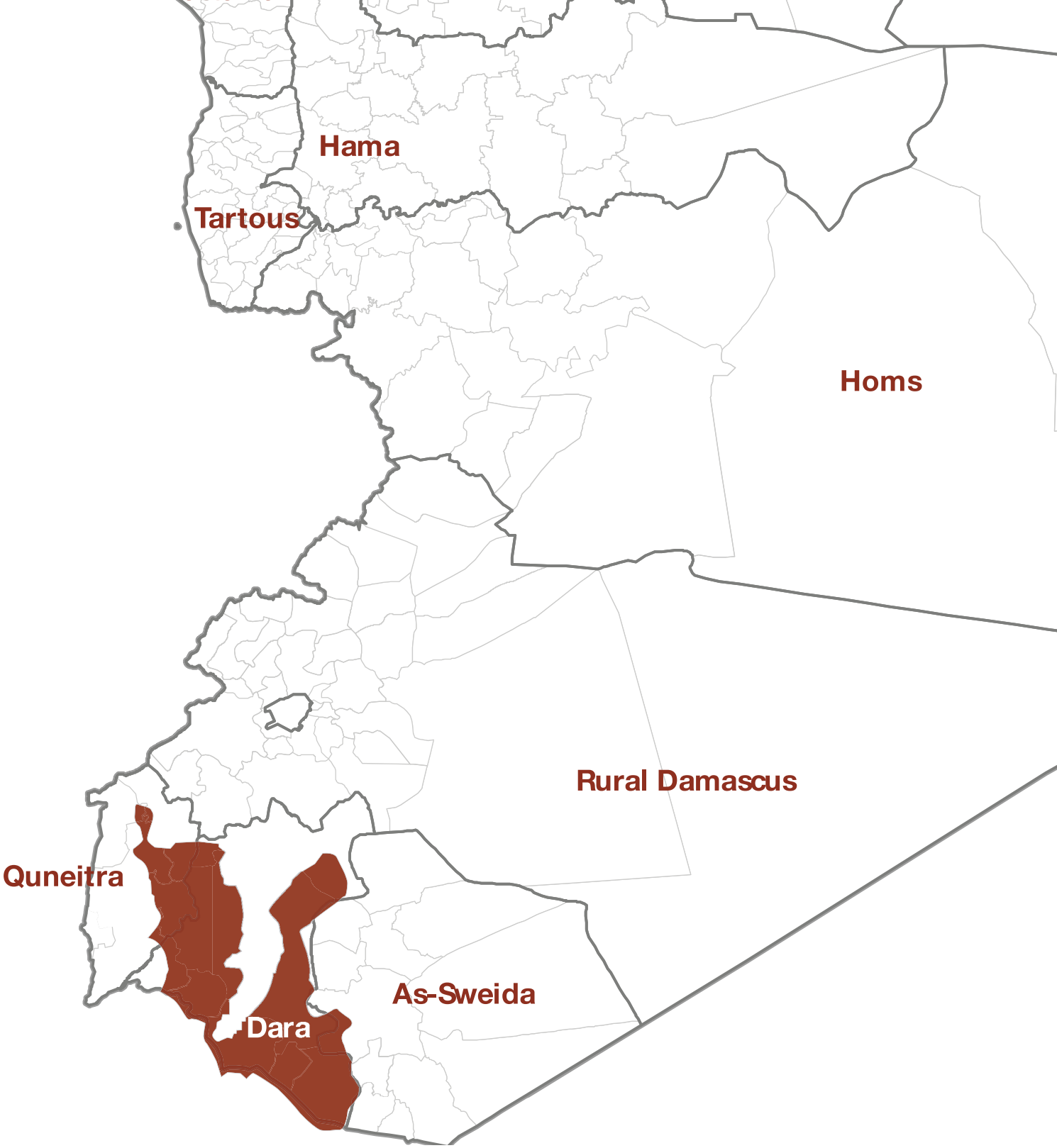
The southern region is divided into: Dara and Quneitra, Ghouta of Rural Damascus, and Rural Homs.

- In **Dara** and **Quneitra,** the estimated population is 1,250,000. Twenty hospitals out of 24 were surveyed in this area; the following data was obtained:

a. The total number of inpatient beds was 292, including 37 ICU beds (13% of the total), with ratios of two beds for every 10,000 people and three ICU beds for every 100,000 people.

b. The total number of doctors was 169, with a ratio of one doctor for every 10,000 people.

c. There was one advanced blood bank and one functional CT scanner (out of two CT machines).



Southern Region
Southern Sector

20 Hospitals

AVAILABLE SERVICES

19 Surgical OPDs

20 Medical OPDs

20 ER

15 Physiotherapy

SURGICAL OUTPATIENT DEPARTMENTS

8 Urology

1 Vascular Surgery

14 Orthopedic Surgery

16 General Surgery

2 Ophthalmology

12 ENT

16 Gynecology

4 Neurosurgery

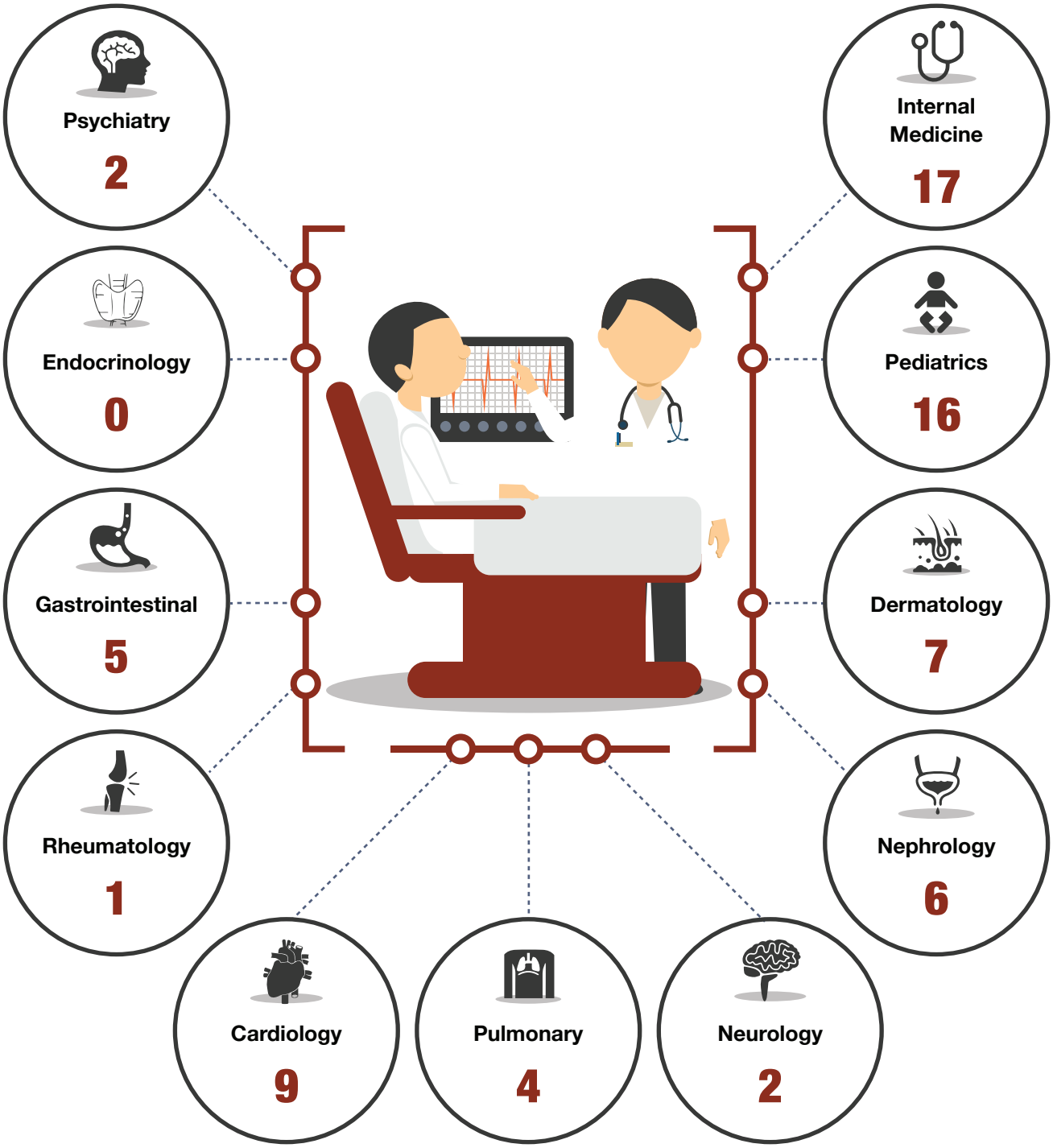
5 Pediatric Surgery

4 Maxillofacial Surgery

3 Reconstructive Surgery

5 Thoracic Surgery

MEDICAL OUTPATIENT DEPARTMENTS



INPATIENT SERVICES

17 Adult Ward

7 Pediatric Ward

6 Surgical ICU

7 Medical ICU

4 Pediatric and Neonatal ICU

20 Operation Theater

4 Renal Dialysis

NUMBER OF INPATIENT BEDS

219 Adult Ward

36 Pediatric Ward

21 Medical ICU

16 Surgical ICU

AVAILABLE RADIOLOGY MACHINES

Portable X-Ray	23	4
Fixed X-Ray	6	3
C arm	8	3
Panorama	1	0
CT	1	1
Doppler	3	1
Handheld US	17	5
Ultrasound	16	2
Mammography	0	0

AVAILABLE INTENSIVE CARE EQUIPMENT

Adult Ventilator	11	2
Pediatric Ventilator	2	0
Neonatal Ventilator	0	0
ABGs Machine	2	1
Pumps	16	0

- Number of Functionong Units
- Number of Non-Functionong Units

AVAILABLE OPERATING ROOM EQUIPMENT

Fixed Lamp	21	5
Portable Lamp	22	9
Anesthesia Machine	28	12
Operating Table	36	6
Traction Table	12	0
Diathermy	37	15

AVAILABLE LABORATORY MACHINES

Electrolytes	6	4
Chemical Tests	20	4
Hematological Tests	8	0
Microscopy	21	2
Rapid HB	9	0
Hemoglobin Centrifuges	20	1
Laboratory Centrifuges	22	2
Wet Laboratory Incubator	14	0
Dry Laboratory Incubator	6	0

- Number of Functionong Units
- Number of Non-Functionong Units

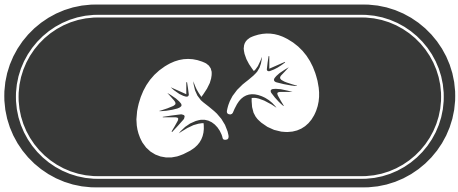
AVAILABLE SHARED EQUIPMENT

	Number of Functionong Units	Number of Non-Functionong Units
Defibrillator	34	12
Monitors	54	30
Dry Sterilization	52	10
Autoclave	35	15
Suction	76	17
Crash Cart	33	4
Nebulizer	63	30
ECG	30	12
Audiometer	2	0
O2 Central Generators	0	1
O2 Concentrator	43	29
Electric Generators	41	16

RENAL DIALYSIS MACHINES

Non-Functioning

1



Functioning

8

BLOOD BANKS

1
Advanced Blood Bank

16
Primary Blood Bank

FINANCIAL SUPPORT

Staff

Fully Supported **1**

Partially Supported **17**

Not Supported **2**

Consumables

Fully Supported **2**

Partially Supported **18**

Not Supported **0**

Running Costs

Fully Supported **1**

Partially Supported **11**

Not Supported **8**

HOSPITAL ATTACKS

Indirect Airstrikes

107

with an average of **5** attacks per hospital

Direct Airstrikes

52

with an average of **3** attacks per hospital

PATIENT ACCESSIBILITY

18 Accessible Hospitals

2 Hard-to-Reach Hospitals

STAFF ACCESSIBILITY

19 Accessible Hospitals

1 Hard-to-Reach Hospital

TYPES OF HOSPITAL BUILDINGS

Hospital	Makeshift	Public Building
8	**6**	**6**

SURGICAL STAFF

	Specialist	Resident
General Surgery	**20**	**6**
Orthopedic Surgery	**11**	**3**
Vascular Surgery	**1**	**0**
Urology	**6**	**0**
Neurosurgery	**2**	**0**
Gynecology	**12**	**3**
Ear-Nose- Throat	**9**	**3**
Ophthalmology	**2**	**0**
Thoracic Surgery	**3**	**0**
Reconstructive Surgery	**2**	**0**
Maxillofacial Surgery	**4**	**0**
Pediatric Surgery	**1**	**1**

MEDICAL, NON-SURGICAL STAFF

	Specialist	Resident
Internal Medicine	11	1
Pediatric	11	2
Dermatology	3	0
Nephrology	2	0
Neurology	0	0
Respiratory Diseases	0	0
Cardiology	3	1
Rheumatology	0	0
Gastroenterology	2	0
Endocrinology	0	0
Laboratory Medicine	1	0
Emergency Medicine	5	0
Intensive Care	1	0
Psychiatry	0	0
Anesthesiology	1	2
Rehabilitation	3	0
Pharmacy	17	0
Oncology	0	0
Radiology	8	1
Pathology	0	0

NURSING STAFF

	Certified	Not Certified
Ward Nurse	**71**	**28**
Pediatric Nurse	**42**	**12**
Neonatal Nurse	**30**	**6**
ER Nurse	**107**	**45**
Out-Patient Clinic Nurse	**38**	**20**
Midwife	**49**	**4**

TECHNICAL STAFF

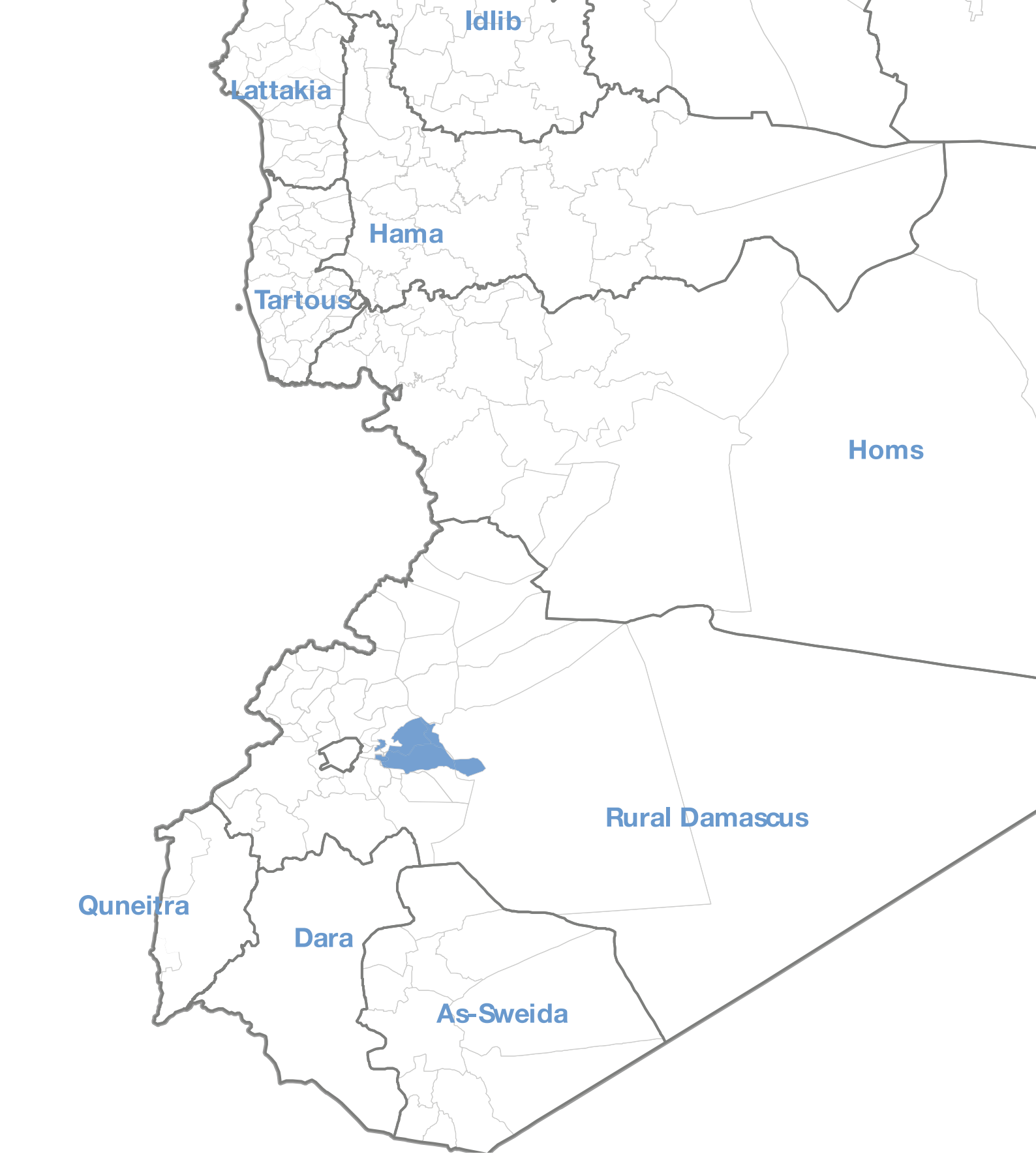
	Certified	Not Certified
Laboratory Technician	**59**	**3**
Radiology Technician	**40**	**5**
OR Technician	**36**	**5**
Anesthesia Technician	**46**	**2**
Renal Dialysis Technician	**4**	**1**
ICU Technician	**16**	**0**
Pharmacy Technician	**21**	**0**
Physiotherapy Technician	**25**	**4**

- **Ghouta,** in rural Damascus, is considered a besieged area, in addition to Qaboun and Barzee. The estimated population in this area is 350,000. All 16 hospitals were surveyed providing the following data:

a. The total number of inpatient beds was 267, including 33 ICU beds (12% of the total), with ratios of eight beds for every 10,000 people and nine ICU beds for every 100,000 people.

b. The total number of doctors was 94, with a ratio of three doctors for every 10,000 people.

c. There was one advanced blood bank and one functional CT scanner (out of three CT machines) available in the area.



Southern Region
Ghouta

16 Hospitals

AVAILABLE SERVICES

15 Surgical OPDs

14 Medical OPDs

13 ER

8 Physiotherapy

SURGICAL OUTPATIENT DEPARTMENTS

9 Urology

2 Vascular Surgery

13 Orthopedic Surgery

14 General Surgery

6 Ophthalmology

7 ENT

5 Gynecology

3 Neurosurgery

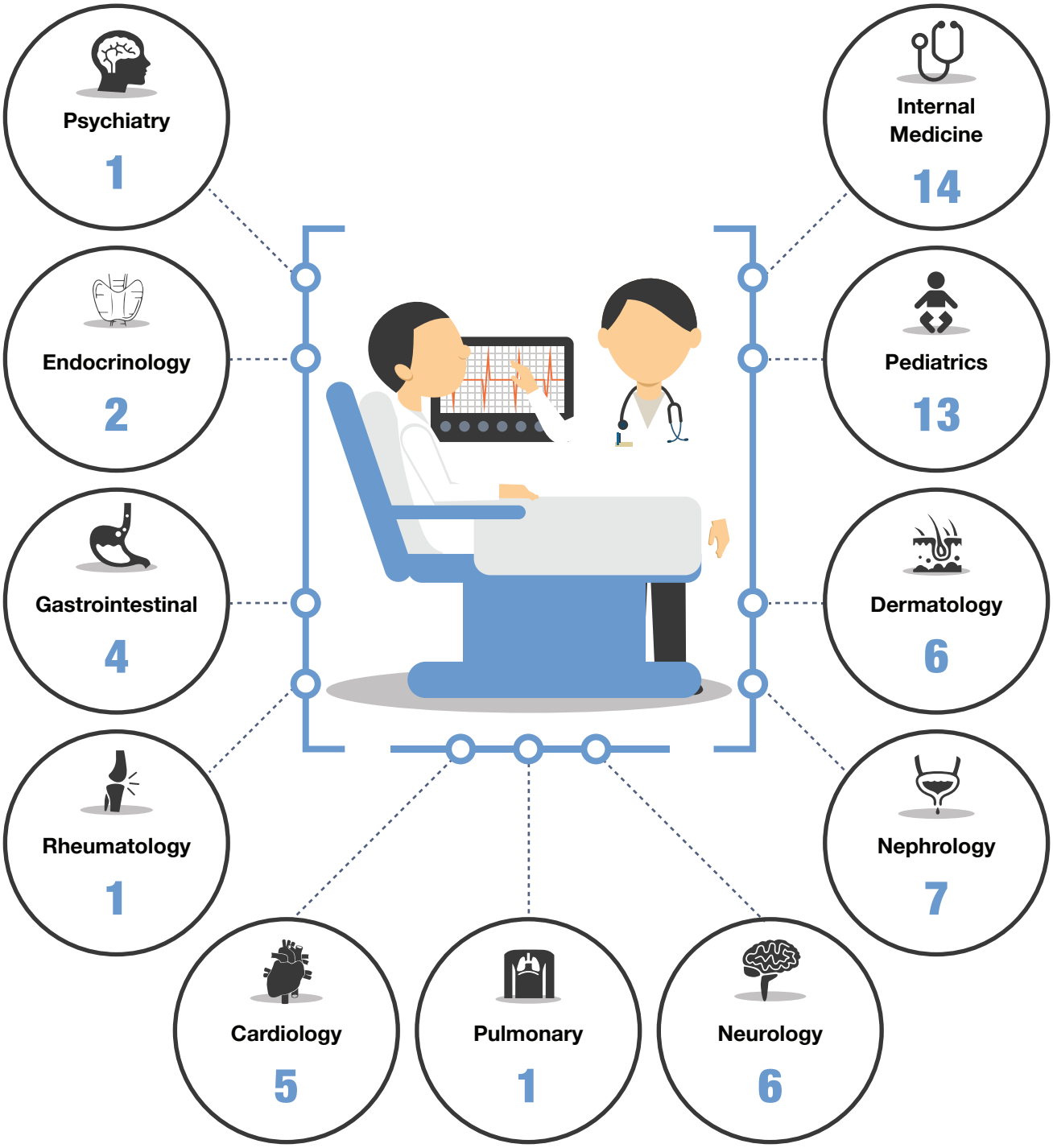
1 Pediatric Surgery

7 Maxillofacial Surgery

1 Reconstructive Surgery

2 Thoracic Surgery

MEDICAL OUTPATIENT DEPARTMENTS



INPATIENT SERVICES

14 Adult Ward

7 Pediatric Ward

3 Surgical ICU

3 Medical ICU

5 Pediatric and Neonatal ICU

16 Operation Theater

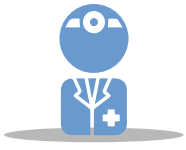
1 Renal Dialysis

NUMBER OF INPATIENT BEDS

198 Adult Ward

36 Pediatric Ward

10 Medical ICU



23 Surgical ICU

AVAILABLE RADIOLOGY MACHINES

Portable X-Ray	15	2
Fixed X-Ray	9	2
C arm	5	6
Panorama	2	0
CT	1	2
Doppler	17	0
Handheld US	19	7
Ultrasound	23	3
Mammography	0	0

AVAILABLE INTENSIVE CARE EQUIPMENT

Adult Ventilator	22	10
Pediatric Ventilator	5	0
Neonatal Ventilator	2	0
ABGs Machine	1	1
Pumps	35	9

- Number of Functionong Units
- Number of Non-Functionong Units

AVAILABLE OPERATING ROOM EQUIPMENT

Fixed Lamp	38	6
Portable Lamp	22	3
Anesthesia Machine	18	5
Operating Table	51	4
Traction Table	7	0
Diathermy	37	5

AVAILABLE LABORATORY MACHINES

Electrolytes	5	2
Chemical Tests	14	5
Hematological Tests	8	3
Microscopy	24	3
Rapid HB	16	4
Hemoglobin Centrifuges	23	2
Laboratory Centrifuges	9	1
Wet Laboratory Incubator	4	0
Dry Laboratory Incubator	8	1

- Number of Functionong Units
- Number of Non-Functionong Units

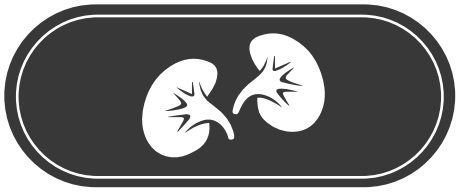
AVAILABLE SHARED EQUIPMENT

	Number of Functionong Units	Number of Non-Functionong Units
Defibrillator	28	3
Autoclave	25	0
Nebulizer	59	20
O2 Central Generators	0	1
Monitors	74	7
Suction	76	7
ECG	28	5
O2 Concentrator	76	11
Dry Sterilization	48	2
Crash Cart	1	0
Audiometer	2	0
Electric Generators	69	6

RENAL DIALYSIS MACHINES

Non-Functioning

4



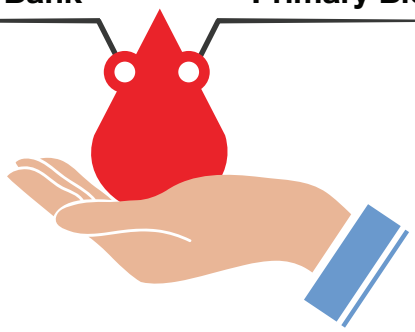
Functioning

4

BLOOD BANKS

1
Advanced Blood Bank

12
Primary Blood Bank



FINANCIAL SUPPORT

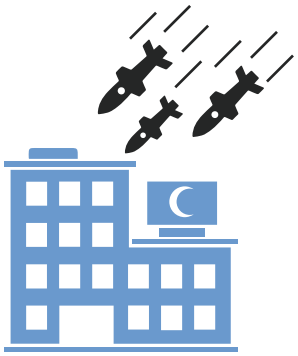
	Fully Supported	Partially Supported	Not Supported
Staff	5	10	1
Consumables	6	9	1
Running Costs	4	10	2

HOSPITAL ATTACKS

Indirect Airstrikes

67

with an average of **4** attacks per hospital



Direct Airstrikes

45

with an average of **3** attacks per hospital

PATIENT ACCESSIBILITY

2 Accessible Hospitals

14 Hard-to-Reach Hospitals

STAFF ACCESSIBILITY

2 Accessible Hospitals

14 Hard-to-Reach Hospitals

TYPES OF HOSPITAL BUILDINGS

Hospital

2

Makeshift

14

SURGICAL STAFF

	Specialist	Resident
General Surgery	11	0
Orthopedic Surgery	11	5
Vascular Surgery	0	2
Urology	4	3
Neurosurgery	0	0
Gynecology	5	1
Ear-Nose- Throat	3	2
Ophthalmology	5	1
Thoracic Surgery	1	0
Reconstructive Surgery	1	0
Maxillofacial Surgery	3	1
Pediatric Surgery	0	0

MEDICAL, NON-SURGICAL STAFF

	Specialist	Resident
Internal Medicine	7	3
Pediatric	7	2
Dermatology	0	1
Nephrology	1	0
Neurology	2	0
Respiratory Diseases	1	0
Cardiology	0	0
Rheumatology	1	0
Gastroenterology	1	0
Endocrinology	0	0
Laboratory Medicine	0	0
Emergency Medicine	3	0
Intensive Care	0	0
Psychiatry	0	0
Anesthesiology	3	0
Rehabilitation	1	0
Pharmacy	0	0
Oncology	0	0
Radiology	2	0
Pathology	0	0

NURSING STAFF

	Certified	Not Certified
Ward Nurse	**29**	**158**
Pediatric Nurse	**2**	**8**
Neonatal Nurse	**2**	**11**
ER Nurse	**3**	**110**
Out-Patient Clinic Nurse	**3**	**46**
Midwife	**9**	**11**

TECHNICAL STAFF

	Certified	Not Certified
Laboratory Technician	**24**	**14**
Radiology Technician	**14**	**7**
OR Technician	**7**	**54**
Anesthesia Technician	**25**	**20**
Renal Dialysis Technician	**1**	**1**
ICU Technician	**2**	**1**
Pharmacy Technician	**3**	**22**
Physiotherapy Technician	**14**	**5**

- **In rural Homs,** the estimated total population is 330,000. The area consists of eight hospitals, which were all surveyed. Data for rural Homs is as follows:

a. The total number of inpatient beds was 125, including 18 ICU beds (14% of the total), with ratios of four beds for every 10,000 people and five ICU beds for every 100,000 people.

b. The total number of doctors was 62, with a ratio of two doctors for every 10,000 people.

c. No advanced blood bank services were available in the area, and there was no CT scanner readily available for service (there was one nonfunctional CT scanner).

Southern Region
Rural Homs

8 Hospitals

AVAILABLE SERVICES

7 Surgical OPDs

8 ER

8 Medical OPDs

5 Physiotherapy

SURGICAL OUTPATIENT DEPARTMENTS

0 Urology

0 Vascular Surgery

7 Orthopedic Surgery

6 General Surgery

0 Ophthalmology

5 ENT

3 Gynecology

1 Neurosurgery

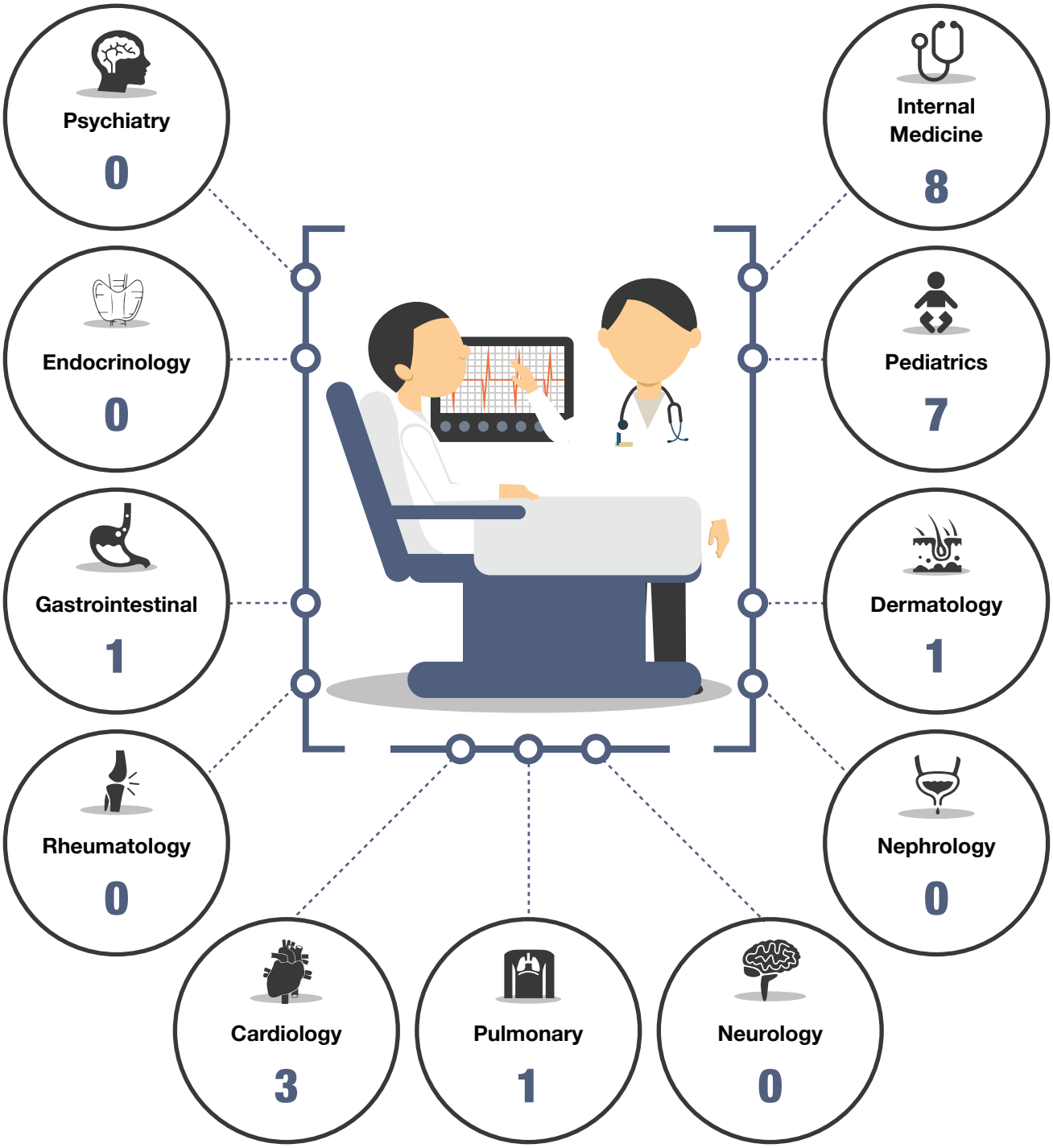
0 Pediatric Surgery

0 Maxillofacial Surgery

0 Reconstructive Surgery

0 Thoracic Surgery

MEDICAL OUTPATIENT DEPARTMENTS



INPATIENT SERVICES

7 Adult Ward

7 Pediatric Ward

4 Surgical ICU

7 Medical ICU

4 Pediatric and Neonatal ICU

8 Operation Theater

2 Renal Dialysis

NUMBER OF INPATIENT BEDS

80 Adult Ward

27 Pediatric Ward

11 Medical ICU

7 Surgical ICU

AVAILABLE RADIOLOGY MACHINES

Portable X-Ray	8	3
Fixed X-Ray	1	2
C Arm	1	1
Panorama	0	0
CT	0	1
Doppler	2	0
Handheld US	6	2
Ultrasound	5	0
Mammography	0	0

AVAILABLE INTENSIVE CARE EQUIPMENT

Adult Ventilator	11	3
Pediatric Ventilator	3	0
Neonatal Ventilator	1	0
ABGs Machine	2	0
Pumps	3	0

- Number of Functionong Units
- Number of Non-Functionong Units

AVAILABLE OPERATING ROOM EQUIPMENT

Fixed Lamp	14	0
Portable Lamp	9	0
Anesthesia Machine	12	2
Operating Table	17	1
Traction Table	2	0
Diathermy	12	3

AVAILABLE LABORATORY MACHINES

Electrolytes	3	0
Chemical Tests	9	3
Hematological Tests	3	0
Microscopy	13	3
Rapid HB	3	0
Hemoglobin Centrifuges	11	4
Laboratory Centrifuges	11	1
Wet Laboratory Incubator	3	0
Dry Laboratory Incubator	9	0

- Number of Functionong Units
- Number of Non-Functionong Units

AVAILABLE SHARED EQUIPMENT

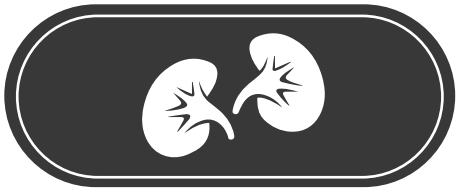
Defibrillator	14	5
Autoclave	6	2
Nebulizer	34	3
O2 Central Generators	0	0
Monitors	29	9
Suction	29	2
ECG	15	6
O2 Concentrator	24	3
Dry Sterilization	26	4
Crash Cart	3	0
Audiometer	0	0
Electric Generators	18	6

- Number of Functionong Units
- Number of Non-Functionong Units

RENAL DIALYSIS MACHINES

Non-Functioning

0



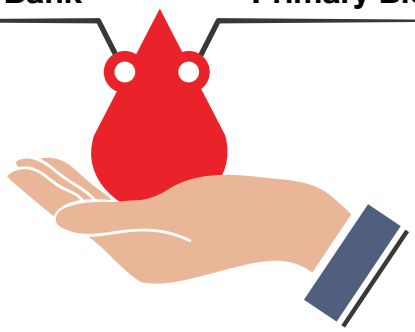
Functioning

2

BLOOD BANKS

0
Advanced Blood Bank

8
Primary Blood Bank



FINANCIAL SUPPORT



Staff

Fully Supported **0**

Partially Supported **7**

Not Supported **1**

Consumables

Fully Supported **0**

Partially Supported **8**

Not Supported **0**

Running Costs

Fully Supported **1**

Partially Supported **7**

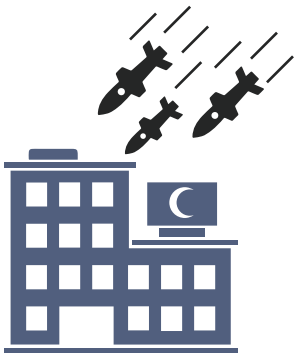
Not Supported **0**

HOSPITAL ATTACKS

Indirect Airstrikes

106

with an average of **13** attacks per hospital



Direct Airstrikes

39

with an average of **5** attacks per hospital

PATIENT ACCESSIBILITY

8 Hard-to-Reach Hospitals

STAFF ACCESSIBILITY

8 Hard-to-Reach Hospitals

TYPES OF HOSPITAL BUILDINGS

Makeshift

2

Public Building

6

SURGICAL STAFF

	Specialist	Resident
General Surgery	7	2
Orthopedic Surgery	5	0
Vascular Surgery	0	0
Urology	0	0
Neurosurgery	1	0
Gynecology	3	0
Ear-Nose- Throat	4	0
Ophthalmology	0	0
Thoracic Surgery	0	0
Reconstructive Surgery	0	0
Maxillofacial Surgery	0	0
Pediatric Surgery	0	0

MEDICAL, NON-SURGICAL STAFF

	Specialist	Resident
Internal Medicine	6	0
Pediatric	7	0
Dermatology	1	0
Nephrology	0	0
Neurology	0	0
Respiratory Diseases	0	0
Cardiology	3	0
Rheumatology	0	0
Gastroenterology	1	0
Endocrinology	0	0
Laboratory Medicine	1	0
Emergency Medicine	1	0
Intensive Care	0	0
Psychiatry	0	0
Anesthesiology	1	0
Rehabilitation	0	0
Pharmacy	4	0
Oncology	0	0
Radiology	3	0
Pathology	0	0

NURSING STAFF

	Certified	Not Certified
Ward Nurse	**44**	**37**
Pediatric Nurse	**16**	**12**
Neonatal Nurse	**13**	**0**
ER Nurse	**33**	**43**
Out-Patient Clinic Nurse	**17**	**17**
Midwife	**17**	**5**

TECHNICAL STAFF

	Certified	Not Certified
Laboratory Technician	**30**	**3**
Radiology Technician	**16**	**1**
OR Technician	**18**	**10**
Anesthesia Technician	**26**	**0**
Renal Dialysis Technician	**8**	**0**
ICU Technician	**13**	**6**
Pharmacy Technician	**9**	**3**
Physiotherapy Technician	**12**	**4**

A COMPARISON WITH THE INTERNATIONAL FIGURES

International statistics show that the number of hospital beds serving inpatients is on average 25 beds for every 10,000 people. Global statistics also show that the number of medical staff is 13 doctors, and 28 nurses & midwives for every 10,000 people.

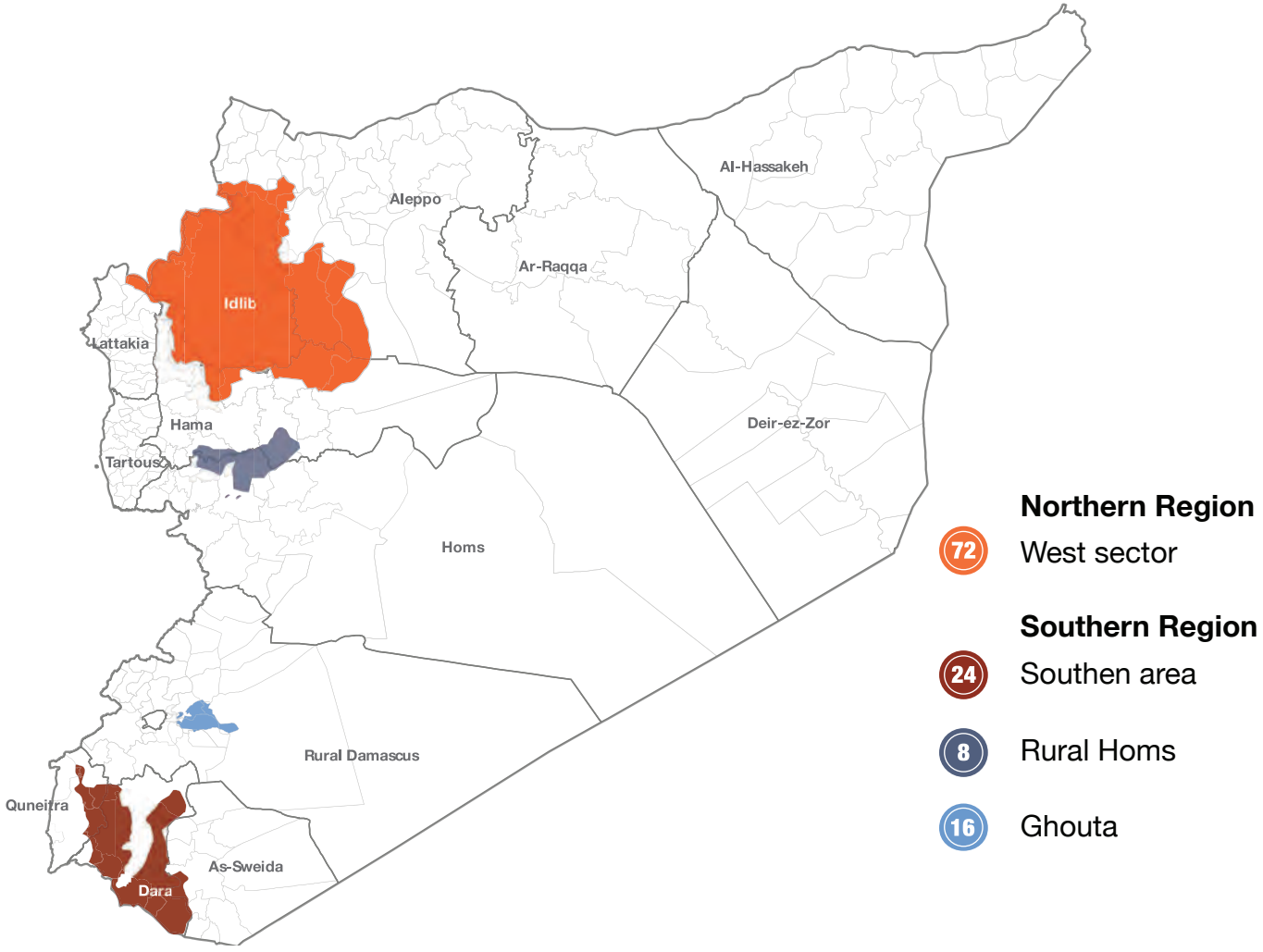
Internationally, there is no fixed ratio for the number of ICU beds to population. However, most participants recommend that there should be 2 ICU beds for every 10 acute hospital beds, and 2 ICU beds per each operation room.

International Health Statistics released by WHO in 2009, shows that the number of hospital beds in Syria reached 15 beds for every 10,000 people. In 2009 there were 5 doctors and 14 nurses & midwives for every 10,000 people.

In our 2015 Hospital Survey, the ratio was 4 beds, 3 physicians, and 6 nurses & midwives for every 10,000 people.

However in our 2016 National Study, the average ratio was down to 3 beds, 2 doctors, and 4 nurses & midwives for every 10,000 people.

DISTRIBUTION OF HOSPITALS IN SYRIA



COMPARISON BETWEEN CURRENT STUDY AND PAST SURVEYS

1. Survey questions

Detailed questions related to hospital fortification were added as well as questions about specific critical equipment, such as dialysis machines. Questions related to the volume of work were eliminated as work volume is reported in the UOSSM Monthly Hospitals Report.

2. Number of studied hospitals

Despite deteriorating circumstances and increasing staff risk due to the ongoing war, we surveyed a higher percentage—82% (107 out of 130)—of active hospitals than were surveyed in the October 2015 survey—78% (113 out of 147). This was only possible with the collaboration of the local health directorates and the UOSSM data team in the area.

3. Hospital equipment and services

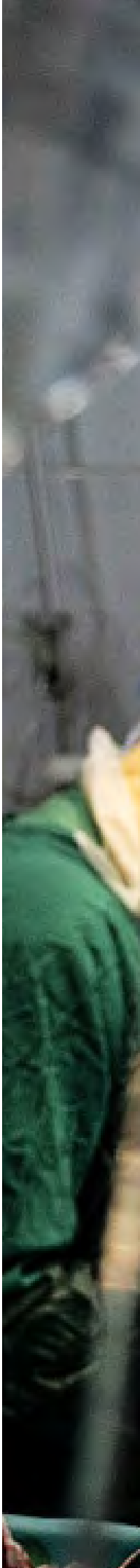
- We found a 5% overall decrease in services due to a decrease in the number of hospitals.
- We encountered the same number of ICU beds, despite the increased complexity of cases documented in our UOSSM monthly reports.
- There was a decrease in the number of X-ray machines, and an increase in the number of ultrasound machines.
- The study again revealed a large number of non-functioning equipment.
- Functioning CT scanners decreased from six to four, a number that is critically low as head trauma cases continued to be of high volume, in addition to other abdominal and chest illnesses that are dependent on CT scans.
- No significant change in essential OR equipment was found.
- Laboratory equipment has significantly increased.
- Central oxygen generators have increased from 17 to 24. However, more non-functional generators were counted, reflecting a need for maintenance or replacement.

4. Financial support

An obvious improvement was observed, especially at the staff level (40% of hospital staff were not supported in the 2015 survey, whereas only 7% of hospital staff were not supported in 2016).

5. Human Resources availability

There was a significant decrease in surgeons (558 compared to 733 in 2015); this decline was particularly applicable to general surgeons (120 compared to 169 in 2015) and orthopedic surgeons (90 compared to 129 in 2015). There was no significant change in technicians and nursing staff.



RECOMMENDATIONS

1. We conclude that there is a crucial need for fortification of hospitals, because Syrian hospitals were subjected to an average of three airstrikes per hospital in 2016. Most hospitals did not take serious measures to protect the building from aerial bombardment. Nevertheless, the best protection is to stop the shelling and attacking of medical facilities in accordance with international law.

2. Critical screening equipment such as mammogram is totally non-existent. The amount of non-functional equipment is very high, indicating a need for biomedical workshops to increase the maintenance of medical machines and technician repair skills. Such workshops could train technicians and engineers and would reduce the cost of equipment replacement, which is the current method used by most NGOs that support these hospitals.

3. The report showed a critical need for different levels of staff training, particularly at medical student, and resident levels, training has declined significantly from 2015. Formal resident training programs are recommended, particularly in the hospitals where a large volume of work and variety of services are available.

4. Medical staff numbers have declined in some critical specialties, such as general and orthopedic surgery. In 2016, the ratio of doctors to the population was 2 to 10,000, dropping further below the recommended international ratio. This reflects the emigration or resignation of physicians and specialists, particularly in areas where safety is not secured. Until the safety issue is resolved, certain specialties could be grouped in high volume hospitals to provide more focused patient care.

GLOSSARY

ABG	Arterial Blood Gases
CT	Computerized Tomography
ECG	Electrocardiography
ER	Emergency Room
HB	Hemoglobin
ICU	Intensive Care Unit
IV	Intravenous
NGOs	Non-Governmental Organizations
O2	Oxygen
OPD	Outpatient Department
OR	Operating Room
PAC	Physicians Across Continents
SAEA	Syrian American Engineers Association
UOSSM	Union of Medical Care and Relief Organizations
US	Ultrasonography

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