

DUBAI CLINICAL SERVICES CAPACITY PLAN 2018-2030





”إن صحة الإنسان هي الأهم والأعلى وبدونها لا تستقيم الحياة البشرية ولا تنعم بالسعادة وطيب العيش.“

صاحب السمو الشيخ محمد بن راشد آل مكتوم
نائب رئيس الدولة رئيس مجلس الوزراء حاكم دبي ”رعاه الله

“Good health is the most important thing. Without it, people cannot enjoy a good living”.

His Highness Sheikh Mohammed bin Rashid Al Maktoum
Vice President and Prime Minister of the UAE and Ruler of Dubai



”يحظى القطاع الصحي في دبي بأولوية قصوى لضمان توفير أرقى الخدمات الصحية وتقديم رعاية نوعية عالية المستوى ترقى إلى أفضل المعايير العالمية، ما يمكننا من تحقيق قفزات نوعية في خدماتنا الصحية وتطوير سياسات واستراتيجيات قادرة على تقييم التحديات الصحية المختلفة بصورة علمية ودقيقة تواكب المتغيرات في هذا القطاع، وبما يعزز طموحنا ببناء قطاع صحي عالمي.“

سمو الشيخ حمدان بن محمد بن راشد آل مكتوم

ولي عهد دبي رئيس المجلس التنفيذي

“Dubai highly prioritises its health sector to ensure the provision of the highest quality of health services that are on par with the best international standards. This enables us to develop policies and strategies that are capable of assessing the various health challenges in a scientific and accurate manner thus supporting our ambition to build a leading healthcare sector.”

His Highness Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum

Crown Prince of Dubai and Chairman of the Dubai Executive Council



”لقد أدركت هيئة الصحة بدبي أهمية التخطيط الصحي باعتباره عملية مستمرة من الأهداف والوسائل لتطوير الخدمات الصحية، فتلاحقت جهودها في إعداد وتنفيذ الاستراتيجيات ووضع البدائل المستقبلية لها.“

سمو الشيخ حمدان بن راشد آل مكتوم

نائب حاكم دبي وزير المالية رئيس هيئة الصحة بدبي

“The Dubai Health Authority (DHA) has recognised the importance of health planning as a continuous process that comprises of goals and plans to develop health services. As a result, the DHA has been diligent in preparing and implementing strategies and developing future alternatives.”

His Highness Sheikh Hamdan bin Rashid Al Maktoum

Deputy Ruler of Dubai, UAE Minister of Finance and
President of the Dubai Health Authority

الرؤى والتطلعات



حرصت هيئة الصحة بدبي - ضمن سياستها المتجددة - على أن تكون الدراسات والبحوث العلمية والميدانية، هي الأساس في صناعة القرار وصياغة المبادرات والبرامج التطويرية التي تتبنى تنفيذها وصولاً إلى مجتمع أكثر صحة وسعادة.

وتستند الهيئة في مجمل ما تقوم به في هذا الشأن إلى تطلعاتها المستقبلية في نموذج صحي من الطراز الأول يحتذى به عالمياً، أخذة في حساباتها الطلب المتنامي على خدماتها الطبية، وثقة المتعاملين معها، وهدفها الرامي إلى تحقيق رضا وسعادة المجتمع وتحسين رحلة المرضى داخل منشأتها الطبية، وتوفير خدمات عالية الجودة بمعايير عالمية.

ويتوافق مع هذه المحددات والأهداف دراستنا الجديدة.. (دراسة السعة السريرية في إمارة دبي)، التي جاءت مواكبة ومترجمة لرؤى صاحب السمو الشيخ محمد بن راشد آل مكتوم نائب رئيس الدولة رئيس مجلس الوزراء حاكم دبي "رعاه الله"، وتوجيهات سموه الكريمة في البند الخامس من وثيقة الخمسين (طبيب لكل مواطن)، حيث تركز الدراسة على: تقييم وتقدير حجم الطلب على التخصصات الطبية وأعداد الأطباء والكوادر الطبية المساندة والفنية، وعدد الأسرة، إضافة إلى تقييم وتقدير حجم الخدمات الصحية المتوفرة حالياً، وحجم الطلب على هذه الخدمات حتى عام 2030، في ضوء التعداد والنمو السكاني للمواطنين وجميع أفراد المجتمع وأيضاً الزائرين، ورواد معرض إكسبو 2020 دبي.

في هذه الدراسة وخلصتها العديد من المقومات والأسس، التي تمكن الهيئة من قراءة المستقبل بشكل أفضل وأكثر وضوحاً، ومن ثم التعامل مع مقتضياته بالأسلوب الذي يعزز جودة الحياة.

ما نأمله ونتطلع إليه هو أن ينعم الجميع بصحة وسعادة، وأن تكون هيئة الصحة بدبي في الطليعة دائماً.

حميد محمد القطامي

المدير العام
هيئة الصحة بدبي

VISION AND ASPIRATION

DHA is working towards achieving its vision of building a world-class healthcare system that keeps patient-centered care in mind and provides access to high quality medical services that are on par with international standards.

This is in line with the vision of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai and in line with the goals of Article five (A doctor for every citizen) of the 50-Year Charter.

Dubai Clinical Services Capacity Plan 2018-2030 (DCSCP) is an important tool that provides us with an in-depth look into clinical services capacity in Dubai so that we can devise evidence-based plans and policies, undertake future facility planning and focus on priority health-service areas.

DCSCP provides essential information and data as well as envisages the demand for clinical service capacity until the year 2030. It evaluates and assesses the demand for medical specialities, doctors, nurses, technicians and number of beds. It also assesses the current number of medical services available and the expected demand for these services, taking into account Dubai's population, visitors and Dubai Expo 2020.

I am confident that the plan will help us achieve a balanced geographical distribution of health services across Dubai and fulfil our vision of providing residents and visitors of Dubai with access to high-quality health services.

Humaid Al Qutami

Director General
Dubai Health Authority

TABLE OF CONTENTS

1. PROJECT OVERVIEW	11
1.1 Dubai Clinical Services Capacity Plan 2018-2030	12
2. METHODOLOGY OVERVIEW	14
2.1 Methodology process	15
2.2 Supply	16
2.3 Demand	16
2.4 Gap analysis	17
2.5 Definitions	18
3. BACKGROUND AND CONTEXT	19
3.1 Health Care Environment	20
3.2 Population and Demographics	20
4. SUPPLY ANALYSIS	28
4.1 Survey Responses	29
4.2 Supply Scenarios	33
5. DEMAND ANALYSIS	37
5.1 Catchment and Assumptions	38
5.2 Demand scenarios	38
5.3 Additional demand	41
6. GAP ANALYSIS	42
6.1 Acute Inpatient care (Overnight)	43
6.2 Acute Inpatient care (Same Day)	46
6.3 Outpatient care (Consultation rooms)	48
6.4 Emergency Department	51
6.5 Procedural Care / Medical Imaging	53
6.6 Critical Care beds	56
6.7 Non-Acute Care and Long-Term Care beds	57
6.8 Operating Theatres	58
6.9 Human Resources	60
7. DISCUSSION	63
7.1 Summary	64
7.2 Service specialty priorities	65
7.3 Contemporary Models of Care	69
7.4 Service Delivery Trends	71
7.5 Setting the Direction for Clinical Service Capacity in Dubai	73
8. APPENDIX	76
8.1 Technical documents	77
8.2 Acknowledgements	90



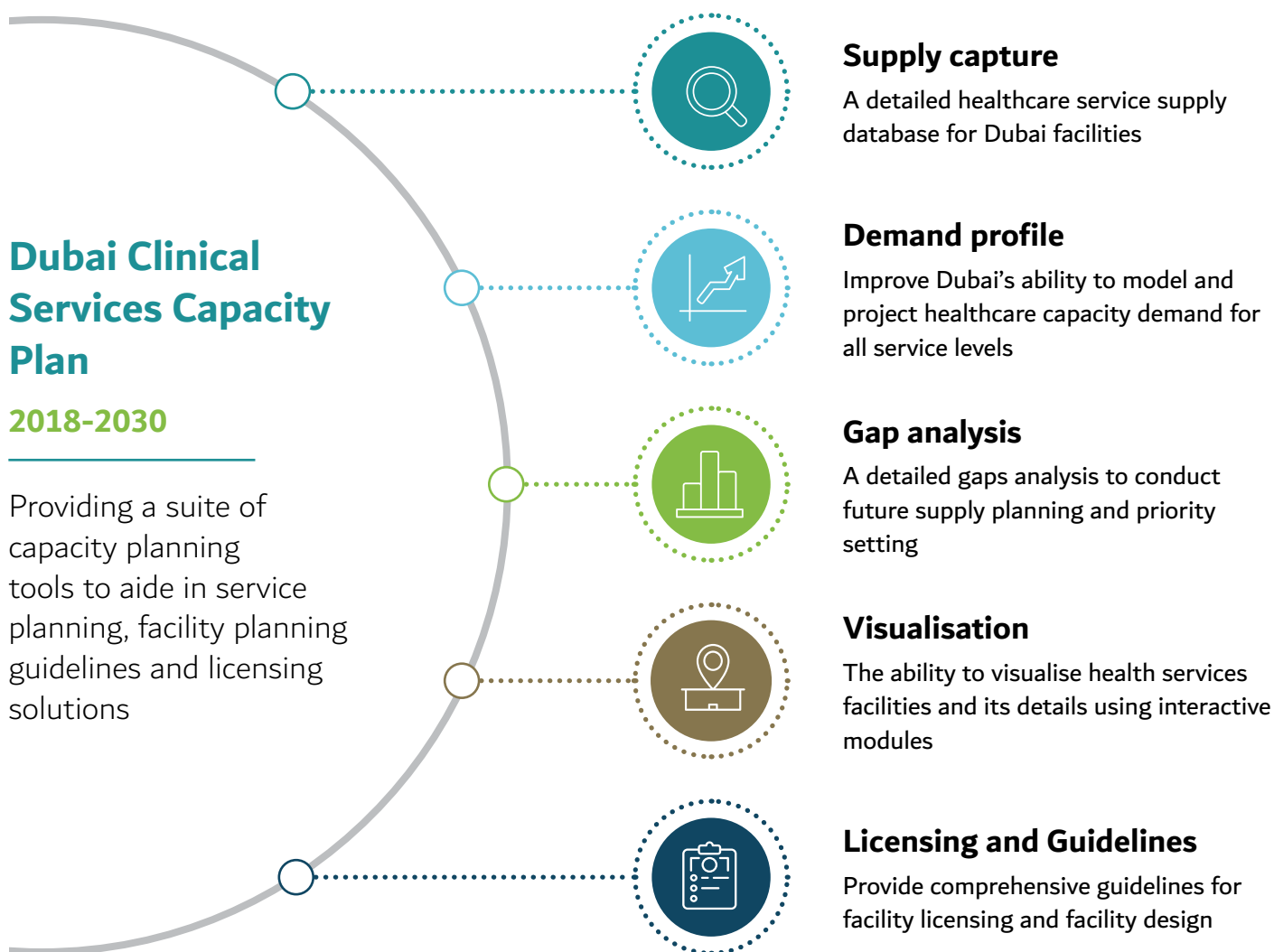
CHAPTER 1

PROJECT OVERVIEW

This chapter describes the rationale, framework, the main objectives and the benefits of the Dubai Clinical Services Capacity Plan 2018-2030.

1.1 Dubai Clinical Services Capacity Plan 2018-2030

Endorsed and supported by the H.E. Humaid Mohammed Obaid Al Qatami, the **Dubai Clinical Services Capacity Plan 2018-2030 (DCSCP)** assists in delivering the 15 Ambitious Strategic Programs of the Dubai Health Strategy 2016 – 2021. The DCSCP aims to develop a Health Network Capacity Plan to benefit patients, investors and the community.



The objectives of the DCSCP are to:

- To capture and validate the current supply of clinical service capacity
- Integrate the planned clinical service capacity approved for development
- Project the demand for clinical service capacity through to 2030 taking account of the Dubai’s resident population and visitors using health service in Dubai from other United Arab Emirates and elsewhere
- Develop scenarios to assess the impact of demand on health service capacity
- Assess the gap in the supply of clinical service capacity for each scenario
- Identify short and long-term priorities and strategies for the development of clinical services
- Develop a mapping tool for displaying the current supply of health service facilities
- Produce a guide to clinical service capacity development and policy recommendations
- Provide comprehensive guidelines for facility licensing and facility design

The DCSCP is a periodic study conducted to understand the current healthcare sector, the demand, supply and existing and future gaps of services. The study was conducted across government and private sectors in Dubai. The data collected and developed was validated and analysed to provide a comprehensive report to guide capacity planning for Dubai healthcare until 2030.

The DCSCP brings together the collaborative efforts of the Dubai Health Authority to create a detailed and practical planning guide that supports the development of the Dubai health sector in delivering efficient, effective, comprehensive and quality services to the community.

The DCSCP was developed by the Policy and Strategy Department, Dubai Health Authority (DHA) but executed collaboratively by DHA and Total Alliance Health Partners International (TAHPI), an experienced and internationally renowned health planning firm.

This report is based on a robust and detailed survey of the current supply of services by facilities and a systematic assessment of the future demand.



“DHA’s Dubai Health Strategy 2016-2021 has three key goals these are: drive innovation and ensure governance, protect and improve population health and ensure patient happiness by providing world-class health services. These goals aim to fulfil DHA’s vision and our focus is working across a continuum of care, starting from early prevention and detection of disease all the way to rehabilitation.”

Fatima Abbas

CEO, Strategy and Corporate Development Sector, DHA



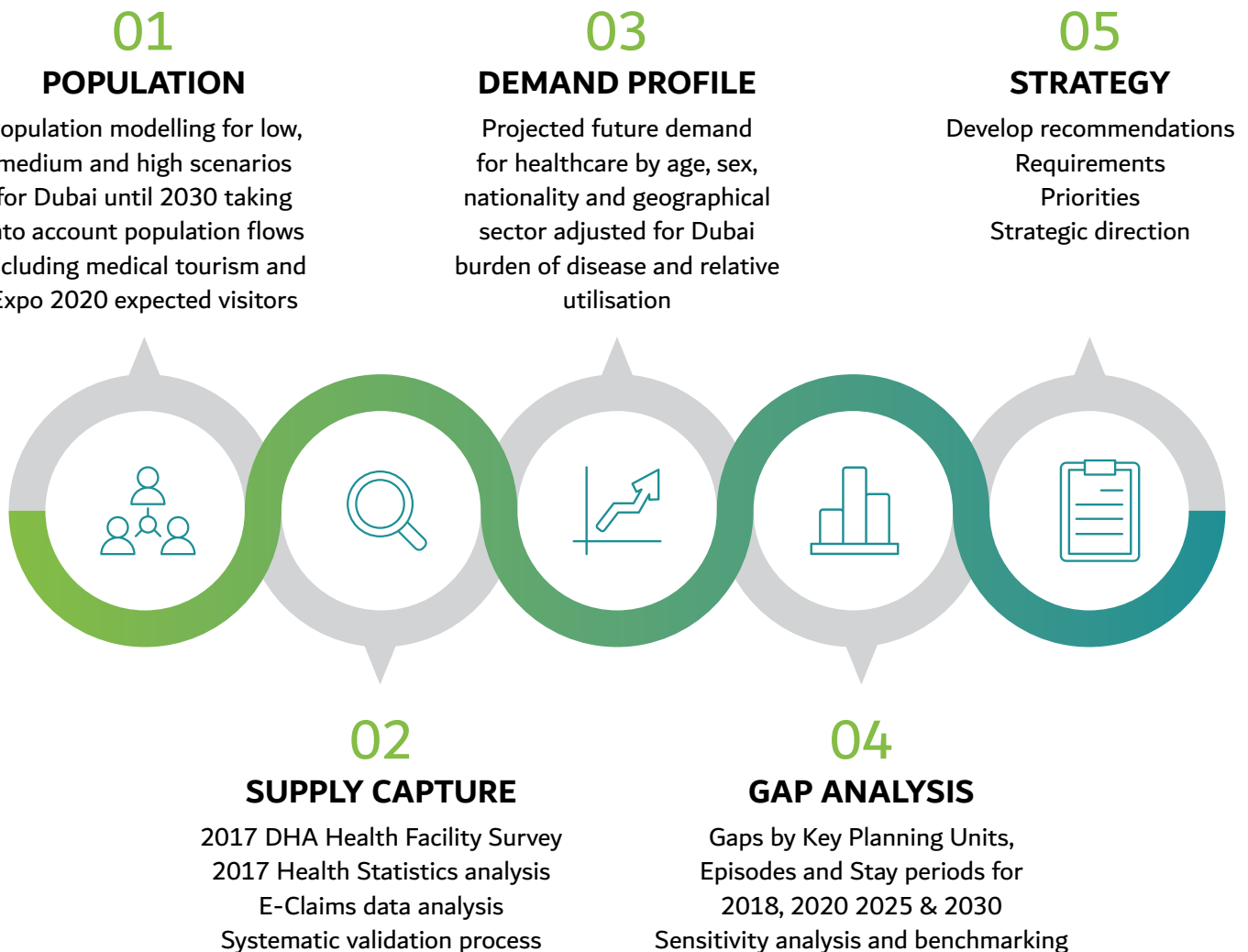
CHAPTER 2

METHODOLOGY OVERVIEW

The chapter describes the methodology used to conduct the supply and demand assessment, as well as give an understanding of the areas focused on to identify gaps for development.

2.1 Methodology process

A systematic and incremental method was adopted in developing the DCSCP, progressing from population modelling, supply capture, demand modelling and gap assessment. This process and its components are summarised as below.



Initially supply data was gathered by conducting a survey of clinical services supplied in 2017 and validating these results using external data sources such as E-Claims and 2017 Health Statistics data.

Population modelling was performed to project the Dubai population by sector, nationality, age and gender in 5-year intervals up to the year 2030. Health service demand projections were estimated using a statistical tool, the Demand Module, developed using refined international population-based reference datasets, adjusted for burden of disease, to project service demand based on population per capita projections of key utilization and capacity measures for outpatient, inpatient and continuing care service types.

The gaps identified in the key measures is a result of the difference estimated between supply and demand. Further nominal adjustments were made, in consultation with an Expert Panel, to ensure that results are sensitive to local factors and incorporate relative utilization factors which adjust the international reference rates to account for local utilization and efficiency factors relevant to Dubai.

2.2 Supply

Supply is the total amount of a services that are available and used by consumers. Supply is defined in this study as the clinical services reported by survey respondents as available and provided at their facility during 2017. Further adjustments were made to supply estimates to account for an incomplete response rate.

Each hospital was visited by a surveyor who distributed the survey forms to a senior hospital executive team. All contents of the survey form were explained to participants and ongoing support was provided during the survey period. A four-week period was allowed for hospitals to collect the survey data and enter this data into the online supply capture module. Outpatient clinic surveys were conducted by telephone interview where surveyors assisted with using the online supply capture tool and provided technical assistance where required.

A survey of planned health facilities was conducted to supplement the capacity survey to account for additional services that will be provided up until 2025. This survey was based on information from DHA’s Health Regulation Department, market intelligence and discussion with an Expert Panel.

Following the completion of the survey, post-survey adjustments were performed to accommodate for non-completed surveys and partially completed surveys. This process was accompanied by a comprehensive validation process which cross-referenced the survey results to DHA utilisation and capacity data (Health Statistics 2017) and the recently established E-Claims database. When differences were found, the correct estimates were confirmed by further follow up with facility managers. This provides increased certainty of supply estimates.

2.3 Demand

Health service demand uses the TAHPI Demand Module to calculate current and future demand for Dubai’s population broken down by age, gender, geographic sectors and nationality status. Demand projections are based on refined international population-based reference health provision datasets to project service demand by key utilisation and capacity measures for outpatient, inpatient and continuing care service types.

Reference datasets have been developed from health service data from Australia, UK, USA, the World Bank, WHO and the OECD for participating countries. The data used is representative of countries with good health status, relatively equitable access to affordable healthcare, and well established and publicly available quality healthcare utilization data for estimating and projecting capacity trends.

These reference datasets have been refined to create best fit regression demand estimates for primary, secondary and tertiary care to a service speciality and casemix level, using at least ten years of historical data to project demand for up to 2030. Age group, gender and nationality specific population rates have been generated for episodes and stay periods. Stay periods have been converted to key capacity measures, such as beds and rooms, based on agreed occupancy rates.

The reference datasets encompass a comprehensive range of service types delivered by contemporary health systems:

- | | | | |
|--|---|---|--|
|  | Acute overnight and same day care |  | Emergency department care |
|  | Non-acute, sub-acute and extended care |  | Outpatient care |
|  | Operating theatre care |  | Procedural care (Medical Imaging) |
|  | Critical care |  | Health workforce |

Projections of health service demand measures generated by the Demand Module are further adjusted for known population, health service demand and provision factors, affecting the population both currently and in future years, including: regional and national burden of disease, policy-driven and stimulated population growth or decline, relative utilisation, occupancy, length of stay and percentage same day.

2.4 Gap analysis

The gap analysis is calculated by the difference of demand and supply, where a deficit indicates a need for additional capacity and a surplus suggests an opportunity for reallocation of capacity to deficient services. This analysis identifies capacity shortages between the demand on the health care system and the current and planned supply within the Emirate. It is used to identify priorities for development of services, facility and workforce in Dubai to 2030.

All measures are translated into key planning units (e.g. beds, chairs, operating theatres, consultations rooms, full time equivalents) using locally validated operational assumptions such as occupancy, turnover and operational days. Key planning units define infrastructure and workforce capacity units that form the core clinical service delivery environment of a clinical service asset. The following tables describe the infrastructure and workforce KPIs used for the DCSCP gap analysis.

Table 1: Key Planning Unit definitions and capacity measures

KPU Setting	Capacity Measure
Acute Overnight Care	Beds
Acute Same Day Care	Places/Chairs
Non-Acute Overnight Care	Beds
Intensive Care	Beds
Emergency Department	Bays/Rooms
Operating Theatres	Rooms
Outpatients	Rooms
Workforce	Full Time Equivalents








Each service type is broken down into a comprehensive list of service lines and their included DRGs, each with their own demand growth profile that is sensitive to the population structure changes of Dubai. This service line framework is displayed in Chapter 8 – Appendix.

A sensitivity analysis is performed to compare results with comparative rates and benchmarks, in combination with discussions of the findings with an Expert Panel. For further information on sensitivity analysis please refer to Chapter 8 – Appendix.

2.5 Definitions

The reference files applied to Dubai's population catchment calculates several measure variables, such as overnight episodes, same day episodes and outpatient visits, converting them to beds, places and consultations room using stay period estimates. This is then adjusted for standard health service operational measures more suited to Dubai's health system, enabling the investigation of projections by age group, gender, service type, service mode, specialty and casemix groups.

Table 2: Key Planning Unit definitions and assumptions

Type	Utilisation Statistic Measure	KPU Measure	Assumption
 Acute Care	Same Day Separations	Overnight Beds	Beds = 70% occupancy, 365 days/year,
	Overnight Separations		
 Non-acute Care	Overnight Stay Periods (days)	Same Day Places	Places = 1.5 patient per day/KPU, 248 days/year
 Emergency Department Care	Presentations Stay Periods (minutes)	Emergency Bays	70% occupancy, 365 days/year
 Intensive Care	Separations Stay Periods (days)	Intensive Care Beds	70% occupancy, 365 days/year
 Outpatient Care	Occasions	Consultation Rooms	70% occupancy, 248 days/year, 8 hours/day
 Procedural Care	Scans	Units	70% occupancy, 248 days/year, 8 hours/day
 Operating Theatre	Operations Stay Periods (minutes)	Theatre rooms	70% occupancy (Elective) 45% occupancy (Emergency)

Each service type has a service definition framework which categorises service lines based on a list of relevant casemix codes, the framework for acute inpatient care used for this report is shown in Chapter 8 – Appendix.



CHAPTER 3

BACKGROUND AND CONTEXT

This chapter describes the current Dubai environment and geography, including its health care sector, population and health status.

3.1 Health Care Environment

3.1.1 Health Sectors

The Dubai healthcare sector is inclusive of government and private entities that are aligned to the overall healthcare strategy and strive to provide quality services that are appropriate, accessible and affordable for the Dubai community.

HEALTH SECTOR			
 <p>هيئة الصحة بدبي DUBAI HEALTH AUTHORITY</p>	 <p>UNITED ARAB EMIRATES MINISTRY OF HEALTH & PREVENTION</p>	 <p>مدينة دبي الطبية Dubai Healthcare City</p>	<p>PRIVATE SECTOR</p>

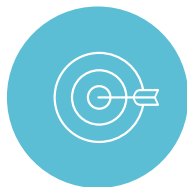
3.1.2 Dubai Health Strategy 2016-2021

The Dubai Health Strategy has been designed to be consistent and compatible with Dubai Plan 2021, positioning the Emirate to become a global leader in the delivery of healthcare, and providing a world-class level of healthcare. The strategy development process involved a broad range of stakeholders from the Dubai health ecosystem including both the public and private sectors. The Strategy developed includes 15 strategic programs and more than 100 strategic initiatives to be applied until 2021.



VISION

Towards a healthier and happier community



MISSION

Transforming Dubai into a leading healthcare destination by fostering innovative and integrated care models and by enhancing community engagement



VALUES

- Customer centricity
- Efficiency
- Engaged and motivated workforce
- Accountability and transparency
- Innovation
- Excellence

3.2 Population and Demographics

3.2.1 Geography

Dubai is one of the seven Emirates of the United Arab Emirates, occupying an area of 4,114 Km square with a population density of 754 persons per square kilometre. Dubai is divided into nine geographic sectors with each sector having a specific mix of population, density, age, gender and nationality.

Figure 2: Dubai land sectors and sector size (km²)

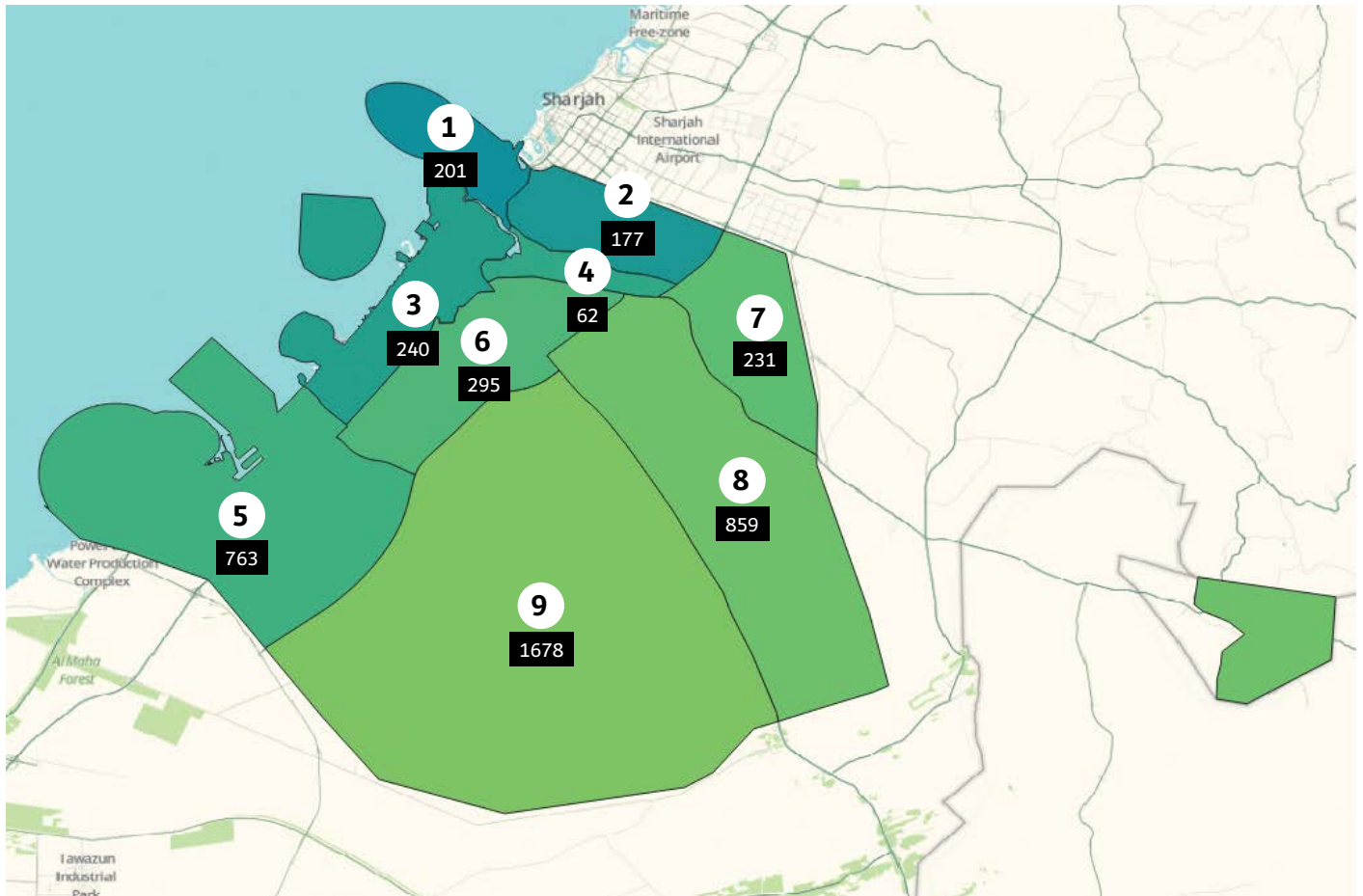
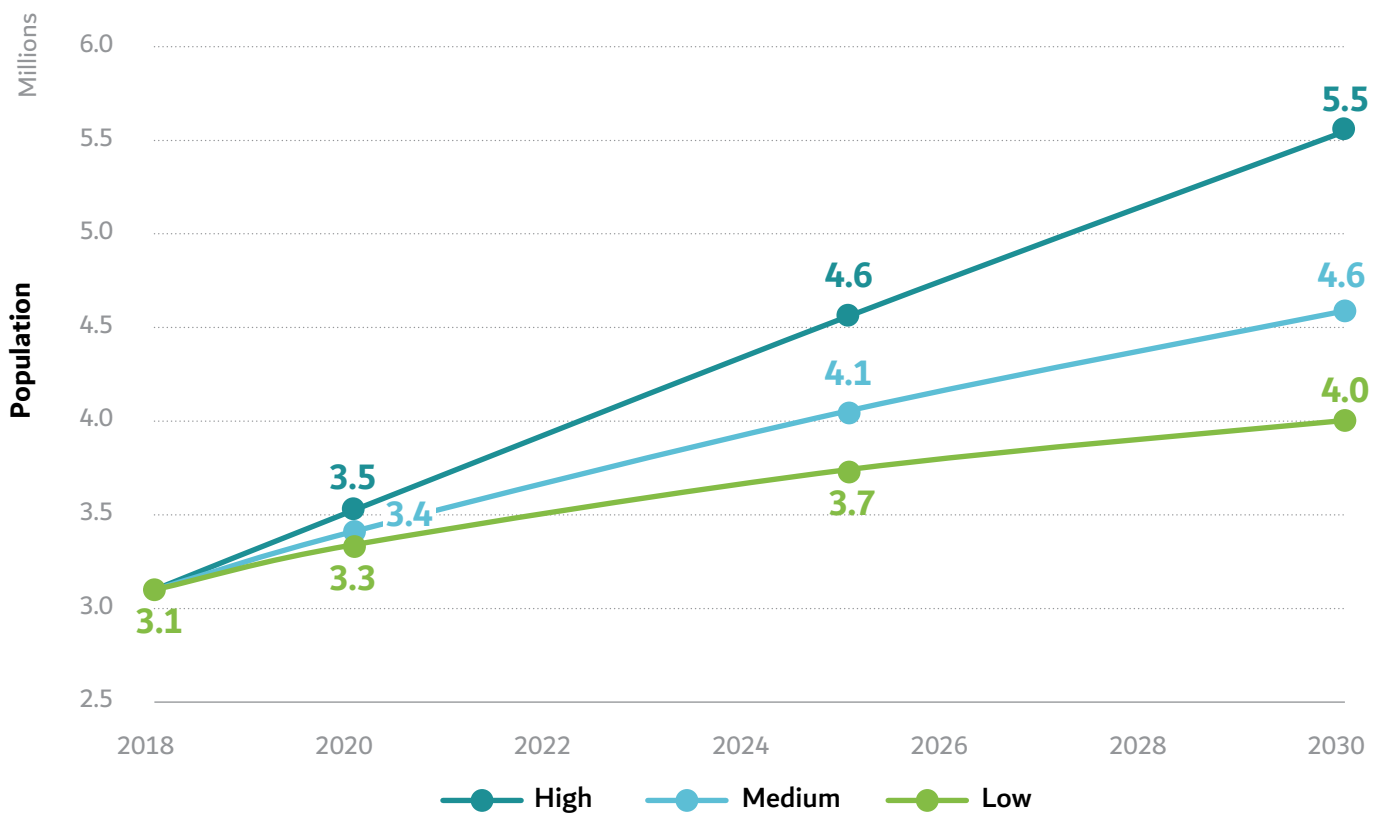


Figure 1: Population projection scenarios, 2018 to 2030



The **medium scenario** is used as the agreed projections for capacity planning, where the population is expected to increase on average 4% per annum from 3.1 million in 2018 to 4.6 million by 2030. For further information on population modelling, please refer to Chapter 8 – Appendix.

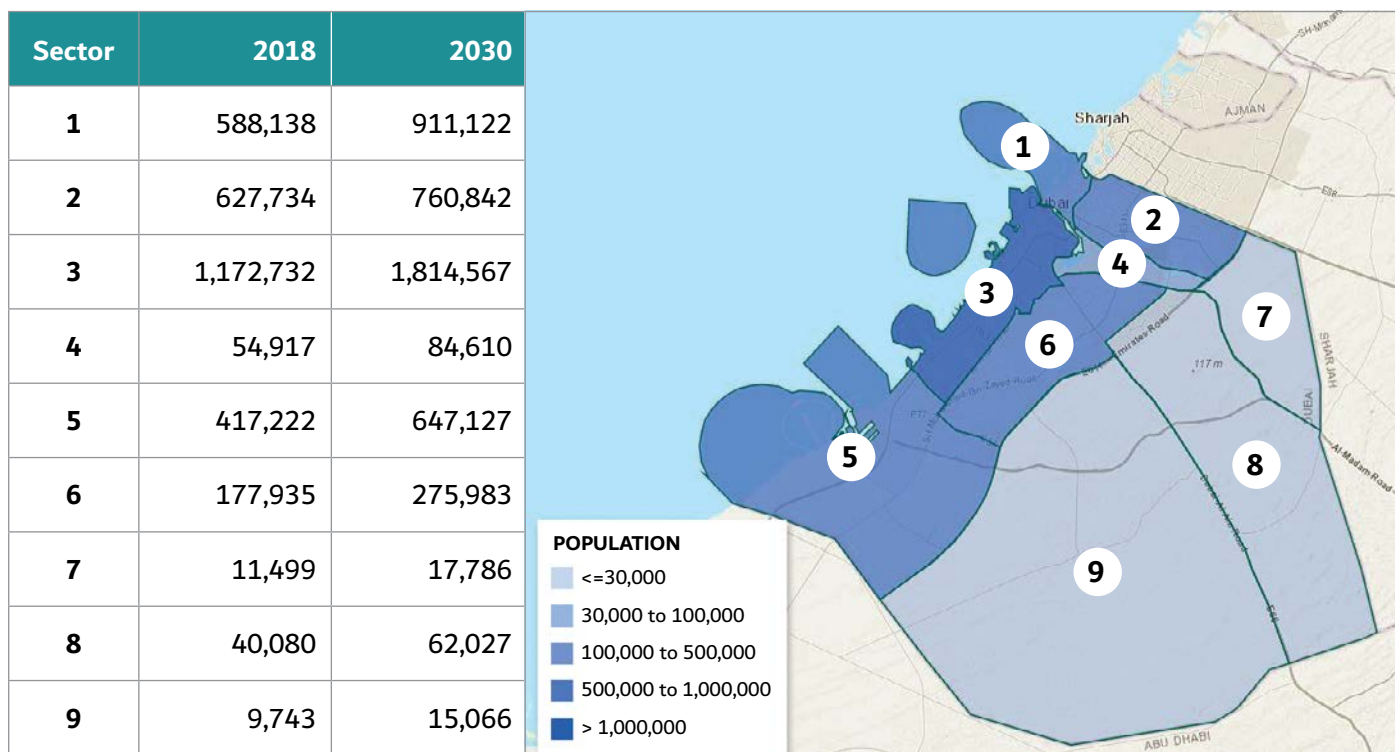
The accurate projection of health service demand is significantly influenced by a population’s age and gender structure with people in the high dependency age groups of 0-4 and 60+, and fertile women having higher service demand than other population components. Also, it is crucial that a clear understanding of the sector residency location and their expected growth is understood so that services and facilities can be estimate for locations of growth and need.

3.2.3 Sectors

Dubai is divided into nine geographic sectors to assist with the planning of the distribution of infrastructure capacity including healthcare facilities.

Population projections were conducted separately for each of the nine sectors using best fit probabilistic modelling from historical trends with 2006 as the base year (using sectorial population data reported from Dubai population bulletins and the 2012 Dubai Clinical Services Capacity Plan).

Table 3: Projected Population by Sector

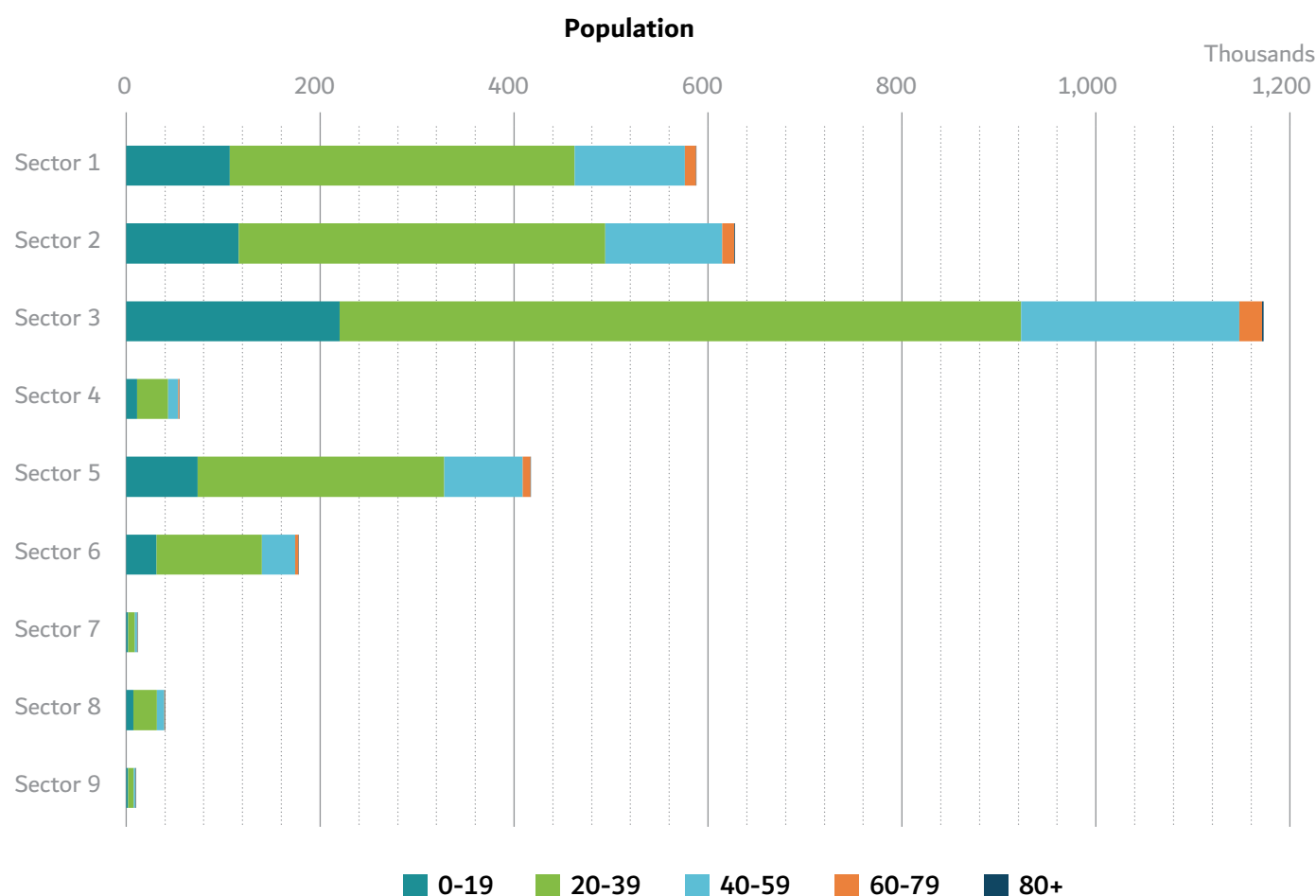


“To account for the influx of population growth and the percentage of the elderly population, it is important that we plan for this growth for the coming years and to do that our health service planning efforts will ensure our communities are offered the best possible services.”

Dr. Nahed Monsef

Director, Strategy and Corporate Development Sector, DHA

Figure 3: Age group distribution, by sector, 2018



3.2.4 Age, gender and nationality profile

The population structure of Dubai displays a relatively young population and comprised by a majority of 67% males and 90% non-nationals.

Table 4: Medium scenario population profile, 2018 and 2030

	Population	Nationals	Non-Nationals	Male	Female
2018	3,100,000	298,356	2,801,644	2,091,765	1,008,235
2030	4,589,131	414,625	4,174,506	2,967,911	1,623,220

The demand for healthcare is a needs-based demand that is sensitive to the age, gender and nationality composition of the population. This population composition has been analysed through the quantification of demand on all service types by per capita rates for each 5-year age group, gender and nationality category. This results in highly sensitive analysis on the population profile by dividing the population into 72 sub-categories, ensuring that demand is specific to different growth scenarios.

Figure 4: Dubai population by age, gender and nationality, 2018

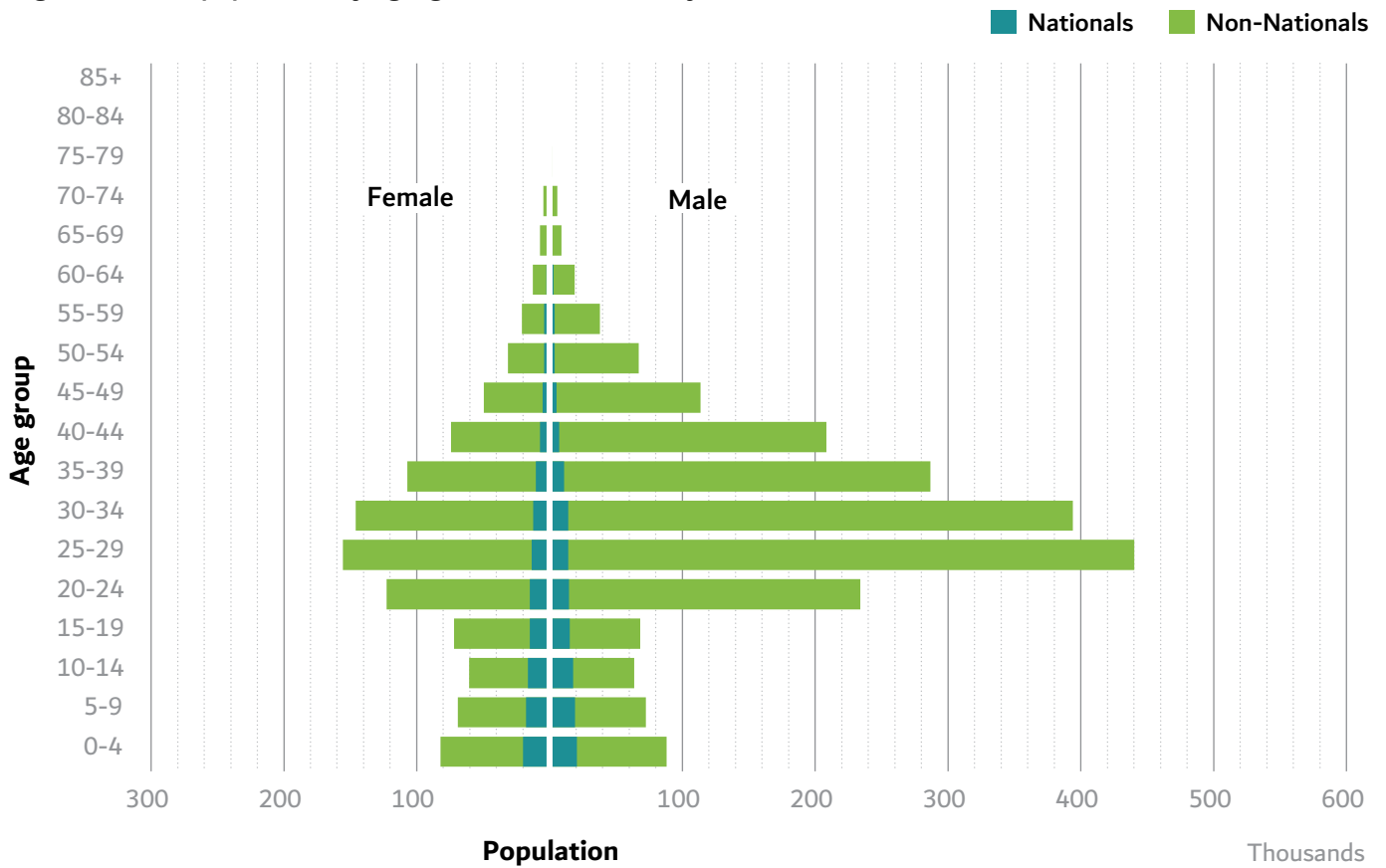
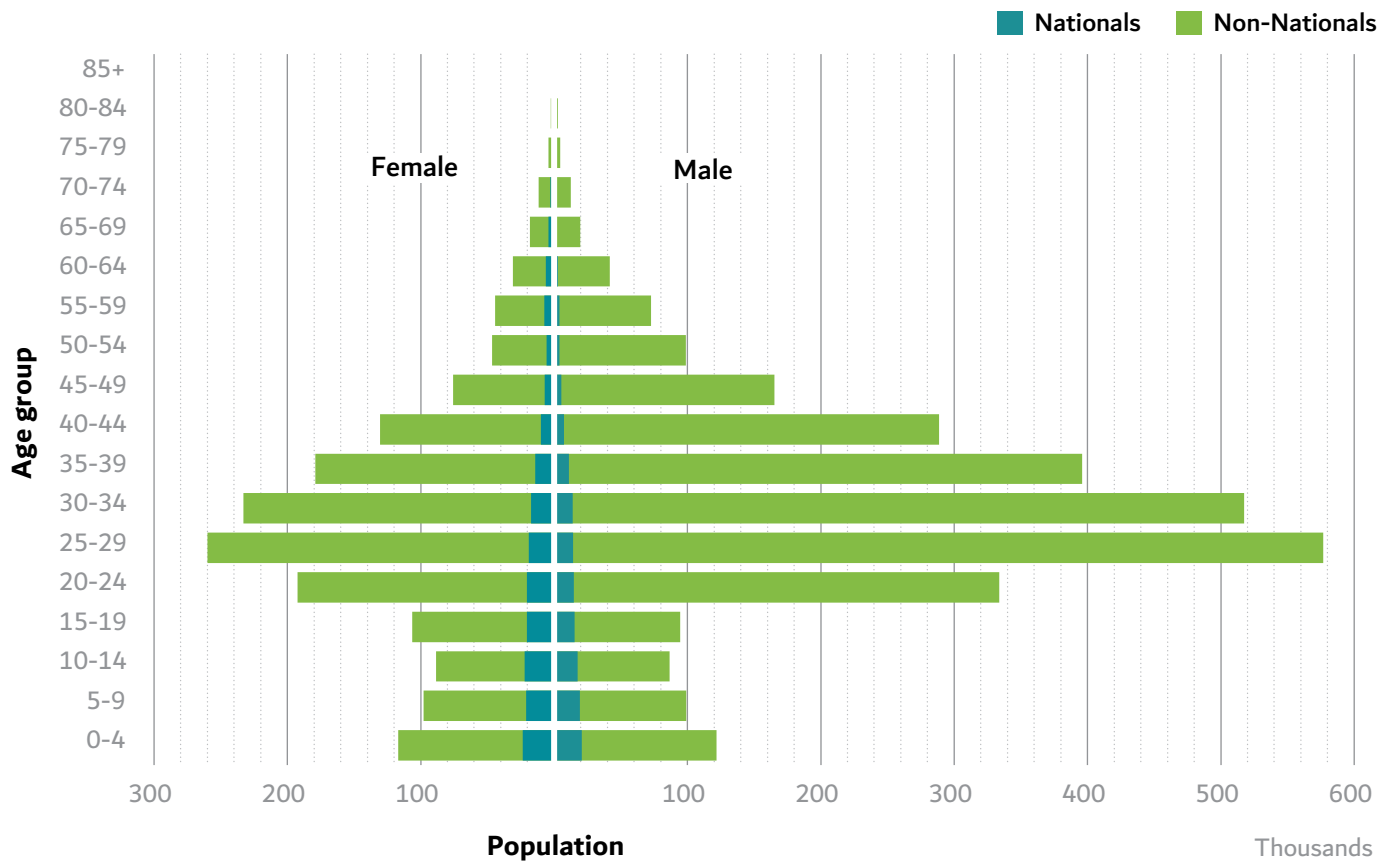


Figure 5: Dubai population by age, gender and nationality, 2030



The 2030 population profile of Dubai displays an aging population for both nationals and non-nationals, which results in an increase in health service utilisation and associated costs. This increase in demand not only increases total activity but also shifts demand to specific age-related specialties and service types.

3.2.5 Economic Environment

The World Bank provides estimates of 2017 GDP per capita for the world's nations and regions., the table below shows a selection of countries' GDP per capita ranking in AED. The UAE places just below the average 'high income countries' per capita rate of 41,211, at a ranking of 22. While Dubai is below the average 'high income countries' per capita rate, at a ranking of 28 (Dubai Economic Report 2017, World Bank 2017).

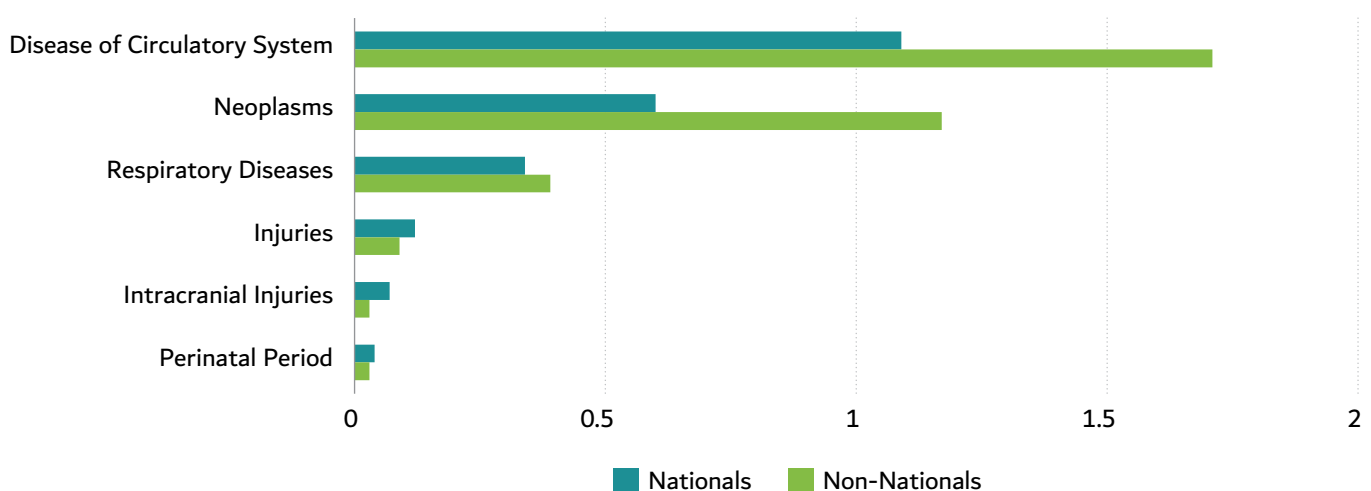
Table 5: GDP per capita by Selected Country (USD)

Ranking	Country	2017 GDP per capita, USD
1	Luxembourg	104,103
7	Qatar	63,505
8	United States	59,531
11	Australia	53,799
12	Sweden	53,442
22	United Arab Emirates	40,698
28	Dubai	38,000

3.2.6. Health Status

Dubai's health status has been closely studied and discussed in its 2017 Dubai Annual Health Statistics Report from which this section has drawn key measures. Life expectancy in Dubai in 2017 was 80 years for total population, 79 years for males and 81 years for females. The figure below shows that lifestyle diseases and its effects, such as heart disease and cancer, are the main causes of death in Dubai. Early screening and prevention strategies, highlighted by the 15 Strategic Programs from the Dubai Health Strategy 2016 – 2021 report, are now at the top of the health agenda for the Health Authority to improve the quality of life and reduce deaths of the Dubai population.

Figure 6: Major Causes of Death in Dubai in 2017 by Nationality, per 1,000 capita



Under-5 mortality in Dubai is presented below. The differences between nationality groups of the rates of the causes of death represent the different exposures children of each group face.

- Twenty Six percent of under 5 deaths were due to Prematurity and Low Birth Weight in 2017, of which Non-Nationals were 65%
- Thirty five percent of deaths were due to the next three causes: Congenital Anomalies, Birth Asphyxia and Birth Trauma, Causes Originating from Perinatal Period. Forty-two percent of these causes of death are for Nationals.

Figure 7: Major Causes of Under-5 Death in Dubai in 2017 by Nationality.

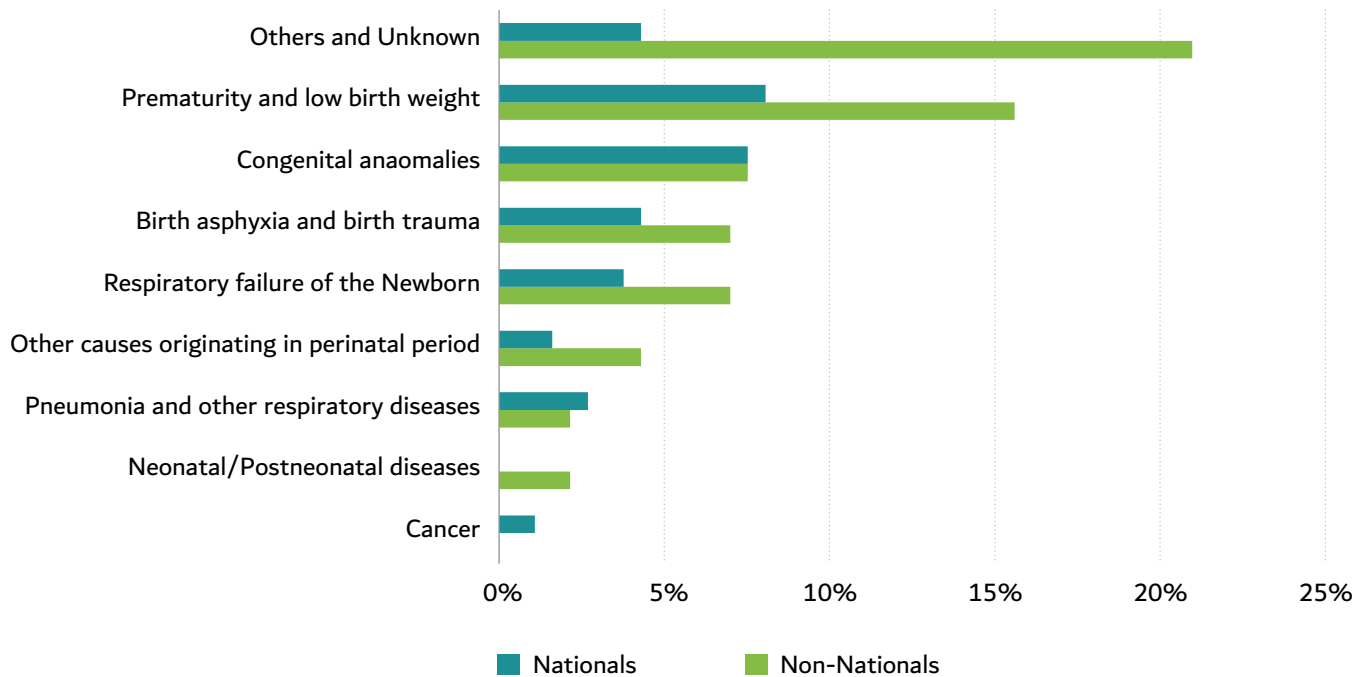
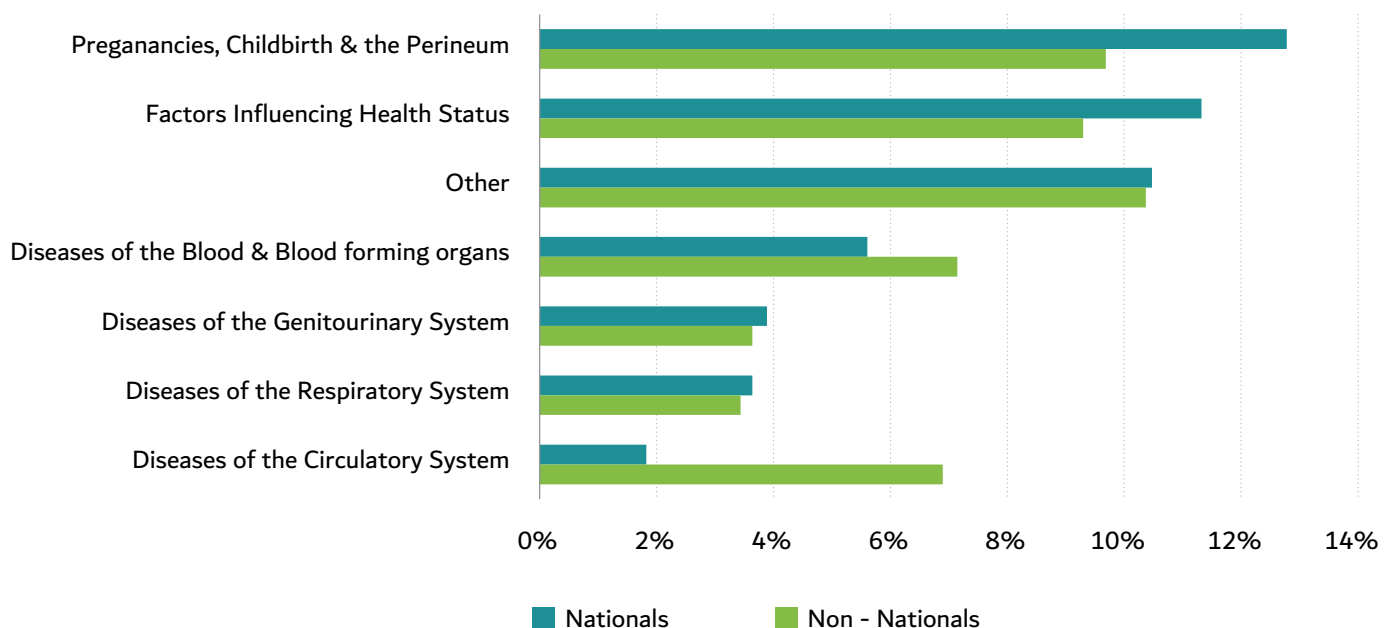


Figure 8: Major Causes for Hospital Admission in Dubai in 2017 by Nationality



Like the rest of the world, the Middle Eastern region’s population has experienced a shift from infectious diseases and childhood illnesses to non-communicable diseases. This notion paired with the increasing life expectancy suggests that the population of UAE is now living for longer with their disabilities, which can cause pain, limit mobility and impair the senses. The most recent Burden of Disease study in 2017 conducted by the Institute for Health Metrics and Evaluation (IHME) reported the following metrics for UAE.

Table 6: UAE burden of disease indicators, 2017 (IHME 2017)

Rank	Causes of death by rate	Causes of Premature death (YLLs)	Causes of disability (YLDs)	Causes of death and disability (DALYs)
1	Ischaemic heart disease	Road injuries	Drug use disorders	Drug use disorders
2	Road injuries	Ischaemic heart disease	Low back pain	Road injuries
3	Stroke	Stroke	Headache disorders	Ischaemic heart disease
4	Other malignant neoplasms	Other malignant neoplasms	Diabetes	Low back pain
5	Diabetes	Congenital defects	Depressive disorders	Diabetes
6	COPD	COPD	Neck pain	Headache disorders
7	Chronic kidney disease	Diabetes	Other musculoskeletal	Stroke
8	Drug use disorders	Chronic kidney disease	Anxiety disorders	COPD
9	Self-harm	Drug use disorders	COPD	Neonatal disorders
10	Lower respiratory infections	Self-harm	Neonatal disorders	Depressive disorders



CHAPTER 4

SUPPLY ANALYSIS

This chapter contains the results of the supply analysis following the completion of the Emirate-wide Health Care Facility Survey and followed by a validation processes performed with Health Statistics, E-Claims and other sources of supply data.

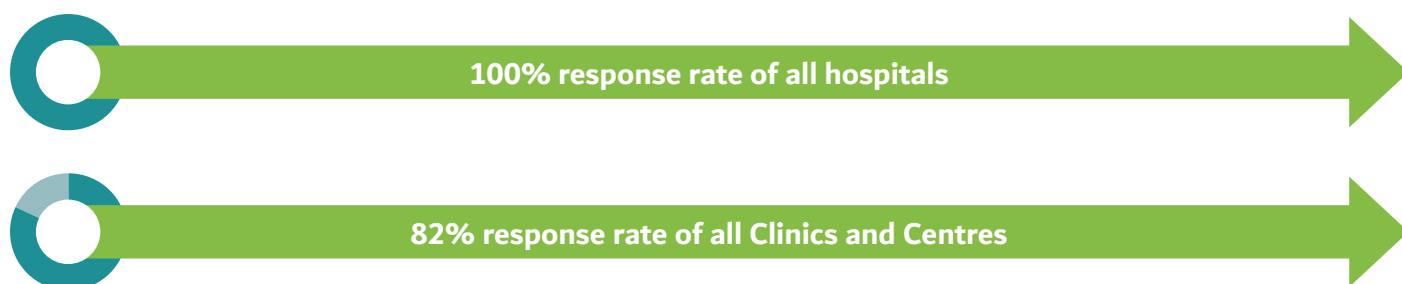
4.1 Survey Responses

A total of 1,561 surveys were distributed to actively licensed facilities within the jurisdiction of Dubai Health Authority, Ministry of Health, Dubai Healthcare City and the private sector, with a high response rate as shown in the table below.

Table 7: Response Rate for the 2017 Dubai Health Care Facility Survey



PRIVATE
SECTOR



The distribution of completed surveys by sector and facility type have been shown below

Table 8: Distribution of Completed Surveys by Sector and Facility Type

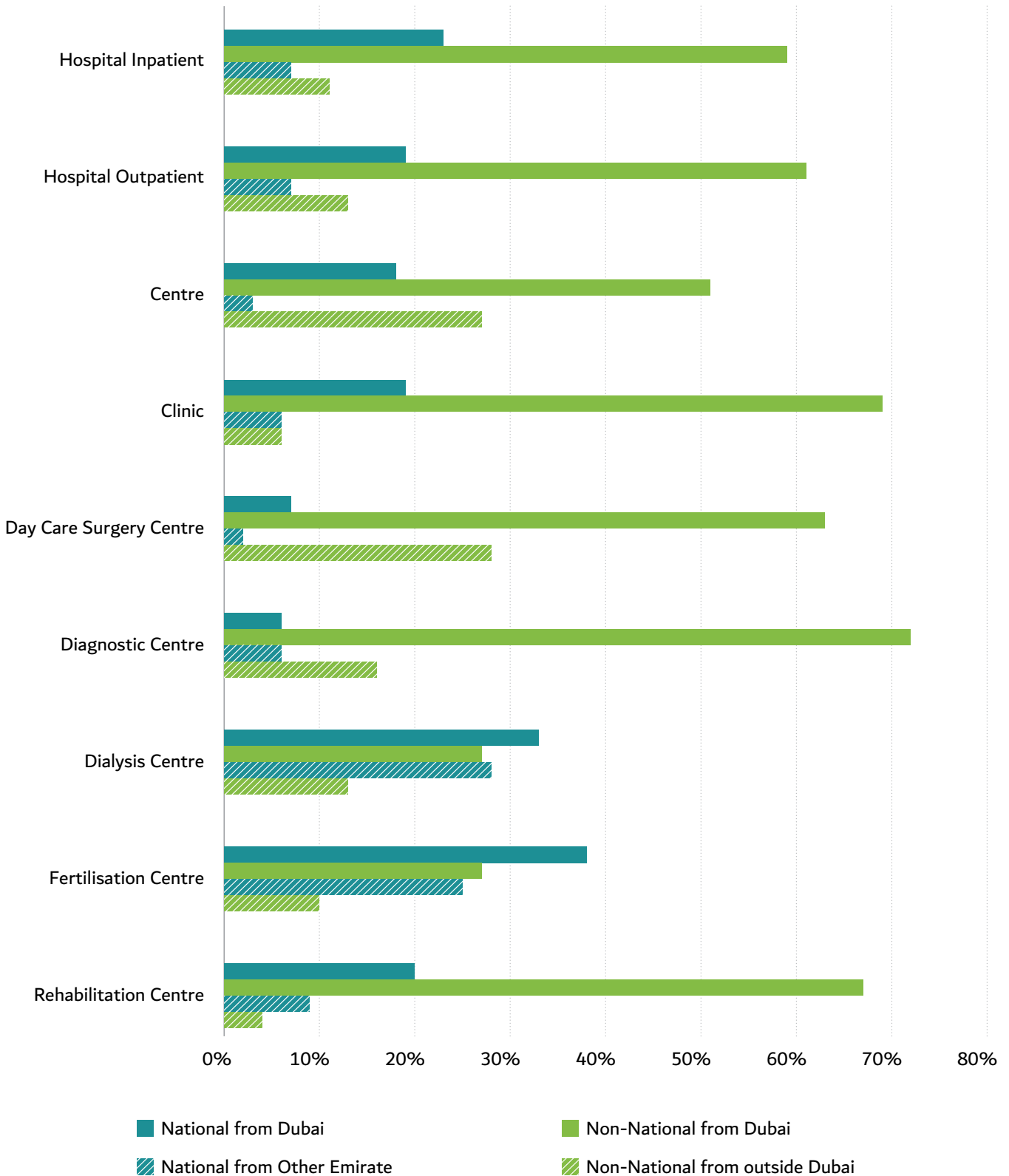
Type	Sector									Total
	1	2	3	4	5	6	7	8	9	
Centre	8	8	38		1	9	1			66
Clinic	162	85	641	18	30	49				1,002
Day Care Surgery Centre	4	1	25		1	2				33
Diagnostic Centre	6	2	14			1				23
Dialysis Centre			2							2
Fertilisation Centre			4							4
Hospital	5	6	23		2			1		37
Rehabilitation Centre	3	13	66	1	2	3			1	89
Total	188	115	813	19	36	64	1	1	1	1,256

Following the completion of the survey, a supply validation process was performed to assess the concordance between the survey responses and the Dubai Health Statistics 2017 report using DHA E-Claims records for the year 2017 as a secondary validation source. This analysis formed the basis of current supply, which was then enhanced by the inclusion of planned supply for licensed facilities expected to be commissioned within the next 5 years.

4.1.1 Residency of Patients

The survey captures the activity generated by nationals and non-nationals from Dubai and for those from outside Dubai. Most activity is generated by non-nationals from Dubai, however the proportion differs based on the facility type as seen in the figure below.

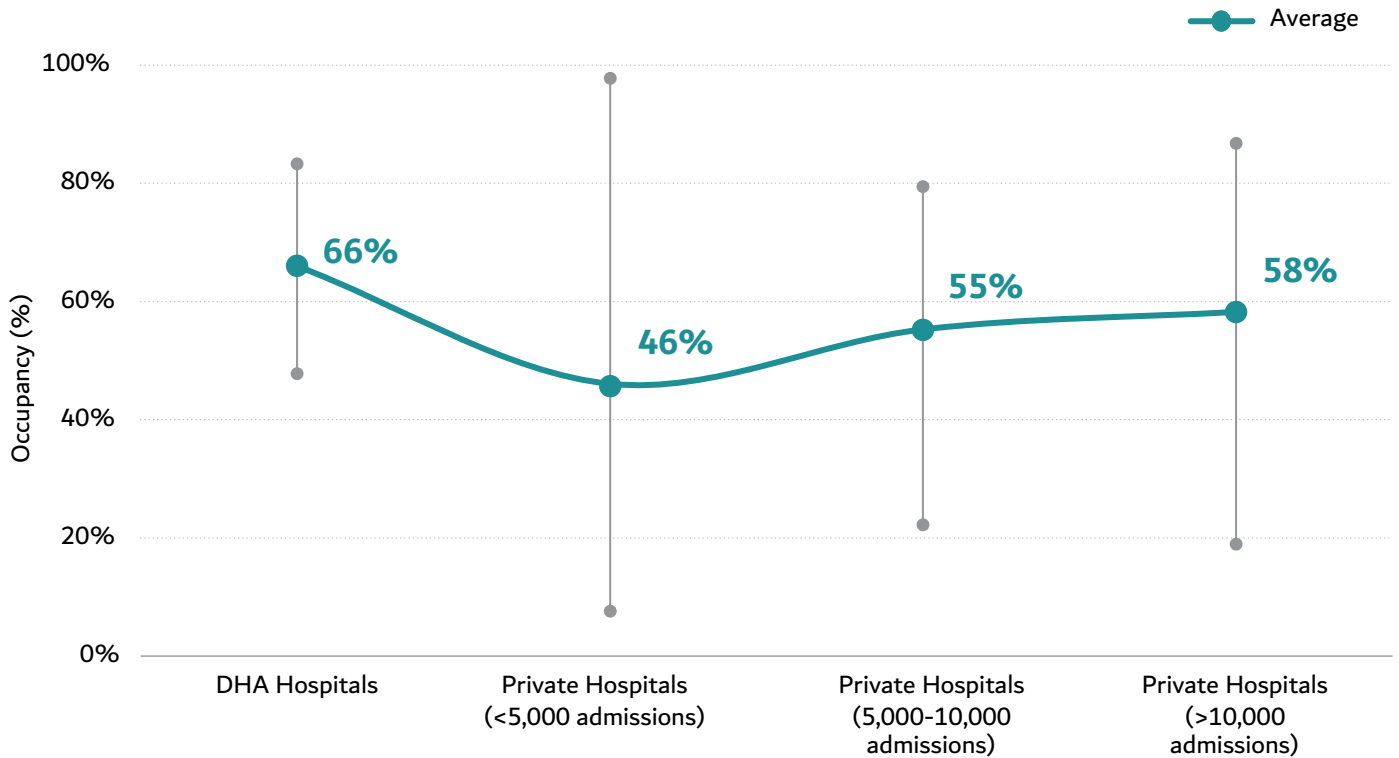
Figure 9: Proportion of Nationality Status Group per Facility Type



4.1.2 Hospital Length of stay and Occupancy

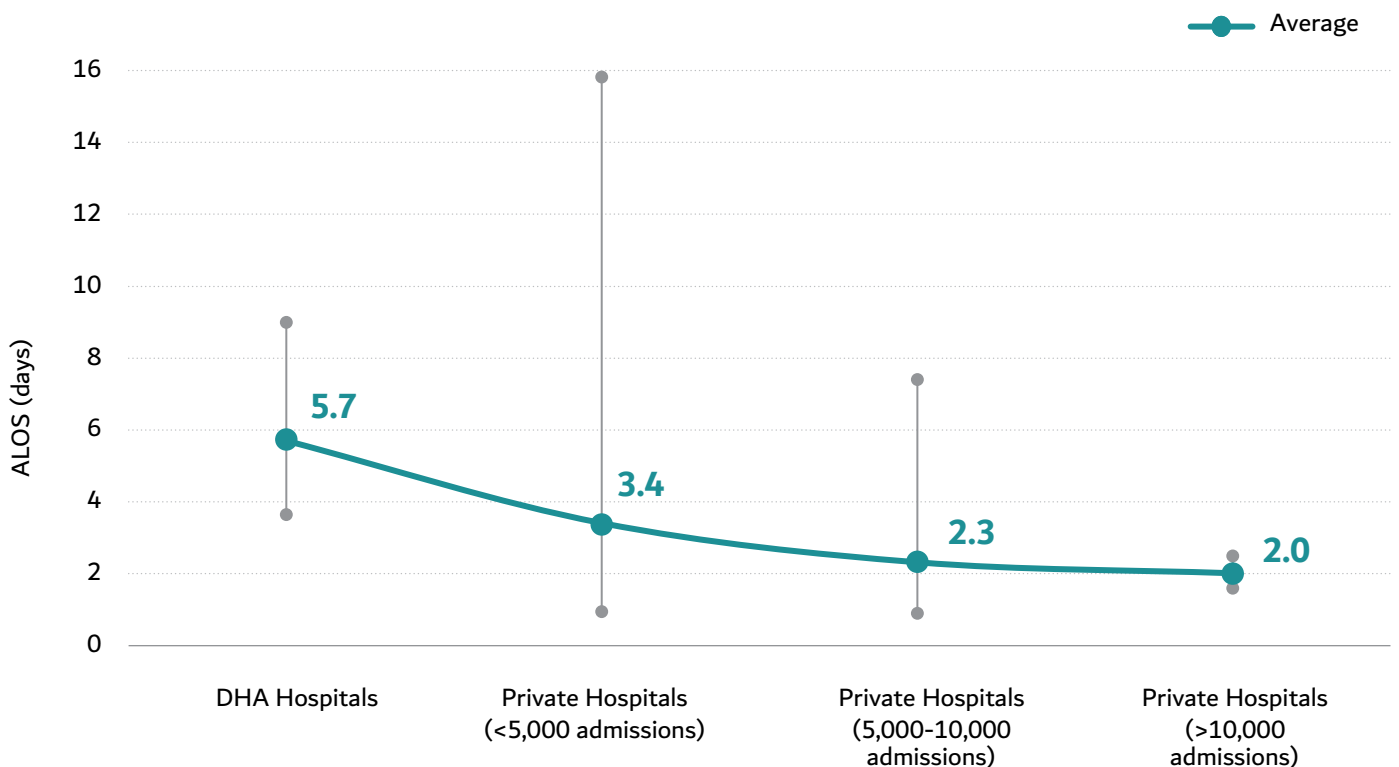
In the year 2017, the unweighted average bed occupancy rate was 73.3% for DHA hospitals and 47.6% for private sector hospitals. The distribution of hospital bed occupancy for both sectors is shown in the graph below.

Figure 10: Average hospital occupancy by facility ownership and number of admissions



Average length of stay, which includes same day admissions, for the private sector ranged from 1.0 to 15.9 days and had an unweighted average of 2.6 days between the years 2017 and 2018.

Figure 11: Average hospital length of stay (ALOS) by facility ownership and number of admissions



4.1.3 Clinical Service Infrastructure Supply

The capacity results of the Dubai Health Care Facility Survey are displayed below, after adjustment for the non-responders of the survey. This supply profile was then further validated with additional supply sources as discussed in the next section.

Table 9: Summary of current capacity captured by the survey

Type	Sector									Total
	1	2	3	4	5	6	7	8	9	
Licensed acute beds	1,111	509	3,417	0	62	0	0	70	0	5,169
Non-functional beds	214	9	429	0	17	0	0	2	0	671
Total functional beds	897	500	2,988	0	45	0	0	68	0	4,498
Functional acute overnight beds	654	453	2,598	0	26	0	0	64	0	3,795
Functional same day beds	243	47	390	0	19	0	0	4	0	703
Non-Acute beds	13	0	122	0	0	0	0	0	0	135
Rehabilitation	13	0	58	0	0	0	0	0	0	71
Other Non-Acute	0	0	64	0	0	0	0	0	0	64
Outpatient rooms*	1,115	880	6,226	107	238	397	6	24	2	8,979
Hospital	324	261	1,175	0	29	0	0	24	0	1,813
Clinic and Centres	791	619	5,051	107	209	397	6	0	2	7,166
Critical Care	111	99	590	0	12	0	0	12	0	824
ICU	42	31	249	0	7	0	0	8	0	337
NICU	52	58	180	0	5	0	0	4	0	299
PICU	3	3	44	0	0	0	0	0	0	50
Adult HDU	13	7	91	0	0	0	0	0	0	111
Paediatric HDU	1	0	26	0	0	0	0	0	0	27
ED beds	101	46	282	0	10	0	0	17	0	456
Resuscitation bays	9	6	35	0	2	0	0	1	0	53
High Acuity bays	27	15	129	0	2	0	0	3	0	176
Low Acuity bays	60	19	92	0	5	0	0	12	0	188
Isolation rooms	5	6	26	0	1	0	0	1	0	39
Operating Theatres	26	31	157	0	6	0	0	4	0	224
Elective	23	21	139	0	3	0	0	3	0	189
Emergency	3	10	18	0	3	0	0	1	0	35
Dental Chairs	262	132	975	16	18	53	1	3	0	1,460

Type	Sector									Total
	1	2	3	4	5	6	7	8	9	
Procedural Care	138	114	626	4	34	22	0	13	0	951
Angiography	3	4	13	0	0	1	0	0	0	21
Computed Tomography	8	6	38	0	3	2	0	1	0	58
Lithotripsy	16	8	17	0	0	0	0	0	0	41
Magnetic Resonance	10	8	40	0	1	0	0	0	0	59
Mammography	8	6	40	0	2	0	0	1	0	57
PET	1	0	1	0	1	0	0	0	0	3
Linear Accelerators	0	0	2	0	0	0	0	0	0	2
Ultrasound	48	50	250	2	12	9	0	5	0	376
X-ray (fixed)	28	24	156	2	12	10	0	2	0	234
X-ray (portable)	16	8	69	0	3	0	0	4	0	100
X-ray (total)	44	32	225	2	15	10	0	6	0	334

* This figure has been corrected for 20% non-respondents and does not exclude consultation rooms types that are not comparable to the demand profile. Comparable outpatient room supply figures are available in Chapter F – Gap Analysis.

An additional 742 beds by 2020 and 1,043 beds by 2025 are planned for development from a range of facilities that will be expanding in size and some that will be newly constructed. These figures have been derived from licensing data and reviewed by and Expert Panel with detailed local industry knowledge on likelihood of commissioning.

4.2 Supply Scenarios

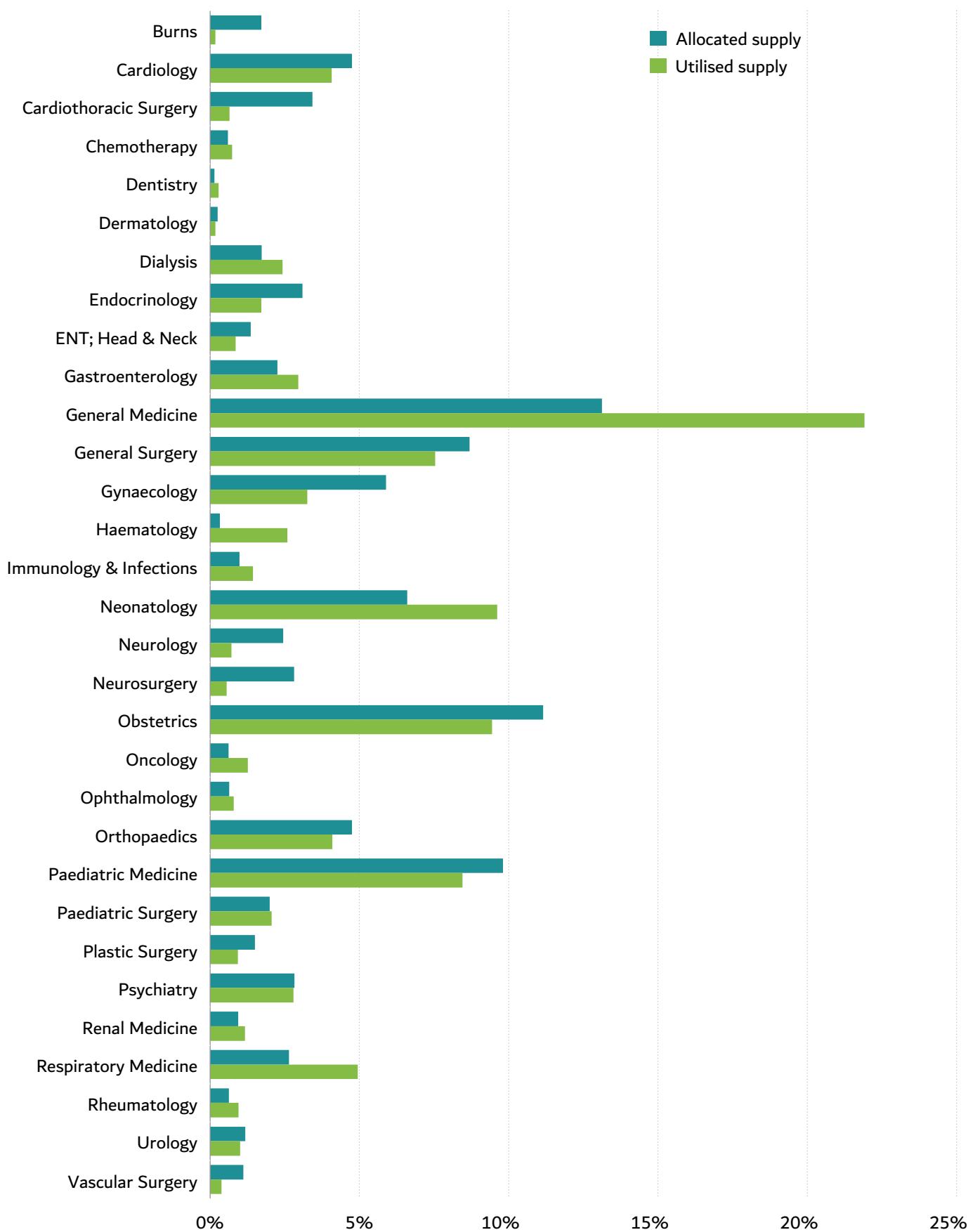
Two supply scenarios are studied to understand the current distribution of beds by specialty

1. **Supply scenario 1:** Capacity distributed by allocation or nomination to a specialty
2. **Supply scenario 2:** Capacity distributed by utilisation reported by Health Statistics 2017

The difference between the two scenarios highlights the misallocation of capacity by specialty, either caused by misreporting, limitations in coding practices or demand/supply mismatch of services. The implication of this misallocation is that the nominated resources, such as workforce, can often not be suited to the care provided out of this room. **For the gap analysis, Supply scenario 1 is used as the current supply capacity**

The table below demonstrates the differences between the distribution of capacity by specialty based on the two scenarios.

Figure 12: Supply scenario comparison, by proportion of total supply

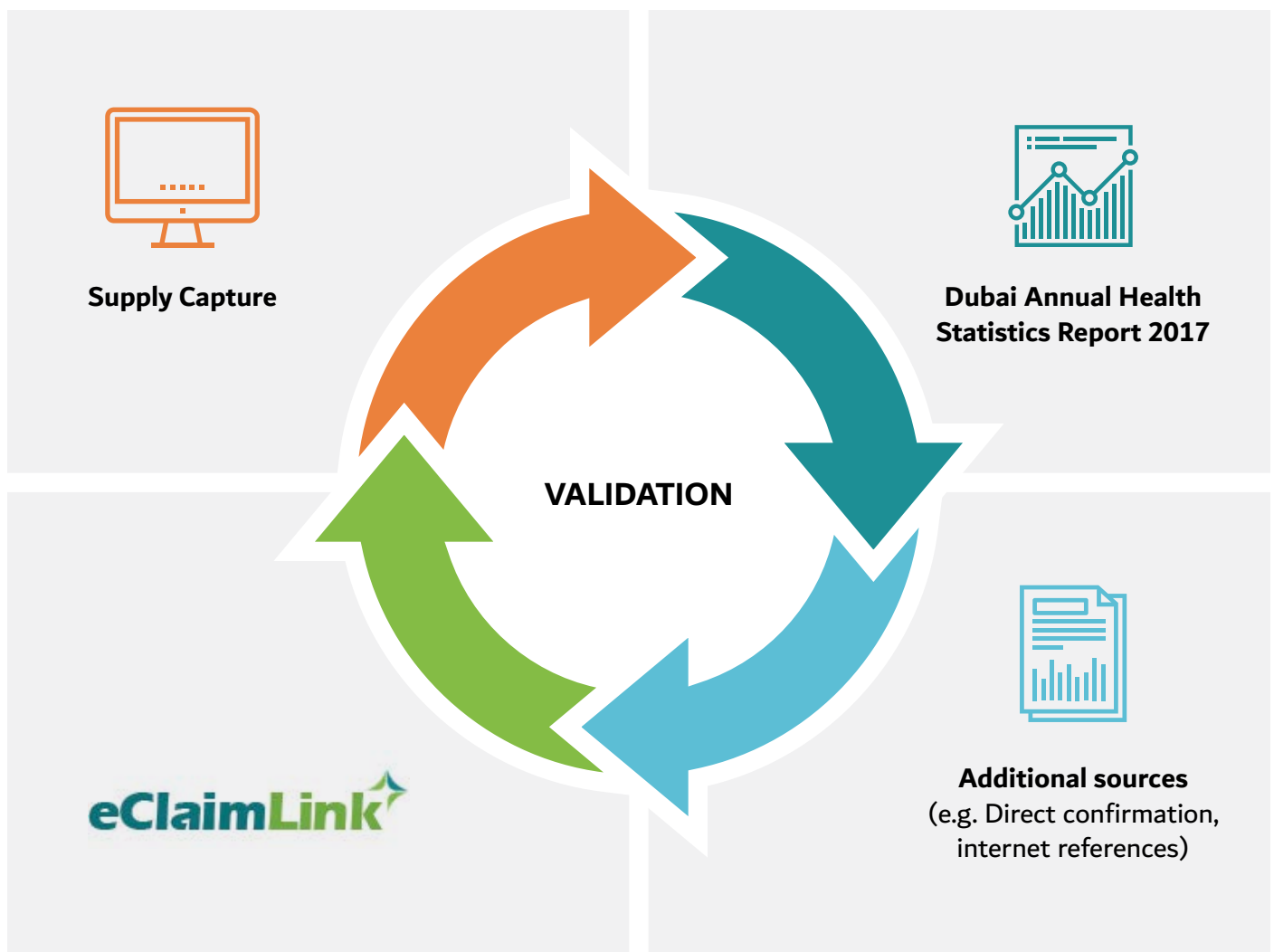


4.2.1 Supply validation

Supply validation processes were undertaken to ensure the validity of survey results regarding both capacity and activity. The purpose of the supply validation process was to assess the concordance between the survey responses and the Dubai Health Statistics 2017 report using DHA E-Claims records for the year 2017 as a secondary validation source to align the clinical specialities in the Health Statistics Report.

Where there were large variations in bed numbers, further validations were conducted using publicly accessible official data sources or by recontacting the facility to reconfirm results. The survey results were adjusted if the Health Statistics figures were found to be accurate in the additional validation checks.

For further reading on an in-depth methodology of supply validation, please see Chapter 8 – Appendix



4.2.2 Workforce Supply

Workforce supply has been derived from official workforce licensing data, by headcount, and cross validated with results from the survey, which quantifies a workforce profile by Full Time Equivalents (FTEs). An FTE is the number of working hours that represents one full-time employee during a fixed time period. FTE simplifies work measurement by converting work load hours into the number of full-time personnel required to complete that work.

Table 10: Summary of current license workforce by facility type and category, headcount

Facility Type	Category					Total
	Medical	Nurses & Midwives	Allied Health	Dentist	Comp. Alt. Medicine	
Hospital/DSC	4,828	10,317	3,762	322	1	19,230
Outpatient Care Facility	2,951	5,361	2,253	1,798	196	12,559
Pharmaceutics			3,559			3,559
Others	75	649	623			1,347
Diagnostic Centres	102	24	546			672
Total	7,956	16,351	10,743	2,120	197	37,367
DHA 2017 headcount subtotal	1,847	4,645	N/A	178	N/A	

Only 3% of the entire licensed healthcare workforce are UAE Nationals, with the largest majority from India and Philippines which contribute nearly 70% of the workforce by headcount.

Table 11: Top 10 largest proportion of workforce, by nationality and category

Nationality	Category					Total
	Medical	Nurses & Midwives	Allied Health	Dentist	Comp. Alt. Medicine	
India	30%	50%	49%	32%	51%	45%
Philippines	1%	39%	18%	2%	0%	23%
Egypt	11%	1%	5%	6%	2%	4%
Pakistan	9%	1%	5%	2%	0%	4%
UAE	7%	0%	3%	5%	2%	3%
Syria	6%	0%	3%	10%	0%	3%
Jordan	2%	2%	3%	5%	1%	2%
Iran	3%	1%	1%	5%	1%	2%
United Kingdom	4%	1%	1%	2%	7%	2%
Sudan	4%	0%	2%	1%	1%	1%

Across all workforce categories, the Dubai healthcare workforce has an average age of 37 years and is made up of 62% of females. A breakdown of workforce categories is shown in the table below, highlighting the differences in each measure between each category.

Table 12: Workforce average age and proportion by gender and by category

Measure	Category					Total
	Medical	Nurses & Midwives	Allied Health	Dentist	Comp. Alt. Medicine	
Average age	45	34	35	40	43	37
Males	58%	15%	44%	51%	36%	35%
Females	40%	83%	50%	48%	57%	62%
Unidentified	2%	2%	6%	2%	7%	3%



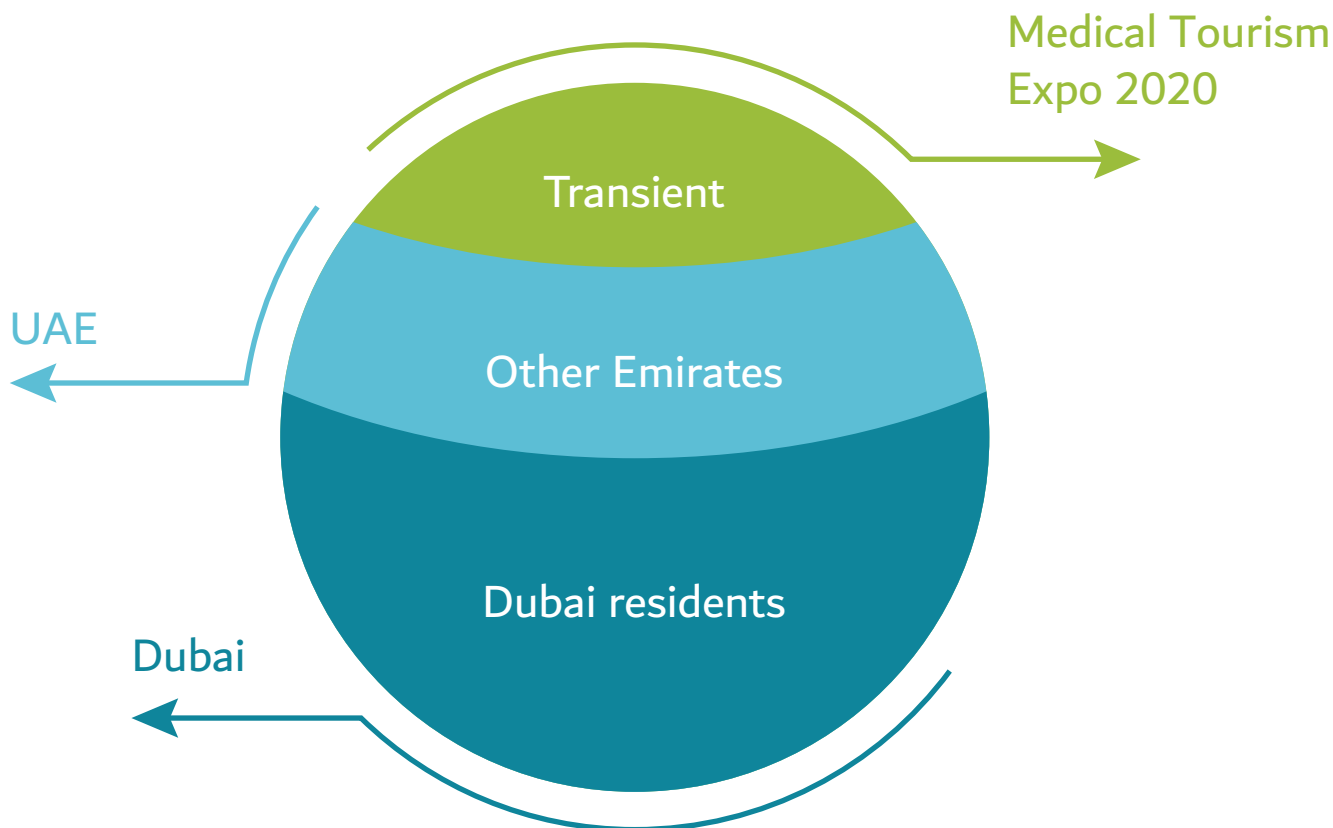
CHAPTER 5

DEMAND ANALYSIS

This chapter contains the descriptions and implications of the Demand results as well as a discussion on scenarios, assumptions and additional inflow and outflow of demand

5.1 Catchment and Assumptions

A catchment or population segment is defined as the utilization of services by a population and provided by a facility within an agreed geographic area. These segments allow flow patterns to be identified and analysed to demonstrate the impacts of both inflows (patients arriving) and outflows (patients departing). From these two flow directions of each segment, there are 6 flow categories which define the location of which the patient has arrived from or will depart to.



Flows		
1	Dubai residents	Dubai inter-sector flow
2	Other Emirates	UAE inflow and outflow
3	Transient	Medical Tourism and Expo 2020 flows

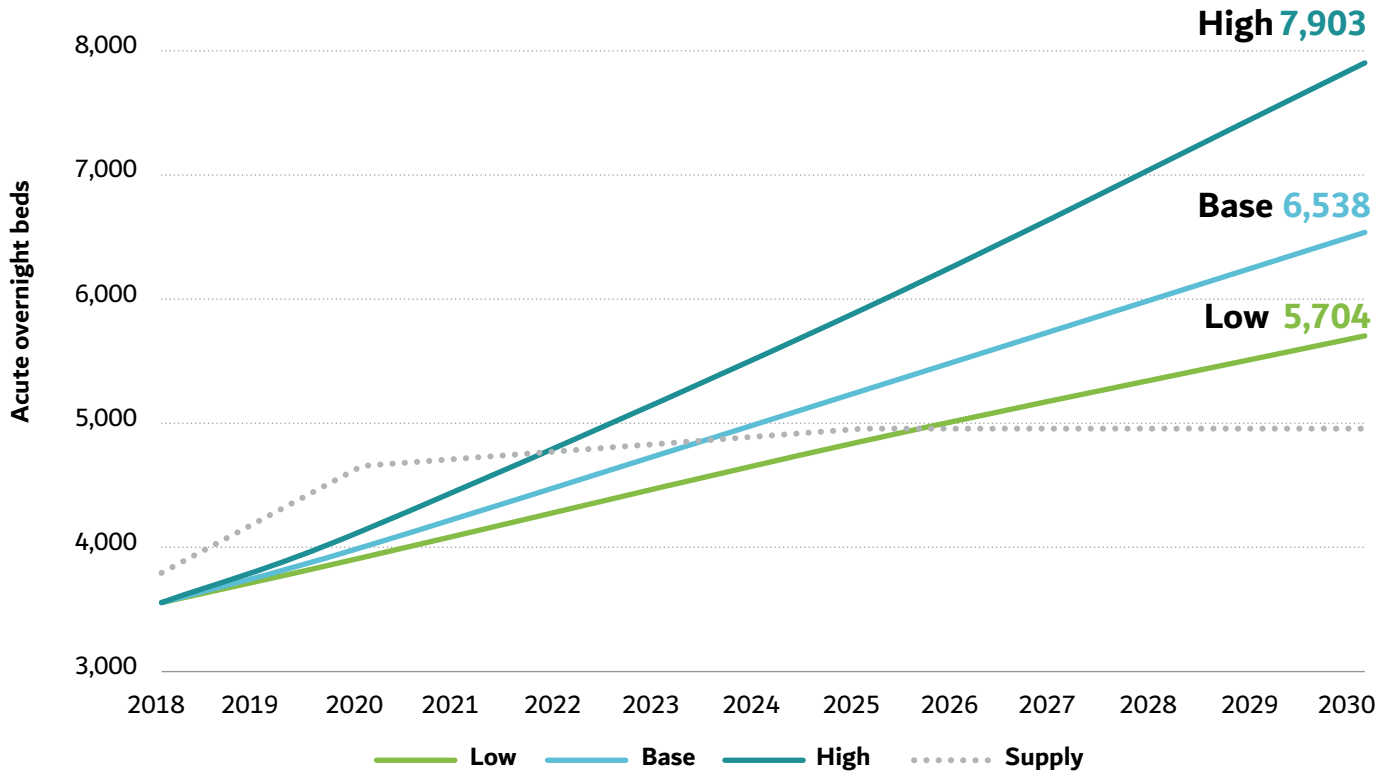
5.2 Demand scenarios

Three healthcare utilization scenarios were developed to identify Dubai’s demand for clinical capacity until 2030; namely Reference (High utilization), Relative Utilization (Low utilization) & Base scenarios. Each of these scenarios applied different utilization rates to demonstrate the impacts of policy change to the utilization of health care services.

The Base scenario accounts for local service utilization adjustments, models of care and current policy impacts on health care demand, whilst also allowing for capacity planning to move closer towards international standards by 2030. These demand utilization adjustment factors were discussed with an Expert Panel and analysed in conjunction with Health Statistics 2017 activity data with an additional sensitivity analysis to allow for benchmarking to local ratios.

For each service type, the Base scenario utilization rates is applied to the low, medium and high population growth profiles to generate the projected demand for that service type. As an example, the medium population profile demand scenario for acute overnight bed demand scenario modelling is shown below.

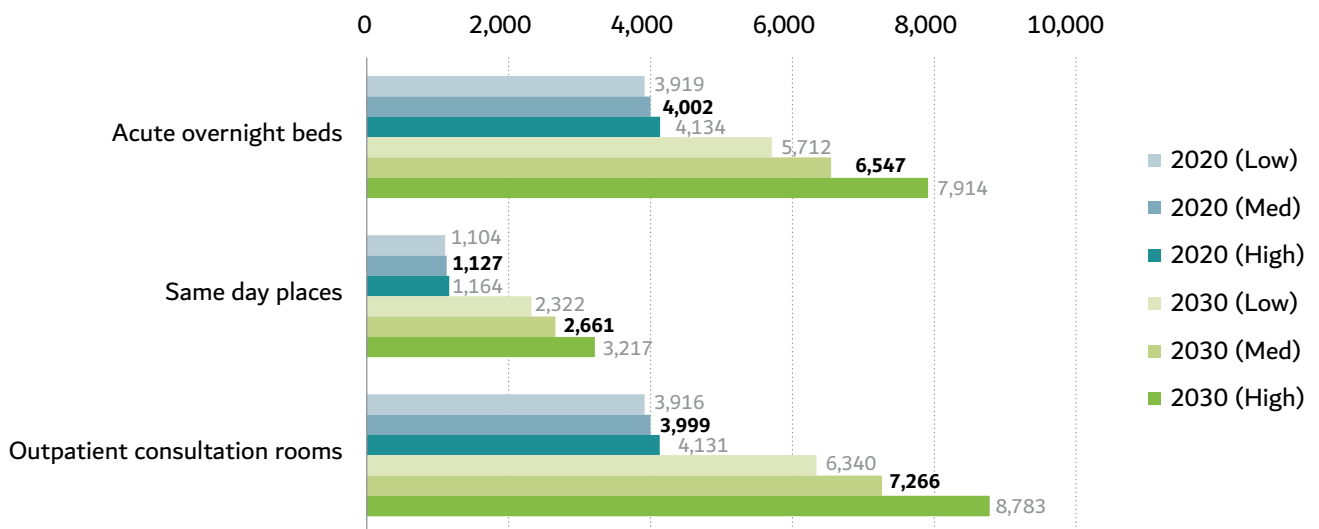
Figure 13: Demand scenarios for acute overnight beds

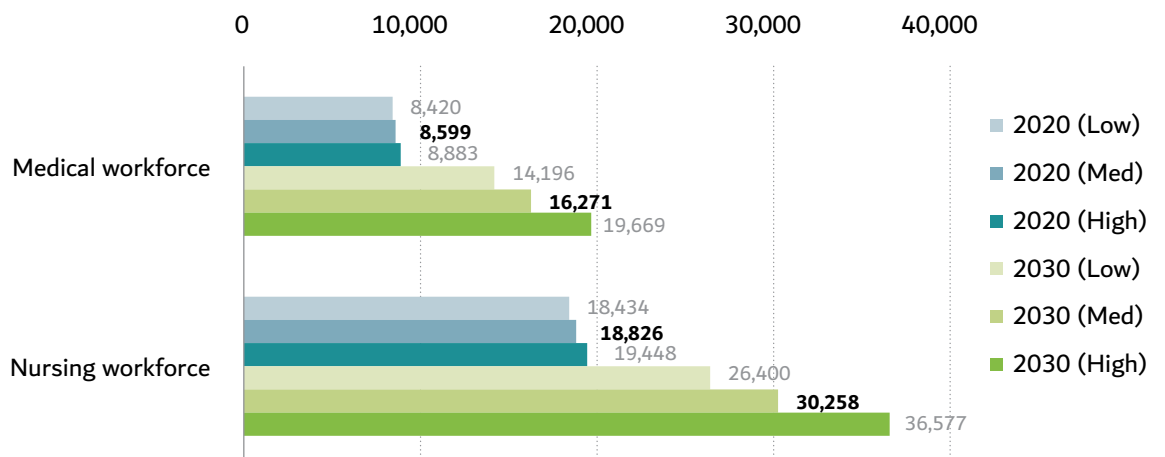
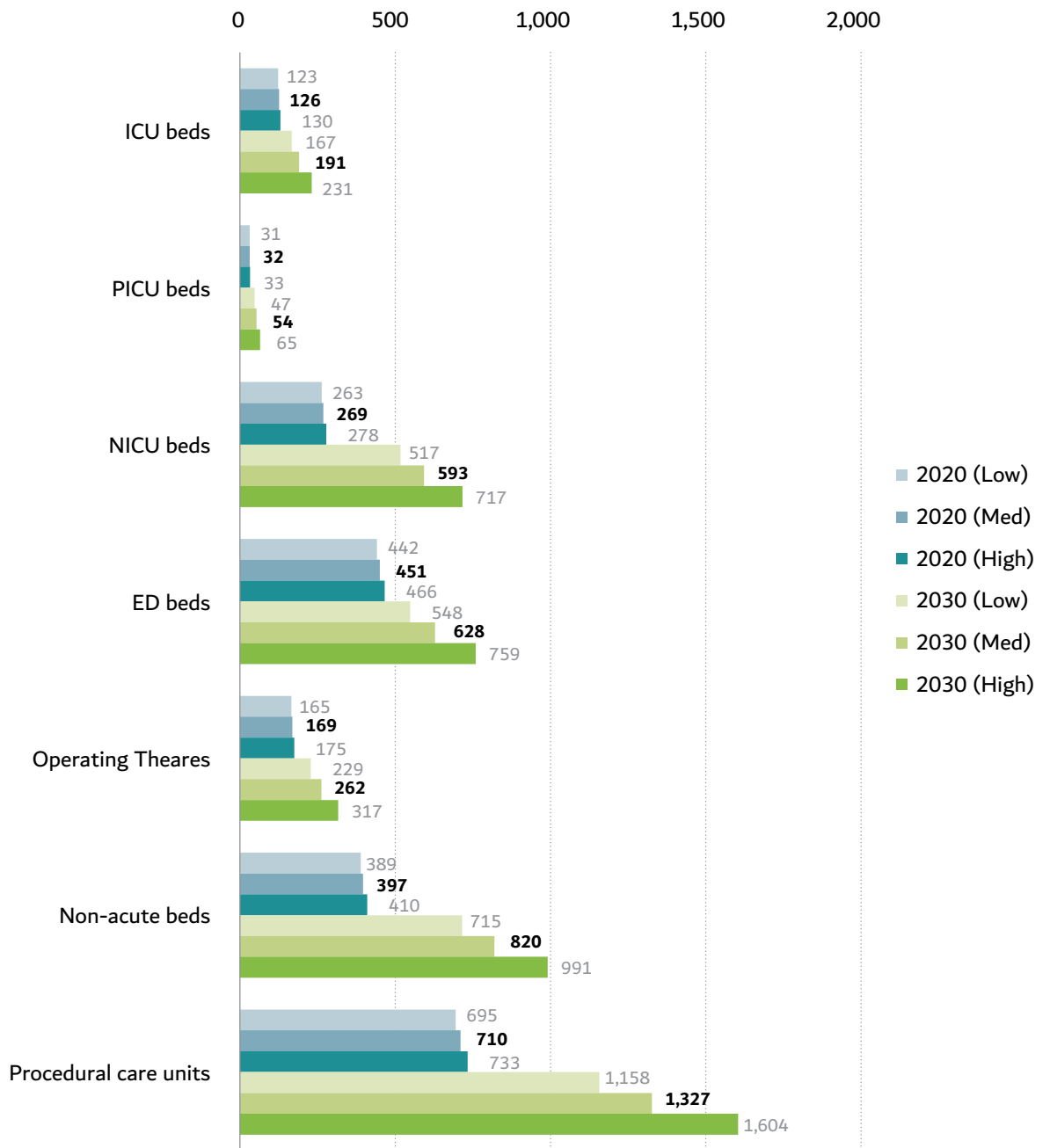


5.2.1 Population growth profile comparison

The Base scenario has been chosen as the analysed scenario, with low, medium and high population growth profiles being modelled to determine the range of capacity that is projected to be required.

Figure 14: Demand projections for each population series, by service type, 2020 and 2030





5.3 Additional demand

Expo 2020

Dubai Expo 2020 will run between from 20th October 2020 to 10th April 2021 and impose an additional transient demand on the health care system. The 438-hectare site has a site capacity of 300,000 visitors and it is expected that over 70% of visitors will be international. Healthcare demand per day of clinic visits and episodes of care is estimated based on the number of domestic and international visitors coming to Dubai per day during the Expo and the likelihood of accessing specific types of healthcare. Demand modelling assumptions for Expo 2020 are outlined in detail in Chapter 8 – Appendix.

Medical Tourism

Through local initiatives and the Dubai Health Experience (DXH), Dubai has developed into an emerging global health tourism destination. Medical tourism inflows present an additional scenario to health care demand for the Dubai health infrastructure as medical patients typically receive outpatient consultation(s) and depending on their purpose of travel may also include use of an operating theatre, inpatient bed or same day place.

Medical tourism inflow results have been driven by findings and assumptions in the DHA Health Tourism Strategy 2018-2021. Future demand figures have been derived from medical tourism targets, distributed across specialties by their current activity proportions.

Demand modelling assumptions for Medical Tourism are outlined in detail in Chapter 8 – Appendix.



CHAPTER 6

GAP ANALYSIS

This chapter describes the priorities that will need development within infrastructure and workforce to accommodate Dubai's health requirements to the year 2030. All gap figures displayed in this Chapter are based on the medium population series for the base scenario. Sensitivity analysis between population series is available in Chapter 8 – Appendix.

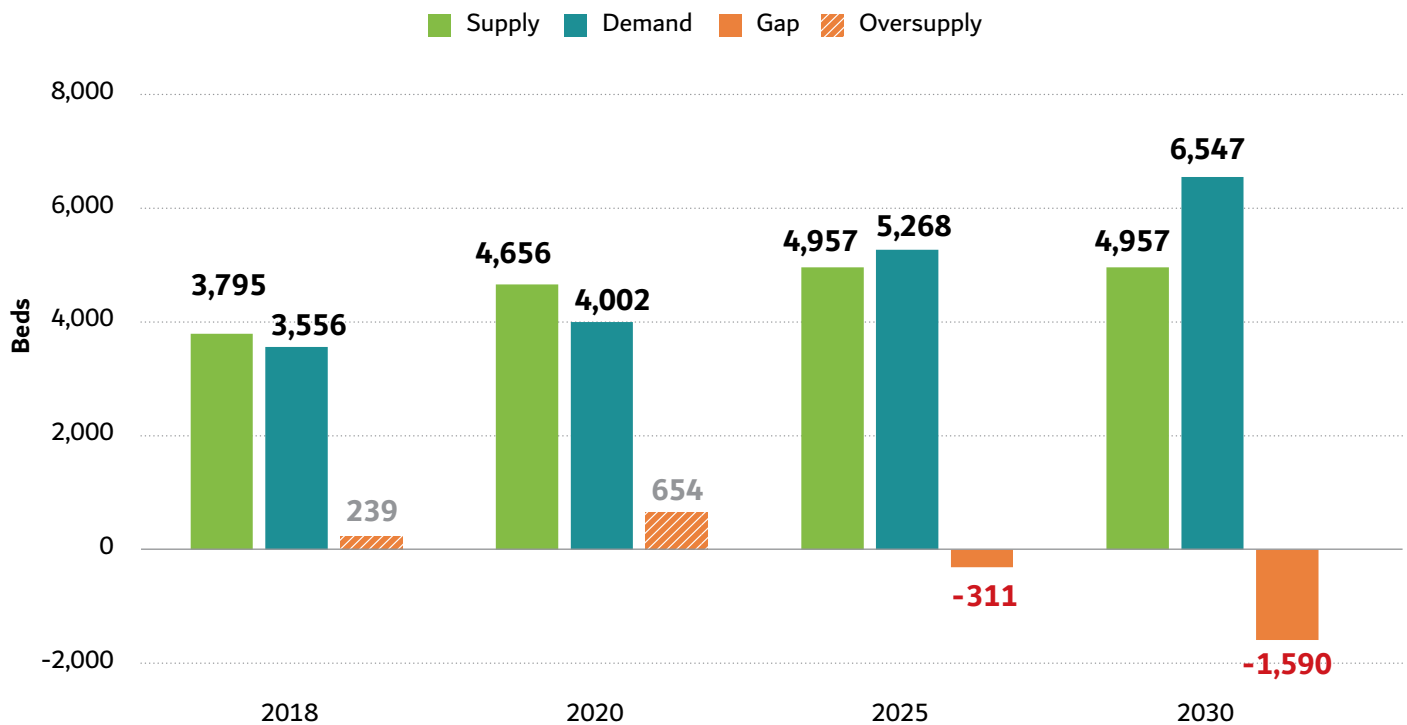
6.1 Acute Inpatient care (Overnight)

Of the 5,169 licensed beds in Dubai, 671 are non-functional and 703 are allocated beds to same day care, which results in a supply of 3,795 functional acute overnight beds. Based on licensing applications and Expert Panel discussion, planned supply is expected to add an additional 861 beds by 2020 and a total of 1,162 beds by 2025.

Bed status	Number
Licensed beds	5,169
- Non-functional beds	671
Functional beds	4,498
- Same day beds	703
Acute overnight functional beds	3,795

Gap analysis shows that by 2025 there will be a gap of **311** acute overnight beds, which is projected to increase to **1,590** by 2030.

Figure 15: Acute overnight bed gap, 2018 to 2030



The gap in 2025 can be addressed by utilising the non-functional beds currently built to address the requirements by specialty as shown below. Planned supply has been distributed by the proportion of gap for each specialty, assuming that future supply will likely address the service lines with the greatest requirements.

Table 13: Acute overnight bed gap by specialty, 2018 to 2030, sorted by 2030 gap

Specialty		Supply		Demand			Gap		
		2018	2025	2020	2025	2030	2020	2025	2030
1	Orthopaedics & Rheumatology	158	253	213	349	513	-1	-96	-241
2	Respiratory Medicine	48	166	253	334	386	-108	-167	-237
3	Paediatric Medicine	355	445	429	534	682	-5	-89	-227
4	Obstetrics	371	494	414	584	727	23	-90	-225
5	Gastroenterology	68	125	102	202	335	-10	-77	-189
6	Psychiatry	160	259	338	367	403	-78	-108	-163
7	Cardiology & Cardiothoracic	285	389	318	444	539	40	-55	-153
8	General Surgery	314	415	361	458	554	27	-43	-142
9	Oncology & Haematology	31	80	116	147	178	-43	-67	-103
10	Renal Medicine	23	53	48	93	155	-10	-41	-93
11	Paediatric Surgery	60	90	85	127	174	-3	-37	-81
12	Urology	39	58	39	76	134	7	-18	-65
13	Immunology & Infections	28	50	64	75	85	-16	-25	-39
14	Neonatology & NICU	614	691	592	658	709	100	33	-33
15	Rheumatology	13	25	6	9	13	-7	-15	-29
16	Transplantation	0	4	2	3	10	-3	-5	-9
17	ENT; Head & Neck	46	54	36	48	56	16	6	-2
18	Vascular Surgery	40	50	22	35	50	25	15	0
19	Dentistry	4	5	4	5	5	0	0	0
20	Dermatology	9	10	4	6	7	6	4	3
21	Ophthalmology	23	25	9	12	14	15	13	10
22	Neurology	88	106	51	74	88	51	32	16
23	Plastic Surgery	56	64	28	34	32	35	30	29
24	Burns	62	64	7	10	12	57	54	52
25	Endocrinology	112	125	53	62	68	72	64	55
26	Neurosurgery	104	113	32	38	43	81	75	69
27	General Medicine	485	546	329	398	452	208	148	85
28	Gynaecology	213	221	49	86	123	169	135	99

RECOMMENDATIONS

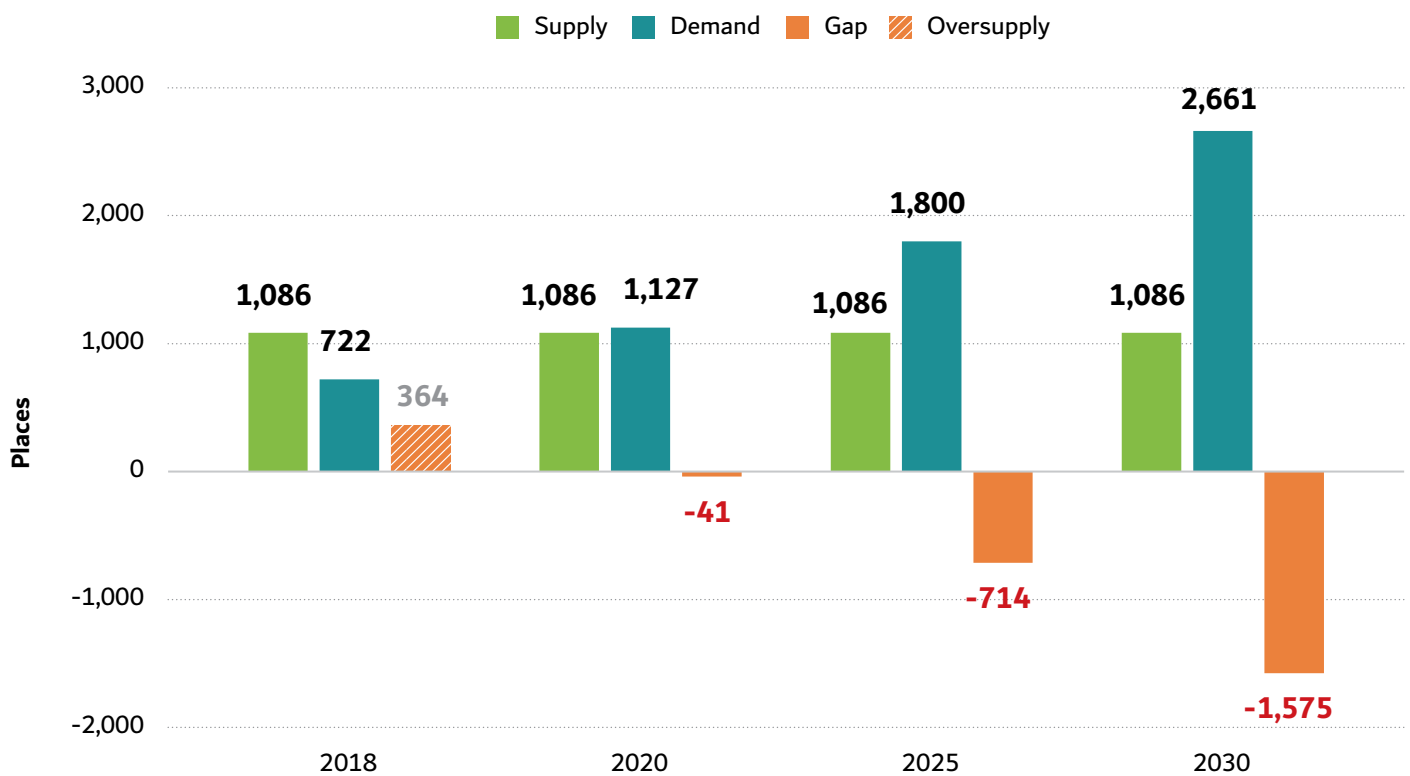
- **Distribution of capacity:** Aggregate capacity has kept up with local demand however significant gaps are prevalent in select service lines. A redistribution of beds is required to ensure that there is a better match between allocated and utilised capacity. Improved allocation of capacity will allow for higher quality of service provision as both the asset and workforce will be better placed to provide specialised care. Suboptimal occupancy rates in the private sector may be reflective of the mismatch in distribution of capacity.
- **Role delineation and referral networks.** There needs to be clearer role delineations of hospitals to create an efficient referral network between private and public sector hospitals. This delineation allows for a more efficient use of infrastructure and workforce resources through better utilisation of under-occupied facilities, economies of scale and improved quality of care.
- **Definitions and frameworks:** A clearly defined framework for defining a hospital bed and the standardised reporting of capacity is required. There needs to be a greater understanding of the difference between built capacity, licensed beds and functional beds to allow for better strategic planning and visualization of capacity buffers.
- **Census reporting.** Reporting of hospital occupancy and activity by inpatient unit through a regular census will provide a more transparent system-wide picture of utilised capacity and assist in spare capacity forecasting to assist in operational planning and disaster management.
- **Improved collection and reporting of admitted patient health statistics:** the accurate coding, collection and reporting of the summative admitted patient record is crucial to understanding the utilisation of Dubai's hospitals. The further development of a standard data dictionary; mandatory reporting requirements, standards and timeframes; and coding quality reviews for both public and private hospital will significantly improve the reliability and usefulness of these data for performance and capacity management.
- **Future planned supply:** Implement Certificate of Need policies to ensure that capacity of planned facilities is linked to gaps and investment opportunities, and addresses health system needs to optimize demand and supply and sustain and equilibrium state
- **Hub-and-spoke models:** Establishing a structured network of linked facilities will allow care to be provided closer to the patient's place of residence where gaps in supply indicate. Decentralising capacity growth from sector 3 and establishing supply in growth sectors when demand exceeds the capacity of sector 3 facilities should be considered. Hospitals in growth sectors should focus on spoke facility role. Spoke facilities will generally have a primary and secondary care focus and refer to tertiary hub facilities when required.
- **Demand reduction strategies:** Offsetting acute overnight admissions through increased utilisation of same day and outpatient care should be further investigated. Demand mitigation can be achieved through strengthening the primary and community care network and improving its ability to case manage patients in the ambulatory setting for conditions where evidence shows that hospital admission can be avoided.
- **Reducing overnight length of stay:** Implement systematic discharge planning and DRG performance review as a way of reducing overnight length of stay of admissions, especially within the public system. This in conjunction with use of same day or short stay care units in hospitals, such as Medical Assessment Units, allows for multi-disciplinary input and case management to patients presenting with acutely exacerbated chronic medical conditions, needing short term stabilisation, or those requiring development of care plans prior to discharge and referral to community-based care.
- **Mental health policy:** Policy review is required to improve utilisation for both nationals and non-nationals to address the unmet demand of mental health illness. Mental health demand projections have been reduced due to historically low relative utilisation of the service in Dubai. This policy review should examine patients being assessed and treated in different settings based on their needs; remote telehealth and community care for those that require ongoing care; and specialised mental health acute facilities for those requiring high complexity mental health care. A multi-disciplinary service model that supports community-based care should be explored to reduce the pressure on scarce inpatient mental health facilities.

6.2 Acute Inpatient care (Same Day)

The acute same day place supply of 1,086 places consists of all designated medical and surgical same day beds as well as treatment chairs for chemotherapy, infusions and renal dialysis. The distribution of this supply to specialties is based on acute overnight bed as reported by the survey and adjusted for local utilisation figures calculated from HS17 activity data.

The gap analysis shows that Dubai has an undersupply of **41** acute same day places in 2020, which will increase to **1,575** places by 2030.

Figure 16: Acute same day place gap, 2018 to 2030



The gap analysis for each specialty shows that the top 5 specialties in requirement by 2030 will be Dialysis, Paediatric Medicine, Gastroenterology, Orthopaedics & Rheumatology and General Medicine.

Table 14: Acute same day place gap by specialty, 2018 to 2030

Specialty		Supply	Demand			Gap		
		2018	2020	2025	2030	2020	2025	2030
1	Dialysis	123	162	298	493	-39	-175	-370
2	Paediatric Medicine	105	120	177	264	-15	-71	-159
3	Gastroenterology	27	49	102	181	-22	-75	-155
4	Orthopaedics & Rheumatology	43	65	118	188	-21	-75	-144
5	General Medicine	167	191	248	296	-24	-81	-129
6	General Surgery	92	117	152	190	-25	-60	-98
7	Haematology & Oncology	9	53	75	103	-44	-65	-94
8	Cardiology & Cardiothoracic	23	49	84	136	4	-31	-83
9	Paediatric Surgery	8	41	65	97	-18	-42	-74
10	Renal Medicine	53	16	37	73	-8	-29	-65
11	Chemotherapy	7	21	41	68	10	-10	-37
12	Urology	38	11	26	48	1	-14	-37
13	Obstetrics	12	27	50	73	11	-12	-35
14	Gynaecology	31	61	117	165	71	15	-34
15	Ophthalmology	131	20	32	45	-4	-16	-29
16	Dentistry	16	18	21	22	-15	-18	-19
17	Respiratory Medicine	3	12	23	35	4	-6	-19
18	Psychiatry	16	17	21	25	-6	-9	-14
19	ENT; Head & Neck	11	11	19	28	4	-4	-13
20	Neurology	16	14	26	40	17	5	-9
21	Immunology & Infections	3	6	8	11	-2	-4	-7
22	Vascular Surgery	31	3	6	9	4	1	-2
23	Dermatology	7	2	3	4	1	0	-1
24	Neonatology & NICU	5	4	4	4	1	1	1
25	Endocrinology	9	16	22	30	19	12	5
26	Burns	34	1	1	2	8	8	7
27	Neurosurgery	25	7	10	13	18	16	12
28	Plastic Surgery	43	12	17	16	31	26	27

RECOMMENDATIONS

- Increasing same day utilisation:** A growing proportion of inpatient services can be effectively treated in a same day setting. It is recommended that there be clear guideline be established on diagnosis group, procedures and operations that are suited to same day service delivery to inform funders of this strongly emerging opportunity. Establishing guidelines for same day model of cares will assist Dubai cater for a growing number of high volume and low complexity hospital episodes suited to same day care and would help mitigate demand for overnight inpatient wards, particularly in the public sector. With appropriate redesign, same day models allow increased activity within existing resources without compromising patient safety or quality of care. Patients are provided essential inpatient management, however, are case managed in the outpatient setting.
- Definitions and coding practices:** To further assist the implementation of DRGs in Dubai, establish clear definitions of acute service types to help distinguish between overnight, same day and outpatient care. Inconsistencies in classifications and coding practices between facilities compromises ability to clearly analyse activity and plan future capacity. An example of this exists in the variability of coding practices and lack of clarity of chemotherapy, renal dialysis and admitted emergency presentations.
- Growing demand:** Renal dialysis is demonstrating rapidly increasing requirements for acute same day services until 2030. It is noted that two additional dialysis centres are expected to be commissioned within the next two to three years. This, however, may be insufficient to accommodate the projected gaps in supply by 2030. An Emirate-wide systematic review of renal dialysis care is recommended to ensure that the population is readily able to access care in settings suitable to their needs. Education and preventative strategies to reduce the prevalence of renal failure should be a priority for policy. However, alternative treatment modalities, such as home dialysis and increased used of peritoneal dialysis should be explored as part of the review to determine their viability as alternative treatment options.

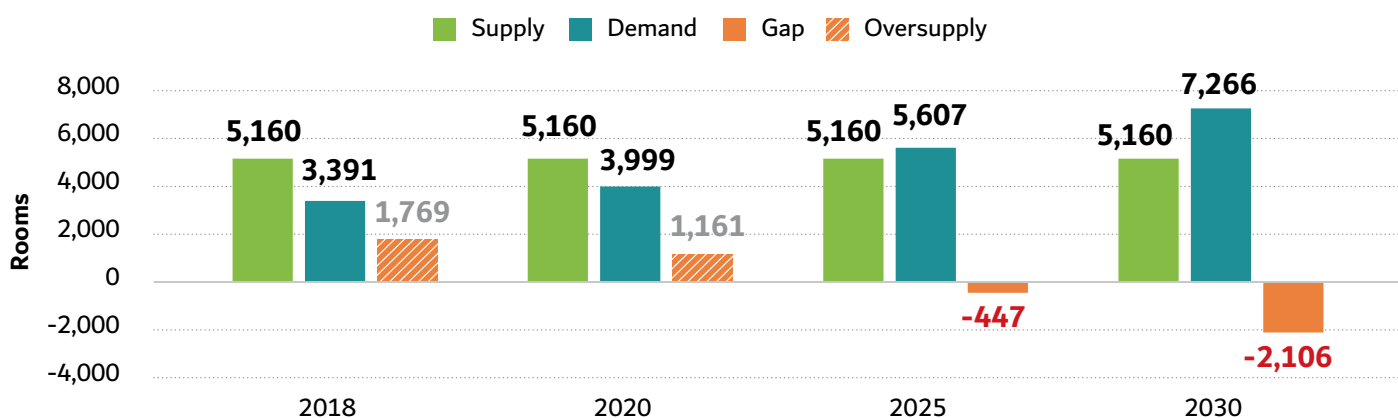
6.3 Outpatient care (Consultation rooms)

There are a reported 5,160 outpatient consultation rooms in Dubai across the facility settings of hospitals, clinics and centres. The vast majority (70%) of these rooms are in Sector 3, with Sector 1 and 2 contributing 13% and 10% respectively.

The demand profile for outpatient care has been adjusted for local utilisation factors as derived from Health Statistics 2017 activity data, which gives a locally sensitive gap result based on current practices and models of care.

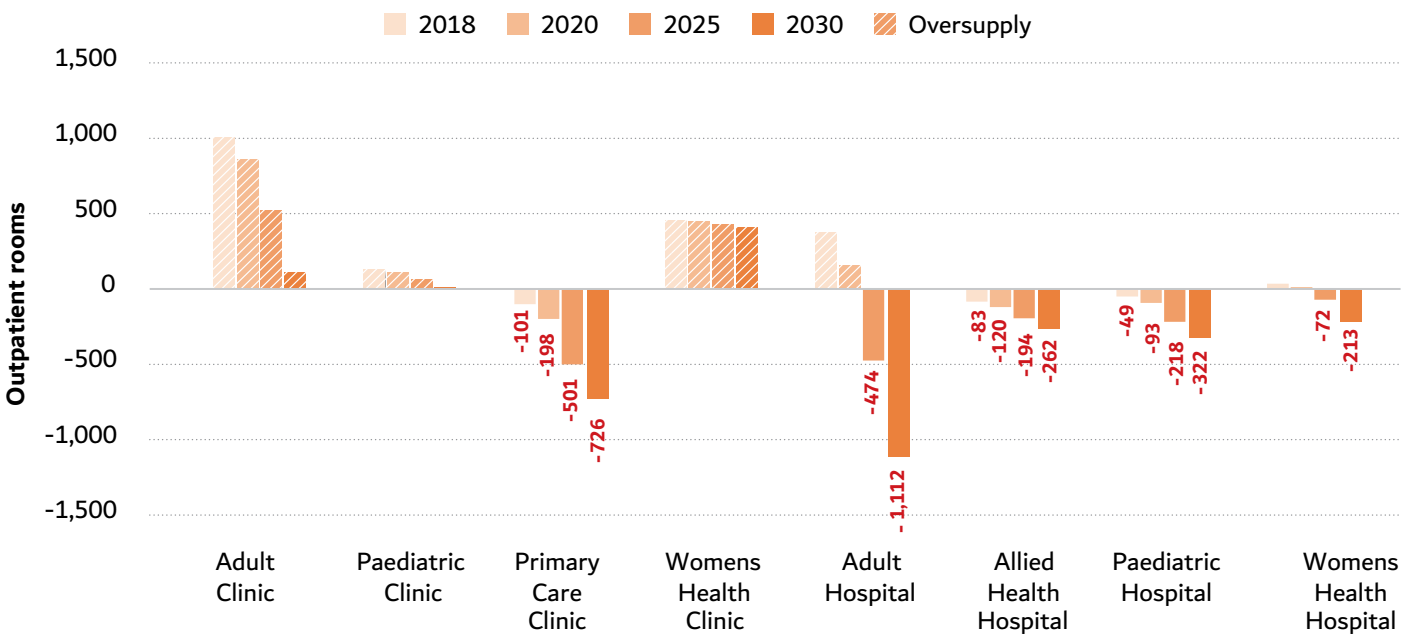
The gap analysis shows that Dubai is currently well served with outpatient consultation rooms with a requirement for an additional **447** rooms by 2025, increasing to **2,106** rooms by 2030.

Figure 17: Outpatient room gap, 2018 to 2030



The largest contributor to the gap in outpatient consultation rooms occurs in both the primary care and adult hospital outpatient service modes, with most clinic-based rooms being in oversupply up to 2030.

Figure 18: Outpatient room gap by service mode, 2018 to 2030



When viewing the gap by geographical sector, the large concentration of supply in Sector 3 results in no requirement of consultation rooms up to 2025, with an additional 105 rooms required by 2030. The majority of gap will occur in Sectors 1, 2, 4, 5 and 6, highlighting the current patient flow trends and historical focal capacity allocation in Sector 3. The geographic distribution of primary care may emerge as a significant concern with the increasing density of Dubai’s population and the associated increased travel times.

Figure 19: Outpatient room gap by sector, 2018 to 2030

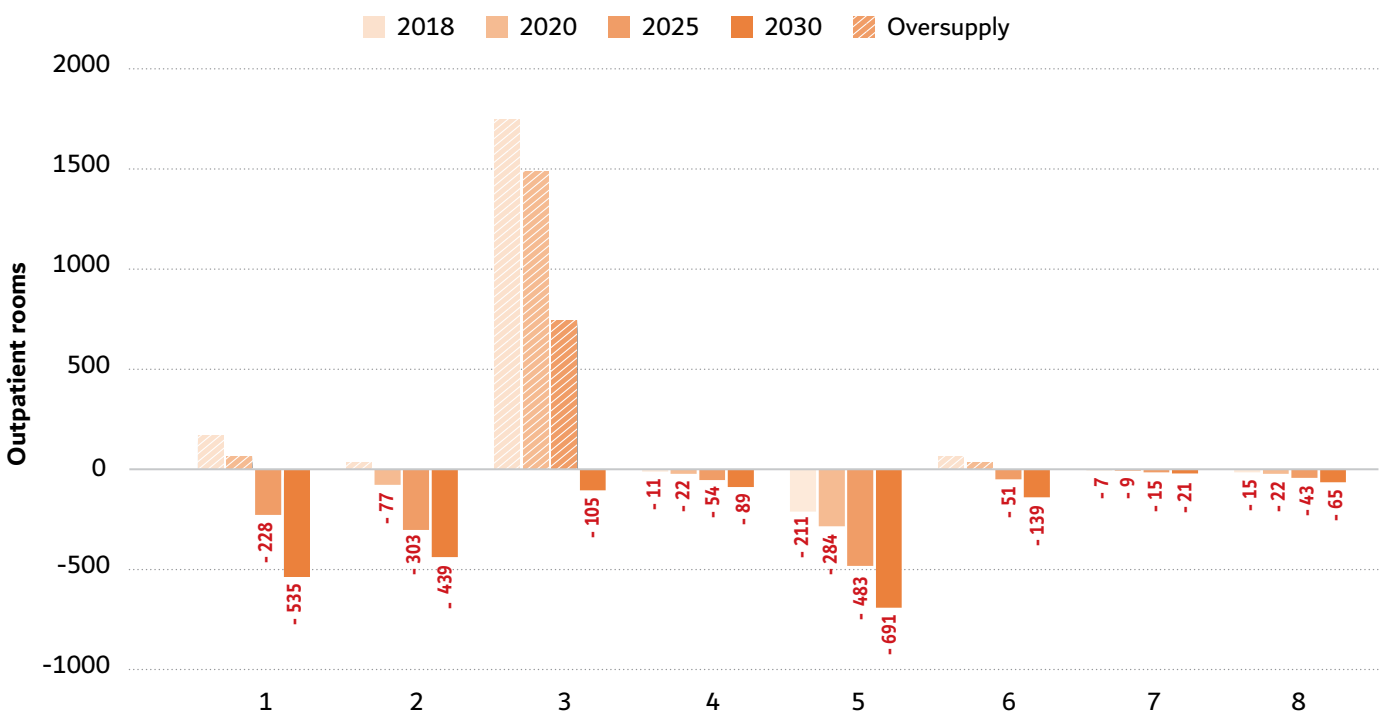


Table 15: Outpatient room gap by specialty, 2018 to 2030, sorted by largest 2030 gap

Specialty		Supply	Demand			Gap		
		2018	2020	2025	2030	2020	2025	2030
1	Primary Care	677	875	1,178	1,403	-198	-501	-726
2	Allied Health	101	221	295	363	-120	-194	-262
3	Paediatrics	423	363	499	651	60	-76	-228
4	General Medicine	657	381	596	870	276	61	-213
5	Respiratory Medicine	36	136	181	245	-100	-145	-209
6	Endocrinology	97	143	207	286	-46	-110	-189
7	Neurology	75	150	191	232	-75	-116	-157
8	Gastroenterology	105	113	172	256	-8	-67	-151
9	Oncology & Haematology	37	72	100	136	-35	-63	-99
10	Orthopaedics & Rheumatology	349	236	315	419	113	34	-70
11	Immunology & Infections	20	40	52	65	-20	-32	-45
12	Urology	118	79	113	158	39	5	-40
13	Trauma and Injury	8	28	36	42	-20	-28	-34
14	Renal Medicine	26	29	38	53	-3	-12	-27
15	Dentistry	55	40	57	80	15	-2	-25
16	Vascular Surgery	17	19	26	34	-2	-9	-17
17	Neonatology	2	6	8	10	-4	-6	-8
18	Psychiatry	140	83	111	138	57	29	2
19	Neurosurgery	42	12	16	20	30	26	22
20	ENT; Head & Neck	183	90	116	149	93	67	34
21	Obstetrics	307	143	179	262	164	128	45
22	General Surgery	181	66	91	122	115	90	59
23	Cardiology & Cardiothoracic	193	61	91	131	132	102	62
24	Ophthalmology	218	62	90	140	156	128	78
25	Plastic Surgery	205	24	31	37	181	174	168
26	Gynaecology	515	114	170	247	401	345	268
27	Dermatology	373	69	81	93	304	292	280

RECOMMENDATIONS

- Primary Care priority:** An enhanced system-wide co-ordinated approach to improve primary care is recommended. This is to be supported by local service delivery, clearly defined referral service delivery networks. Further work is need on the differentiation the roles of primary, secondary and tertiary care providers in this network. Enhancing a gatekeeper model and promoting primary care as entry point into Dubai’s healthcare network will assist in effective referrals for elective and urgent care. Promoting primary care providers as a patient’s entry point will facilitate more effective screening and has the potential to reduce unnecessary and expensive treatments.
- Overcapacity:** Clinic-based consultation rooms, especially those located in Sector 3, display a large oversupply. This creates a highly concentrated ambulatory care structure, which may resist primary care and patient focus initiatives. Strategies need to be put in place to enhance local primary care and to provide remote care through the aid of telemedicine solutions where feasible.
- Multi-disciplinary team:** Allied health and nurse practitioners provided cost effective alternatives to standardised, non-complex care and free up scarce medical practitioner resources for the management of higher complexity cases. Ambulatory multi-disciplinary models focusing on preventative and supportive functional care in the outpatient setting improves patient outcomes, quality of care and reduces unnecessary costs.
- Capacity:** Perform a detailed utilization-based review of functional and non-functional capacity of consultation rooms to better understand utilized capacity and occupancy. This framework would assist in reducing duplication of consultation rooms for the same service.



“In line with the 50 year charter and direction for a Doctor for Every Citizen we will continue to develop infrastructure in Dubai to ensure that the fifth article acts as a performance indicator for DHA to measure efficiency of hospitals, primary care centers specialized centers and clinics across Dubai”

Humaid Al Qutami
Director General, Dubai Health Authority

6.4 Emergency Department

Across Dubai, there are 501 Emergency bays of which 229 are allocated to Life Threatening care and 272 are allocated to Urgent Care. Most of these bays are in Sector 3 (61%), followed by Sector 1 (22%) and Sector 2 (10%).

The gap analysis indicates that Dubai is well served by total emergency bays currently and will require **35** bays by 2025, increasing to **107** bays by 2030. When the gap is analysed by type of bay, it shows an immediate requirement for Life Threatening bays, increasing from **26** bays currently to **211** bays by 2030. This presents an opportunity to repurpose existing capacity to meet this current and emerging requirement.

Figure 20: Supply, demand and gap for ED bays, 2018 to 2030

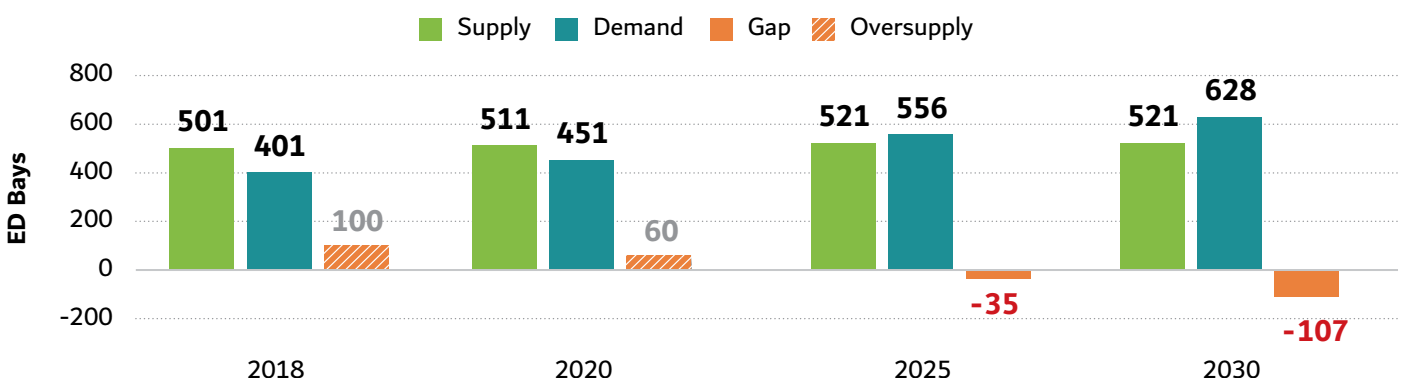
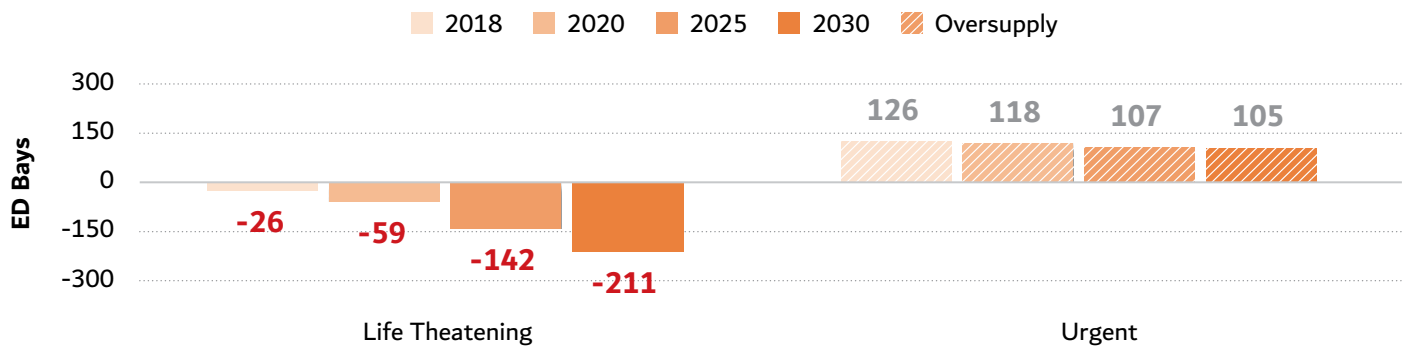


Figure 21: Gap by type, 2018 to 2030



RECOMMENDATIONS

- Life threatening emergency bays:** Additional life-threatening emergency bays are an immediate need and will remain a requirement up to 2030, reinforced by the high levels of emergency department activity at public hospitals where most life-threatening care is provided in Dubai. It is recommended that life-threatening capacity is increased in facilities where patients are presenting. This additional capacity should be resourced to rapidly respond and effectively identify and treat patients who are at a high probability of dying.
- Walk-in urgent care clinics:** Appropriately staffed walk-in urgent care clinics be established to cater for urgent non-life-threatening patients and reduce pressure on existing emergency departments that are facing pressure from high volumes of life-threatening presentations. These urgent care centres are to be established in smaller generalist hospitals with underutilised capacity because higher acuity patients are being diverted to the larger specialist hospitals of Dubai. This model will be assisted by telehealth applications to allow patients to have access to specialists when required and be triaged to a higher acuity facility and transferred when necessary.
- Workforce:** Consistent with international trends in Emergency Care, larger facilities should be encouraged to employ emergency medicine-trained practitioners instead of internal medicine generalists to improved practice quality and reduce hospital emergency department-based morbidity and mortality.
- Planning requirements:** It is recommended that facility licensing policies be reviewed to limit the development of low-quality and poorly utilised emergency bays in small and inappropriately staffed hospitals where utilisation and quality care cannot be assured.

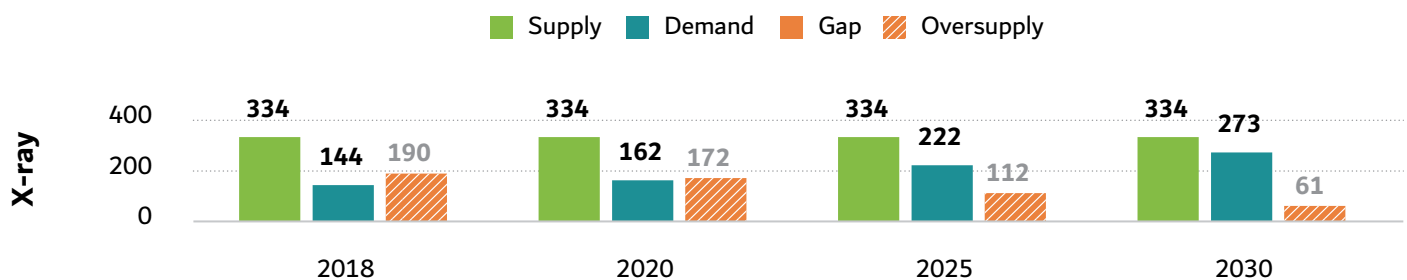
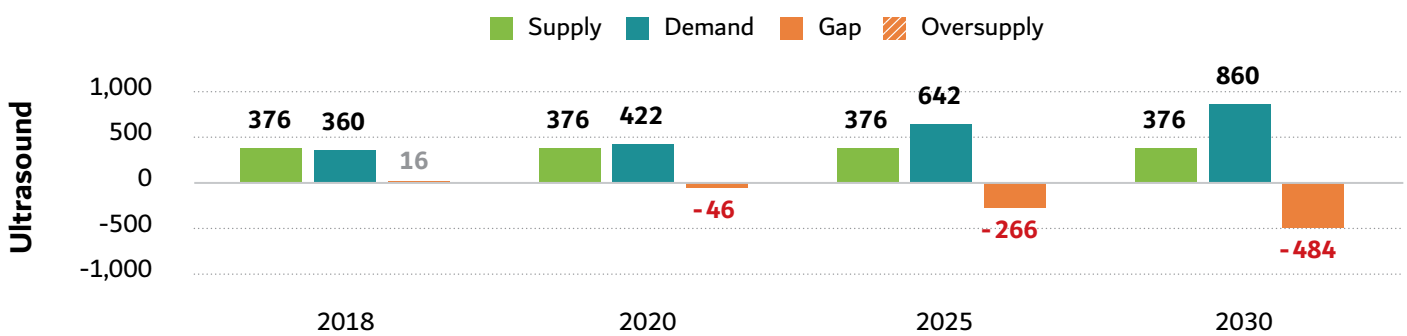
6.5 Procedural Care / Medical Imaging

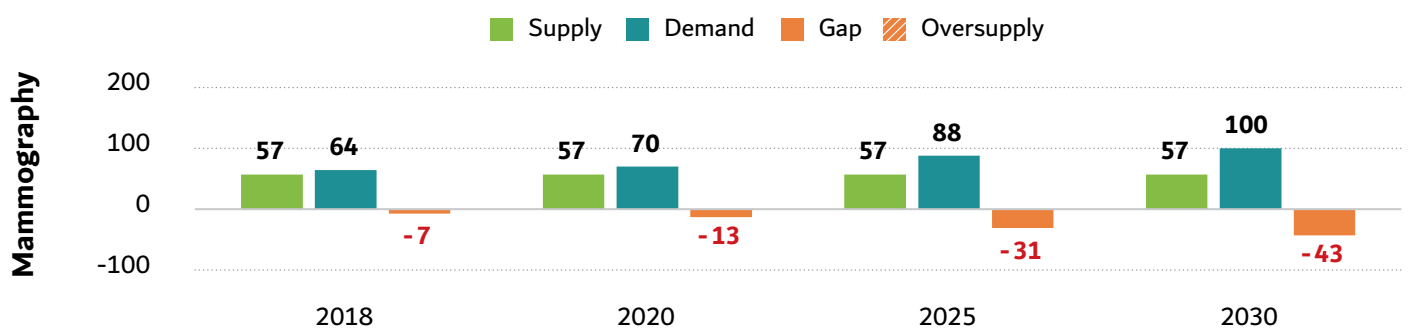
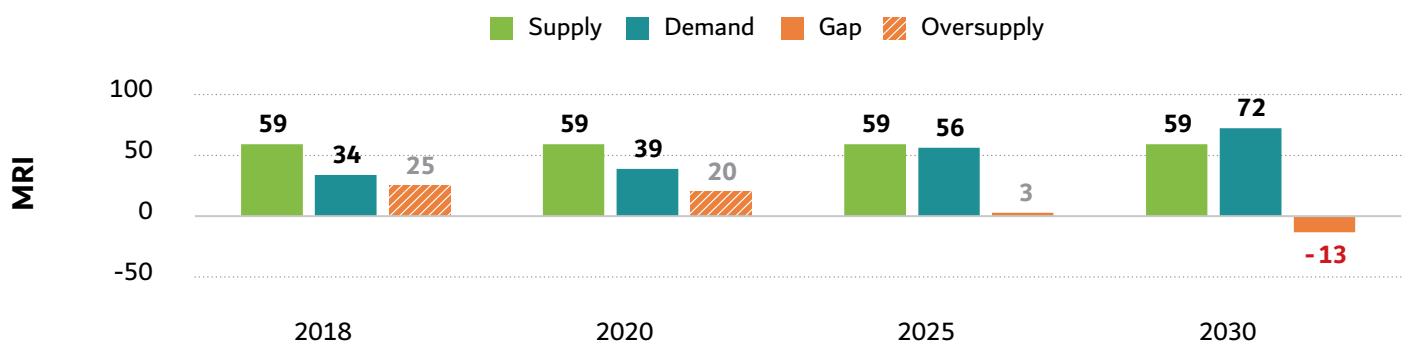
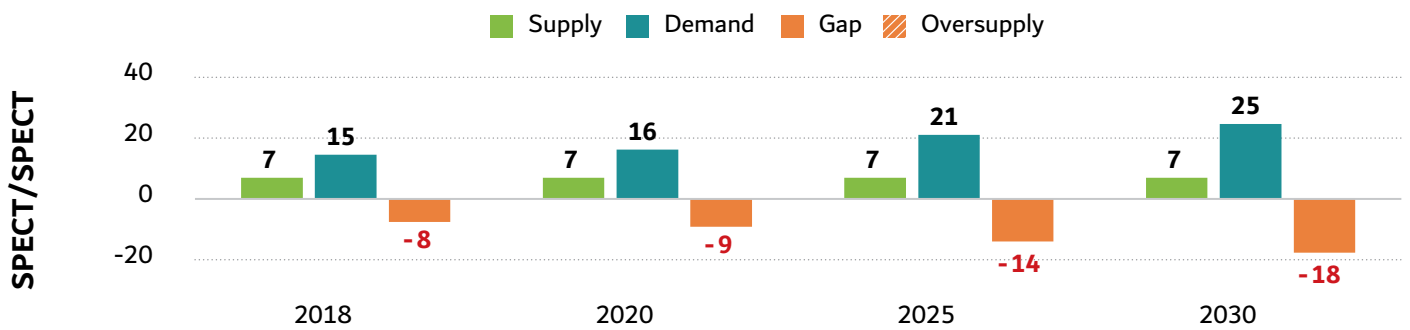
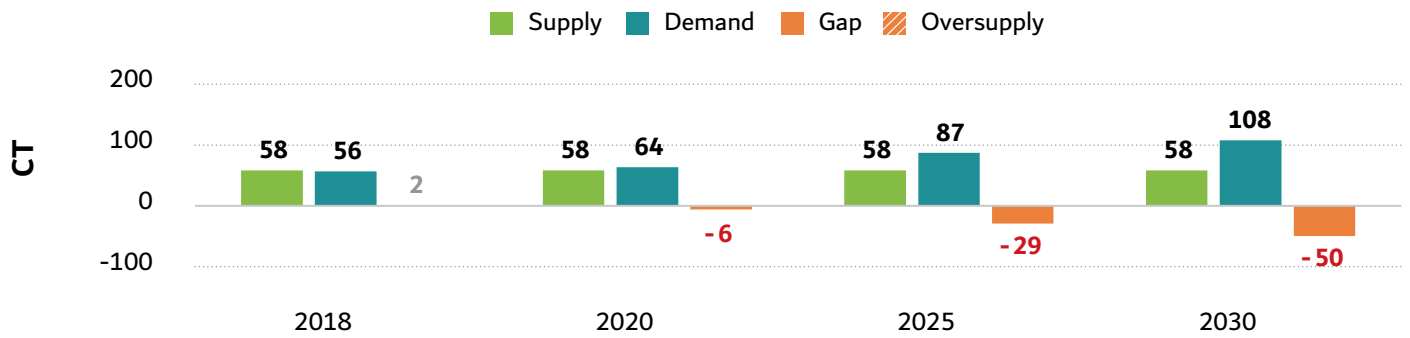
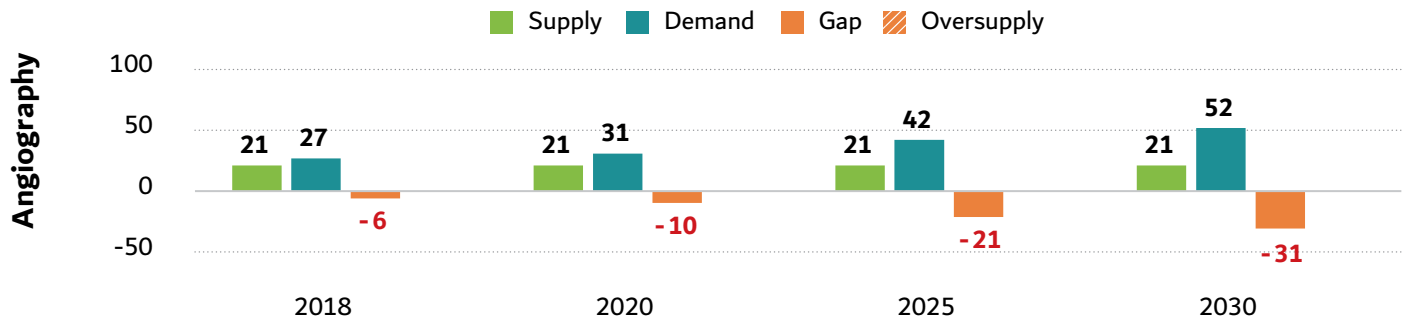
The distribution of procedural care, or medical imaging, units amongst the Emirate is heavily focused in Sector 3 (65%), Sector 1 (14%) and Sector 2 (12%). The demand profile estimates for each procedural care unit type has local relative utilisation rates applied where indicated after Expert Panel discussion; this was most pronounced for SPECT/SPECT-CT, PET and Radiation therapy.

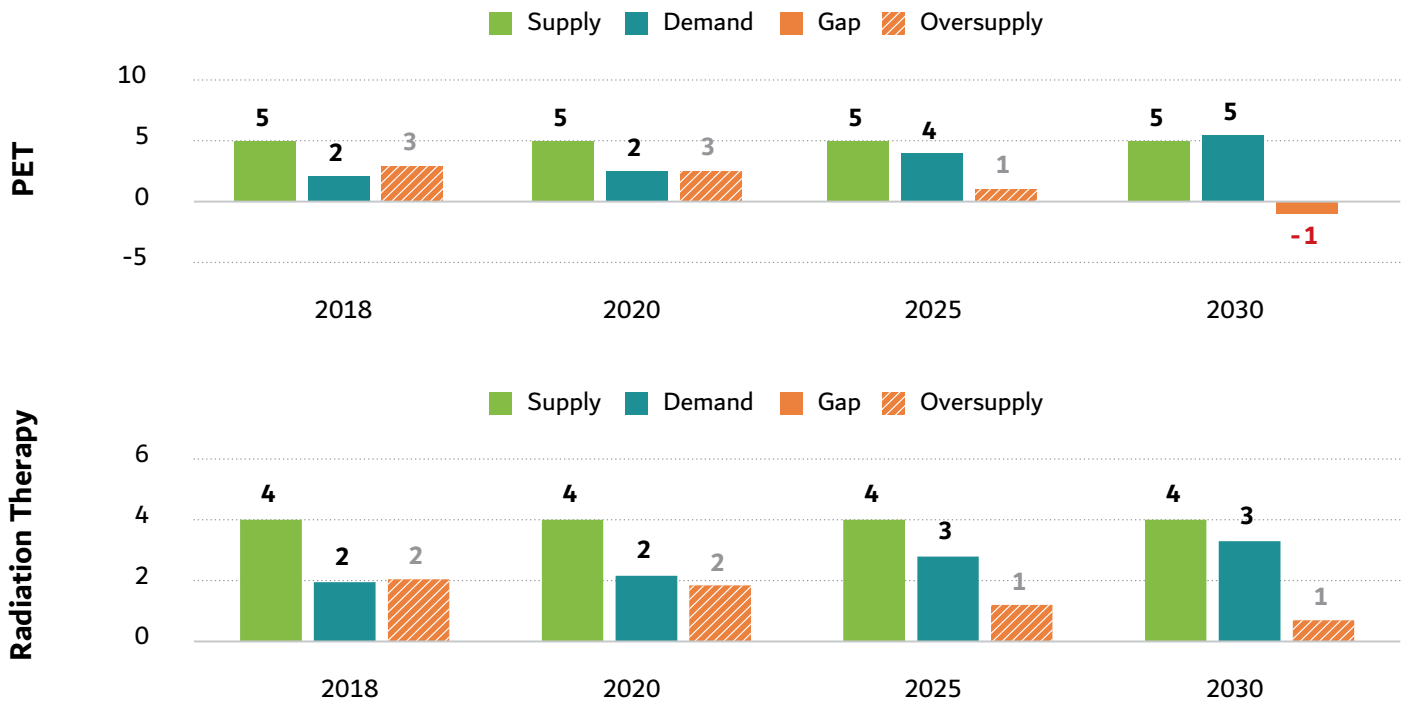
The gap analysis for procedural care units is summarised in the table below, followed by accompanying supply, demand and gap figures for each unit type.

Table 16: Procedural care unit gap by type, 2018 to 2030

Specialty		Supply	Demand			Gap		
		2018	2020	2025	2030	2020	2025	2030
1	Ultrasound	376	422	642	860	-46	-266	-484
2	Computed Tomography	58	64	87	108	-6	-29	-50
3	Mammography	57	70	88	100	-13	-31	-43
4	Angiography	21	31	42	52	-10	-21	-31
5	SPECT/SPECT-CT	7	16	21	25	-9	-14	-18
6	Magnetic Resonance	59	39	56	72	20	3	-13
7	Positron Emission Tomography	5	2	4	5	2	1	-1
8	Radiation Therapy	4	2	3	3	2	1	1
9	X Ray	334	162	222	273	172	112	62







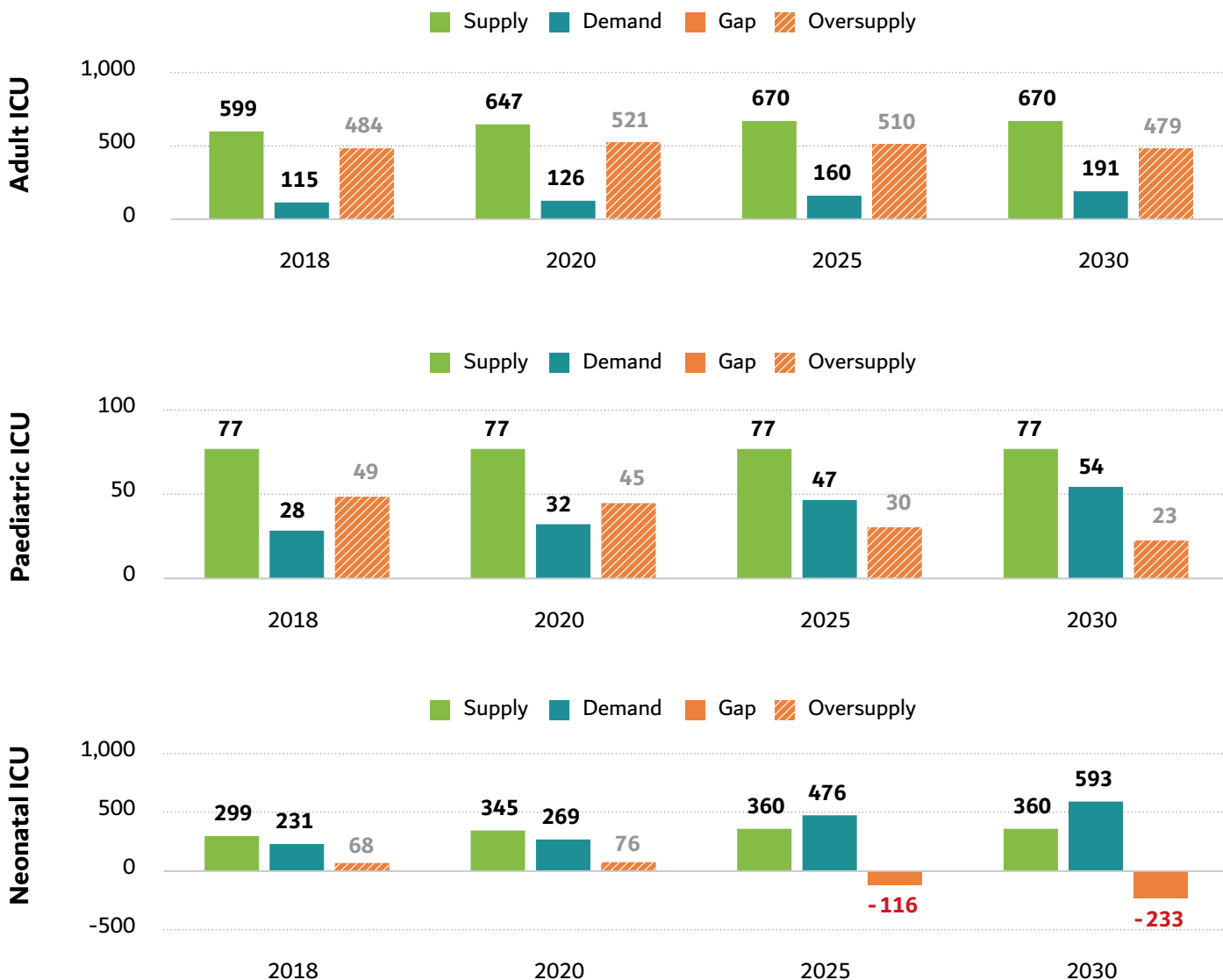
RECOMMENDATIONS

- **Planning requirements:** Review policies and license requirements for medical imaging equipment at the facility planning stage to reduce unnecessary allocation of expensive and underutilised machines
- **Diagnostic centres:** Standalone diagnostic centres are recommended to reduce duplication of services and improve workforce utilisation. Rationalising medical imaging for smaller clinics in highly concentrated areas helps to reduce infrastructure and workforce capacity duplication
- **Teleradiology:** Review of policies and requirements to encourage uptake of teleradiology that will allow the review of digital radiological images by expert radiologists regardless of a diagnostic centre's location
- **Shared Diagnostic platform:** Enabling diagnostic results to be shared amongst facilities through a cross-platform solution will improve efficiency and safety of care for the patient. This will also allow capacity to be used by multiple facilities instead of being siloed into individual units.
- **Reducing outflow:** Reducing outflow to outside Dubai for specialist procedural care, such as radiation therapy, will increase utilisation by improving self-sufficiency. It is recommended that radiology centres of excellence be established in high outflow specialities where there is a projected gap in supply.

6.6 Critical Care beds

There are currently 902 critical care beds in Dubai (526 Adult, 299 Neonatal and 77 Paediatric), with an additional planned supply of 144 adult ICU and 61 NICU beds expected to be commissioned by 2025.

The gap analysis indicates that critical care beds will remain oversupplied up to 2030, however when displayed by type of bed, there is an undersupply of **116** Neonatal ICU beds by 2025 which increases to **233** by 2030.



RECOMMENDATIONS

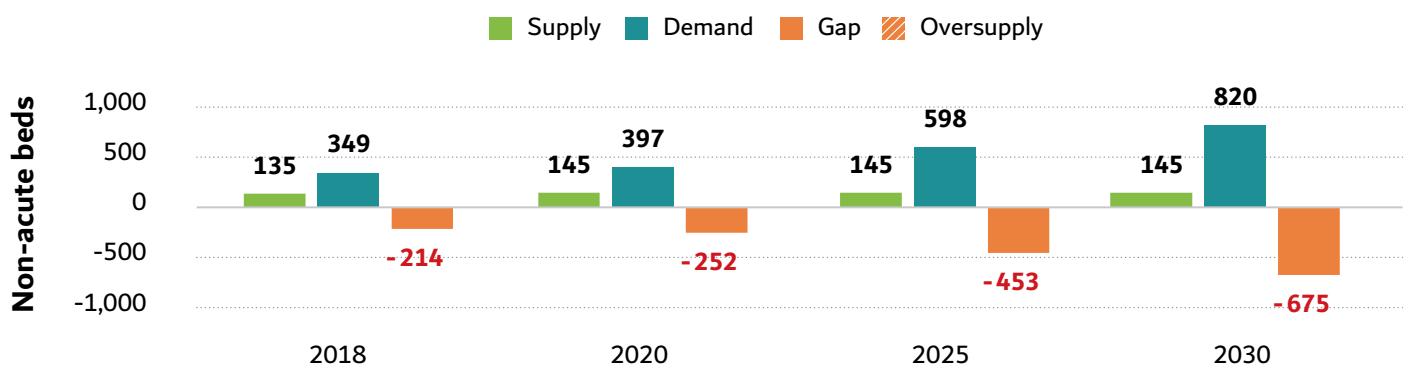
- Long-term care:** Improving LTC capacity and its model of care will reduce intensive care bed utilisation of patients requiring long term airways assistance, one of Dubai’s largest contributors to the oversupply of adult ICU beds.
- NICU capacity:** Addressing the growing demand and gap in NICU beds through allocation of additional licences and funding. This growth is largely due to increased neonatal survival rates from technological advancements and the delay of childbirth by families to older ages in women increasing the number of high-risk births.
- Planning requirements:** Review policies and requirements for minimum critical care beds at facility planning stage to ensure that beds are approved to meet expected demand and to meet international bed planning benchmarks

6.7 Non-Acute Care and Long-Term Care beds

The current supply of non-acute care beds is made up of 64 long term care beds and 71 rehabilitation beds, with a further 30 rehabilitation beds planned by 2020. The demand profile for non-acute care has been adjusted for local utilisation factors, with only 10% of non-national population demand being considered needed.

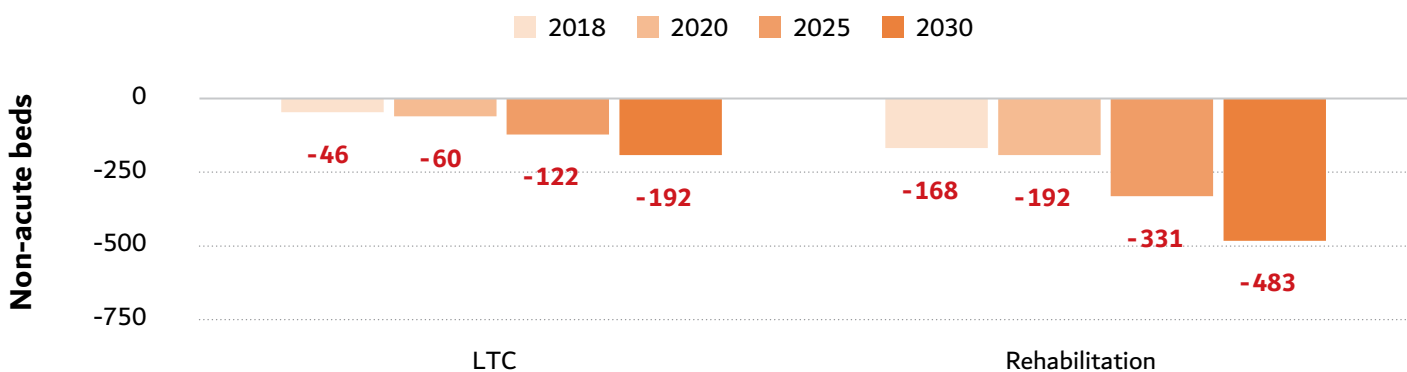
The gap analysis indicates that non-acute care beds are currently in undersupply and their future requirements will continue to grow, increasing from **214** beds in 2018 to **675** beds by 2030.

Figure 22: Supply, demand and gap for Non-acute care beds, 2018 to 2030



When analysed by type of bed, the largest contributor to non-acute care bed gap is Rehabilitation, which currently requires 168 beds and will increase to 483 beds by 2030.

Figure 23: Figure 23 Gap by bed type, 2018 to 2030



Several medical conditions and disorders treated under the service lines of Orthopaedics, Neurology, Respiratory, Cardiology, and Oncology require extended rehabilitation. The growth in Acute Orthopaedics and Rheumatology are estimated to require a significant bed demand by 2025, which is a major contributor to demand for physical therapy and musculoskeletal rehabilitation

The greater survival of patients with moderate to profound functional impairment coupled with a general population aging is placing additional demands on social and health care systems for the provision of longer-term care systems and facilities to accommodate these emerging needs.

RECOMMENDATIONS

- Increasing capacity:** There is an existing and growing requirement in non-acute and long-term care capacity which need supporting with appropriate licence and funding incentives to improve investment in rehabilitation, transitional and long-term care facilities. Public and private and partnership opportunities should be explored for the funding, development and operation long term care systems and facilities.
- Model of care:** Exploration and development of rehabilitation, post-acute and long-term care service delivery models of care to address insufficient supply and growing demand. These models of care should address therapy requirements in all care settings along the patient journey including the management of patients requiring continuous airways management support and those requiring ongoing support with activities of daily living.
- Improving access:** A clearly defined insurance reimbursement framework and process for rehabilitation and long-term care is required to improve service availability in response to increasing demand, especially for non-nationals.
- Reducing demand:** Explore options for community-based and outreach non-acute care to mitigate facility capacity gaps. A large component of rehabilitation and long-term care can be cost effectively delivered through community and home care systems. These systems can be managed and monitored via centralised expert systems and care planning managed through the aid of telemedicine solutions
- Policy driven demand:** Planning for the impact on demand as a result of financing initiatives currently under way, such as implementation of DRGs in 2019, that will increase the demand for step down and long-term care facilities due to payment and length of stay caps on acute care.

“The DHA works to ensure all insurers have adequate providers, both in terms of geographic coverage and medical competence, regardless of the level of plan. We want to move into the preventive medicine instead of curative because it reduces the costs.”



Mr. Saleh Al Hashimi

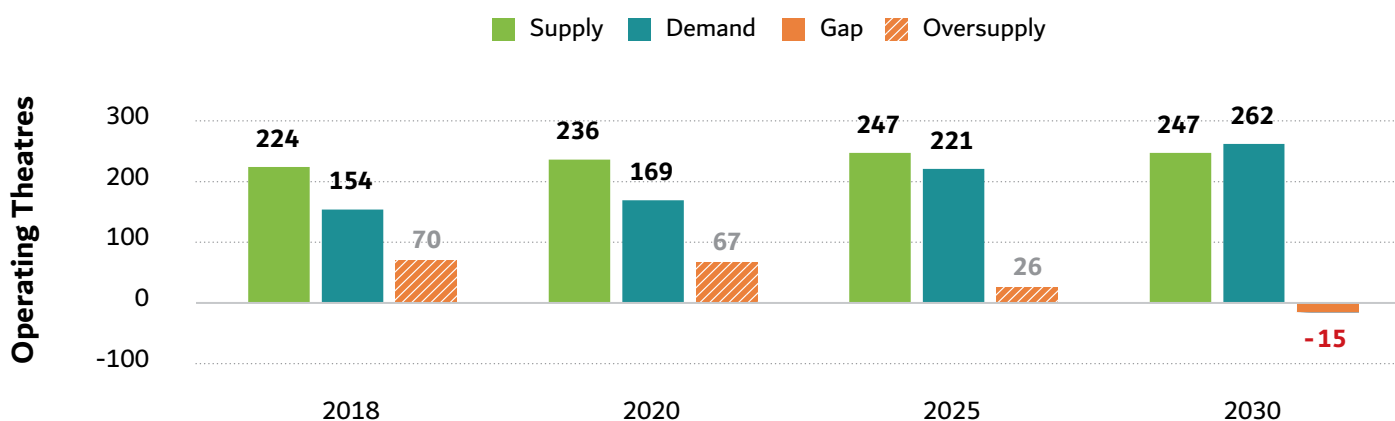
Advisor, Dubai Health Insurance Corporation, DHA

6.8 Operating Theatres

There are currently 224 operating theatres within Dubai, of which 189 are used for elective surgeries and 35 for emergency surgeries. Based on planned facility licensing, an additional 23 operating theatres are expected by 2025.

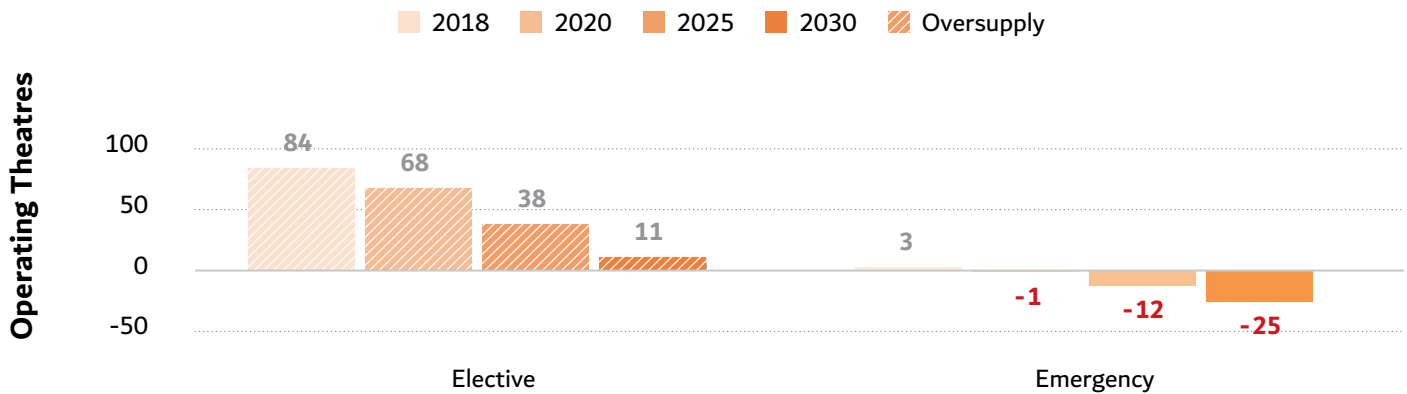
Gap analysis of operating theatres indicates that there is an oversupply of operating theatres in Dubai which becomes an undersupply of 15 theatres in 2030.

Figure 24: Supply, demand and gap for Operating Theatres, 2018 to 2030



This is as a result of the oversupply of elective theatres, which does not reach a requirement for additional capacity in the next 12 years. Whereas, additional emergency theatres are required by 2020 and is expected to increase to 25 theatres by 2030.

Figure 25: Gap by theatre type, 2018 to 2030



This analysis takes into consideration non-national outflow and national inflow from other Emirates of the UAE. There may be additional demand for elective theatres and recovery bays when further taking into consideration the net flows of medical tourism inflow and outflow expected beyond 2020.

RECOMMENDATIONS

- **Medical Tourism:** Better capture of Medical Tourism activity by mandatory reporting of Dubai visitor clinical referrals and hospital admissions, including diagnostic, procedural and location of residence information, to assist in capacity planning and coordination of resources for elective operations or procedures.
- **Occupancy rates:** Undertake a review of operating theatre utilisation to better understand of occupancy rates and functional capacity to allow for improved capacity planning and disaster management.
- **Planning requirements:** Review policies and requirements for minimum operating theatre rooms at facility planning stage based on international benchmarks to reduce oversupply of elective theatres.
- **Procedural rooms:** Utilising facility planning guideline definitions to encourage use of procedural rooms instead of operating theatres where clinically appropriate.



“To meet the developments and growing private sector investment in the Dubai healthcare sector, the DHA is developing its regulatory standards to ensure the delivery of high medical standards that exceed expectations, and to provide the Emirate with skilled and highly qualified health professionals. Incorporating smart technologies in healthcare is an important priority as it enhances patient care, ensures better follow-up and empowers patients”

Dr. Marwan Al Mulla

CEO, Health Regulation Sector, DHA

6.9 Human Resources

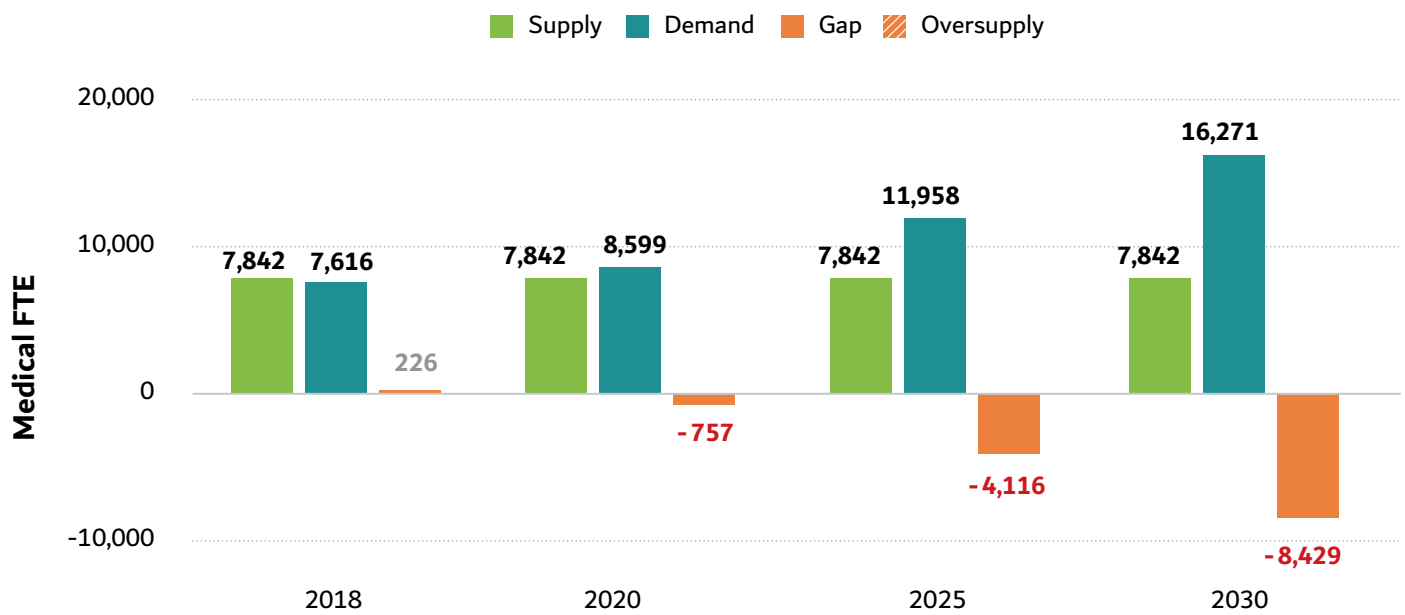
The workforce profile in Dubai in November 2018 has been derived from licensed professionals and its conversion to full-time equivalents (FTEs) based on nationality. This figure has been cross-validated with FTEs reported in the survey by each facility.

FTEs is a measure that represents the number of working hours one full-time employee works during a standardised time-period regardless of the specific number of hours worked by individual workers. FTE simplifies work measurement by converting work load hours into the number of full-time workers required to complete that work.

The demand profile for workforce within the catchment is based on activity levels for inpatients, outpatients and community care with adjustments made for burden of disease and relative utilisation factors linked to patient episode activity

The licensed medical workforce in Dubai is comprised of 7,616 FTE across both the public and private sector, which is expected to be in undersupply before 2020. By 2030, the Dubai health system will need to double its medical workforce to accommodate the medium scenario population demand requirements and meet contemporary healthcare standards.

Figure 26: Medical workforce gap by FTE, 2018 to 2030



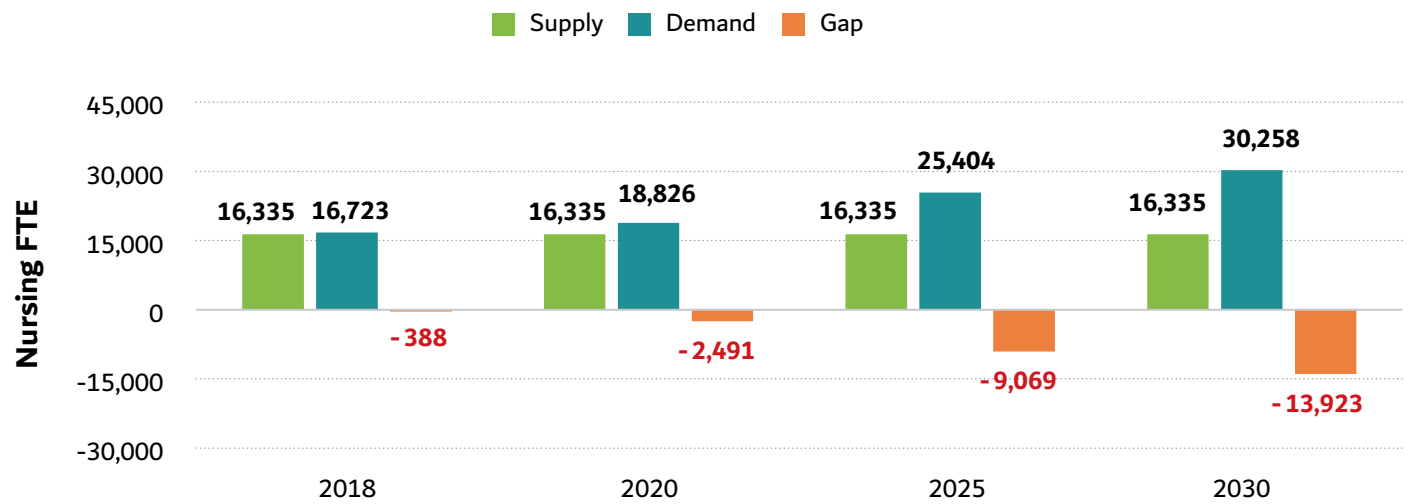
Medical workforce requirements by specialty are shown below and have been derived from demand growth in inpatient and outpatient activity for each specialty.

Figure 27: Medical specialty workforce gap analysis, 2020 to 2030

2020			2030		
Medical specialty	Supply	Gap	Medical specialty	Supply	Gap
General Medicine and Surgery	1,624	-1,034	General Medicine and Surgery	1,624	-4,184
Paediatrics	635	-726	Paediatrics	635	-2,144
Anaesthetics	353	-166	General Medical Practice	1,687	-472
Endocrinology	70	-62	Anaesthetics	353	-455
Psychiatry	75	-59	Obstetrics	574	-227
Haematology	11	-58	Endocrinology	70	-213
Rehabilitation	25	-45	Cardiology	130	-189
Immunology & Infections	17	-40	Renal Medicine	43	-142
Dentistry	25	-32	Respiratory Medicine	51	-127
Respiratory Medicine	51	-30	Critical Care Medicine	78	-127
Cardiology	130	-21	Neurology	87	-103
Renal Medicine	43	-20	Orthopaedics	388	-102
Neurology	87	-19	Psychiatry	75	-90
Critical Care Medicine	78	-17	Immunology & Infections	17	-87
Clinical Genetics	3	-14	Haematology	11	-87
Audiological Medicine	3	-11	Rehabilitation	25	-85
Nuclear Medicine	8	-10	Dentistry	25	-77
Oncology	24	-6	Ophthalmology	217	-62
Cardiothoracic Surgery	32	-1	Oncology	24	-61
			Radiology	258	-57
			Audiological Medicine	3	-29
			Neonatology	43	-28
			Cardiothoracic Surgery	32	-27
			Clinical Genetics	3	-26
			Interventional Cardiology	52	-23
			Nuclear Medicine	8	-16
			Radiation Oncology	17	-15
			Rheumatology	25	-5

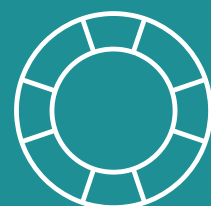
There are currently 16,335 FTE nurses licensed in Dubai, with a current shortfall of 388 FTEs, increasing to nearly 14,000 by 2030. The growth in nurse demand is in keeping with the activity growth in overnight, same day and ambulatory health care services within the Emirate.

Figure 28: Nursing workforce gap by FTE



RECOMMENDATIONS

- **Full-Time Equivalents:** Workforce licensing to capture practitioner working hours in conjunction with headcount to allow FTE estimates and improved workforce planning.
- **Workforce forecasting methods:** Long-term workforce planning recruitment strategies should be tied to both ‘top-down’ activity modelling and ‘bottom-up’ benchmarking exercises. This will assure that international benchmarks are validated against contemporary Dubai workforce conventions.
- **Distribution:** Ensure that the allocated and utilised distribution of workforce capacity reflects skill set capacity requirements. Scarce specialist professionals should be allocated to areas of demand and basic care provided by appropriately credentialed generalists, allied health or nurse practitioners.
- **Increasing Nationals in the Healthcare Workforce:** Develop and implement strategies to recruit, retain and train National health professionals considering Nationals make up only 3% of total workforce yet 10% of Dubai’s population. This should be done in conjunction with review and enhancement of teaching hospitals, training programs, allocation of training places and post-graduate training incentives.
- **Medical tourism:** Better capture of Medical Tourism activity to assist in workforce planning and coordination of human resources. Medical tourists will generally have a higher staff to patient ratios and numbers of clinical and non-clinical interactions.
- **Occupancy rates:** Low occupancy rates create inefficiencies in the utilisation of both infrastructure capacity and workforce capacity. Restructuring of current facilities to improve occupancy and patient throughput will increase the efficient utilisation of the scarce health workforce.
- **Advanced practice nurses:** Improving the primary care model by empowering appropriately post-graduate qualified nurses to provide diagnosis, care planning and treatment for simple conditions under the guidance of a managing physical. A ‘Nurse practitioner’ role can help increase access to services in community primary care specialist and continuing care settings.



CHAPTER 7

DISCUSSION

This chapter summarises the results and implications on future developments in infrastructure and workforce for the Dubai health sector. It further outlines the recommended actions to be undertaken to meet projected demands in an efficient and effective manner

7.1 Summary

Dubai's population is experiencing continuing significant growth at rate that is 3.9 percentage points greater than the world's current growth of 1.1% per annum. This growth and a progressive shift to its age, gender and nationality structure are all impacting utilization patterns of health care services. Health care requirements are thereby increasing at faster rates requiring more efficient utilization of existing infrastructure and further planning and investment in additional capacity to address projected shortfalls.

Systematic capacity planning ensures not only that total capacity continues to keep up with the demands on the health system, but that appropriate new capacity is distributed to the sectors experiencing growth and that existing infrastructure is adapted to accommodate emerging roles, technologies and systems whilst more efficiently addressing demand growth. Since the last DSCSP, there has been significant growth in hospital, centre and outpatient capacity. However, because of the unprecedented population growth there remain significant short falls in certain service lines, highlighted by the gap between allocated and utilised distribution of capacity.

The results of the 2018-2030 DCSCP KPU gap analysis is shown in the table below, highlighting current supply and the projected gaps moving towards 2030.

Table 17: Summary of gaps by KPU, 2018 to 2030





Key Planning Unit	Supply	Demand			Gap		
	2018	2020	2025	2030	2020	2025	2030
Acute overnight beds	3,795	4,002	5,268	6,547	654	-311	-1,590
Acute same day beds	1,086	1,127	1,800	2,661	-41	-714	-1,575
Outpatient consultation rooms	5,160	3,999	5,607	7,266	1,161	-447	-2,106
Non-Acute overnight beds	135	397	598	820	-252	-453	-675
Emergency department bays	501	451	556	628	60	-35	-107
CC – Adult ICU	599	126	160	191	521	510	479
CC – Paediatric ICU	77	32	47	54	45	30	23
CC – Neonatal ICU	299	269	476	593	76	-116	-233
Operating Theatres (Elective)	189	133	174	201	68	38	11
Operating Theatres (Emergency)	35	36	47	60	-1	-12	-25
Human Resources - Medical	7,842	8,599	11,958	16,271	-465	-4,053	-7,067
Human Resources - Nursing	16,335	18,826	25,404	30,258	-2,491	-9,069	-13,923
Ultrasound	376	372	572	765	-46	-266	-484
Computed Tomography	58	56	77	95	-6	-29	-50
Mammography	57	59	76	86	-13	-31	-43
Angiography	21	29	41	50	-10	-21	-31
SPECT/SPECT-CT	7	15	20	23	-9	-14	-18
Magnetic Resonance	59	36	52	67	20	3	-13
Positron Emission Tomography	5	2	3	5	2	1	-1
Radiation Therapy	4	2	2	3	2	1	1
X Ray	334	138	191	234	172	112	62

Note: Gap numbers highlighted in red colour with a –ve sign represents an undersupply

7.2 Service specialty priorities

A “traffic light” assessment is presented for inpatient and outpatient service specialties based on capacity with the greatest growth in demand and gaps in supply. The assessment dashboard is presented in the figure below for each scenario and 2020 and 2030 based on the following evaluation criteria.

Table 18: “Traffic light” assessment for supply gaps

Gap/Supply	Priority	Description
 >50%	High	> 50% deficit in total supply gap
 25-50%	Medium	25-50% deficit in total supply gap
 0-25%	Low	0-25% deficit in total supply gap
 <0%	No	No deficit in total supply gap

The priority table highlights both the gap as a proportion of current supply and the actual gap for each specialty by key planning unit for 2020 and 2030, indicating the priority of planning and investment actions for each service specialty.



“The DCSCP comprehensively outlines new and existing capacity distributed across the nine sectors in Dubai. Through this assessment, it is important that the priority gap areas are addressed by engaging and supporting investments that will address these health service gaps to ensure we meet the future healthcare demand across the Emirate of Dubai.”

Dr. Nahed Monsef

Director, Strategy and Corporate Development Sector, DHA

Table 19: Acute overnight priorities by specialty, shown by gap percentage and number, 2020-30

Acute overnight beds					
2020			2030		
%	No.	Specialty	%	No.	Specialty
-74%	-108	Respiratory Medicine	>100%	-237	Respiratory Medicine
-59%	-43	Haematology & Oncology	>100%	-93	Renal Medicine
-33%	-16	Immunology & Infections	>100%	-103	Haematology & Oncology
-30%	-78	Psychiatry	>100%	-189	Gastroenterology
-27%	-10	Renal Medicine	-95%	-65	Urology
-11%	-10	Gastroenterology	-88%	-240	Orthopaedics & Rheumatology
-3%	-3	Paediatric Surgery	-86%	-81	Paediatric Surgery
-1%	-5	Paediatric Medicine	-82%	-39	Immunology & Infections
-1%	-1	Orthopaedics & Rheumatology	-68%	-163	Psychiatry
5%	23	Obstetrics	-50%	-227	Paediatric Medicine
7%	27	General Surgery	-45%	-225	Obstetrics
11%	40	Cardiology & Cardiothoracic	-40%	-153	Cardiology & Cardiothoracic
14%	100	Neonatology & NICU	-34%	-142	General Surgery
15%	7	Urology	-5%	-33	Neonatology & NICU
18%	1	Dentistry	-4%	-2	ENT; Head & Neck
31%	16	ENT; Head & Neck	0%	0	Vascular Surgery
39%	208	General Medicine	0%	0	Dentistry
50%	51	Neurology	15%	16	Neurology
53%	25	Vascular Surgery	16%	85	General Medicine
55%	35	Plastic Surgery	27%	3	Dermatology
57%	72	Endocrinology	41%	10	Ophthalmology
59%	6	Dermatology	45%	55	Endocrinology
63%	15	Ophthalmology	45%	99	Gynaecology
71%	81	Neurosurgery	47%	29	Plastic Surgery
78%	169	Gynaecology	62%	69	Neurosurgery
90%	57	Burns	82%	52	Burns

Table 20: Acute same day priorities by specialty, shown by gap percentage and number, 2020-30

Acute same day beds					
2020			2030		
%	No.	Specialty	%	No.	Specialty
>100%	-44	Haematology & Oncology	>100%	-370	Dialysis
>100%	-15	Dentistry	>100%	-159	Paediatric Medicine
-98%	-8	Renal Medicine	>100%	-155	Gastroenterology
-84%	-22	Gastroenterology	>100%	-144	Orthopaedics & Rheumatology
-78%	-18	Paediatric Surgery	>100%	-98	General Surgery
-59%	-2	Immunology & Infections	>100%	-94	Haematology & Oncology
-53%	-6	Psychiatry	>100%	-83	Cardiology & Cardiothoracic
-49%	-21	Orthopaedics & Rheumatology	>100%	-74	Paediatric Surgery
-32%	-39	Dialysis	>100%	-65	Renal Medicine
-27%	-25	General Surgery	>100%	-37	Urology
-25%	-4	Ophthalmology	>100%	-37	Chemotherapy
-15%	-24	General Medicine	>100%	-29	Ophthalmology
-14%	-15	Paediatric Medicine	>100%	-19	Dentistry
6%	1	Urology	>100%	-19	Respiratory Medicine
7%	4	Cardiology & Cardiothoracic	>100%	-14	Psychiatry
19%	1	Dermatology	>100%	-7	Immunology & Infections
21%	1	Neonatology & NICU	-94%	-35	Obstetrics
25%	4	Respiratory Medicine	-81%	-13	ENT; Head & Neck
29%	4	ENT; Head & Neck	-77%	-129	General Medicine
29%	11	Obstetrics	-31%	-1	Dermatology
31%	10	Chemotherapy	-30%	-2	Vascular Surgery
54%	71	Gynaecology	-29%	-9	Neurology
54%	19	Endocrinology	-26%	-34	Gynaecology
55%	17	Neurology	14%	5	Endocrinology
57%	4	Vascular Surgery	19%	1	Neonatology & NICU
71%	31	Plastic Surgery	49%	12	Neurosurgery
73%	18	Neurosurgery	63%	27	Plastic Surgery
93%	8	Burns	74%	7	Burns

Table 21: Outpatient priorities by specialty, shown by gap percentage and number, 2020-30

Outpatient consultation rooms					
2020			2030		
%	No.	Specialty	%	No.	Specialty
>100%	-100	Respiratory Medicine	>100%	-209	Respiratory Medicine
>100%	-20	Trauma and Injury	>100%	-34	Trauma and Injury
>100%	-4	Neonatology	>100%	-8	Neonatology
>100%	-120	Allied Health	>100%	-99	Oncology & Haematology
>100%	-75	Neurology	>100%	-262	Allied Health
-98%	-20	Immunology & Infections	>100%	-45	Immunology & Infections
-93%	-35	Oncology & Haematology	>100%	-157	Neurology
-47%	-46	Endocrinology	>100%	-189	Endocrinology
-29%	-198	Primary Care	>100%	-151	Gastroenterology
-13%	-2	Vascular Surgery	>100%	-726	Primary Care
-12%	-3	Renal Medicine	>100%	-27	Renal Medicine
-8%	-8	Gastroenterology	-97%	-17	Vascular Surgery
14%	60	Paediatrics	-54%	-228	Paediatrics
27%	15	Dentistry	-46%	-25	Dentistry
33%	113	Orthopaedics & Rheumatology	-34%	-40	Urology
33%	39	Urology	-32%	-213	General Medicine
41%	57	Psychiatry	-20%	-70	Orthopaedics & Rheumatology
42%	276	General Medicine	1%	2	Psychiatry
51%	93	ENT; Head & Neck	15%	45	Obstetrics
53%	164	Obstetrics	18%	34	ENT; Head & Neck
63%	115	General Surgery	32%	62	Cardiology & Cardiothoracic
69%	132	Cardiology & Cardiothoracic	33%	59	General Surgery
71%	30	Neurosurgery	36%	78	Ophthalmology
72%	156	Ophthalmology	51%	22	Neurosurgery
78%	401	Gynaecology	52%	268	Gynaecology
81%	304	Dermatology	75%	280	Dermatology
88%	181	Plastic Surgery	82%	168	Plastic Surgery

7.3 Contemporary Models of Care

The use of evidence-based models of care and service delivery frameworks will continue to reduce inappropriate clinical variation, support better utilization of hospitals, and improve the patient journey. Enhancements to new and existing models being considered in the development of clinical services include:



Emergency Department – Rapid triage and patient streaming into Observation/ Fast Track/Acute Care zones; Short Stay Units to manage short stay patients who would otherwise be admitted to inpatient care; restricted access to areas that care for paediatric patients; and urgent care centres to support the diversion of low acuity cases away from the management of life-threatening conditions.



Surgery – Short stay surgery and day of admission models for low complexity and high-volume surgical case types; separation of emergency and elective surgical streams; and post-acute care in the ambulatory setting rather than as an overnight inpatient



Medicine – emphasis on managing chronic disease in ambulatory setting rather than crisis management hospital setting. Advent of Emergency Short Stay Medical Units for the admission of patients presenting to emergency departments, and to relieve the Emergency Department's access blockage. The increased use of same day and outpatient care models for the delivery of standardise care packages, such as intravenous antibiotics and wound management.



Rehabilitation services – increasing multidisciplinary care teams across a range of settings including acute settings, ambulatory, or home-based. The use of community care packages to support patients with ongoing functional disabilities who need support for activities of daily living.



Paediatric services - delivered through Centre of Excellence model with collocated inpatient and outpatient services. These services are supported by generalist paediatricians distributed throughout the community and provision of short stay general paediatric services at community hospitals.



Maternity – midwifery-led care for mothers with normal risk pregnancies, antenatal care in community settings, early discharge from hospital-based birthing and community based antenatal care following discharge.



Dialysis – continued shift toward home or self-dialysis delivered through satellite facilities and from ongoing strategic relationships with non-government providers. These facilities are supported by centralised training hubs for the training and management of patients and staff in satellite or home care facilities.



Ambulatory and Outpatient services – increasing service provision and range of procedure and treatment services offered to reduce the need for inpatient admission.



Primary Health – greater use of hub-and-spoke service delivery and operational mechanisms to support appropriate referral pathways. The establishment of one-stop primary centres that support access to the range of screening, diagnostic and treatment services necessary for the management of common condition amenable to relatively simple interventions.

7.4 Service Delivery Trends

Health services and systems continue to evolve as a result of new technologies and therapies, better diagnostic capabilities, new clinical techniques, and ongoing improvements in service provision. Key service delivery trends and approaches that have been adopted by contemporary health systems and have been considered in the development of the 2018 Dubai Clinical Services Capacity Plan include:



Clear role delineation framework to differentiate facilities to be provided as close to where patients live, usually primary and generalist secondary services; and those that benefit from scale, due to low demand volumes, and the availability of scarce clinical expertise (specialist secondary, tertiary and quaternary services) that are provided in centralised locations.



Continuing emphasis on **patient safety, quality, and risk management** to inform service networking, facility role definition and credentialing. Patients and providers are expecting that healthcare outcomes will be positive leading to a reduction in disease, disability or death. Standards for the licensing and credentialing of facilities and personnel are becoming increasingly stringent in response to these changing expectations.



Increasing focus on **patient-centred care** and patient satisfaction. Health consumers are increasingly informed about care quality and outcomes. Intolerance of poor outcomes is increasing due to more pervasive knowledge about clinical processes and practices. Providers motivated to deliver the best available care and to have satisfied patients are becoming more quality focused. This cycle of improvement is promoting more sensitive resource allocation and clinical practice standards to ensure quality care.



Increasing adoption of **multidisciplinary care teams** across a range of service settings. The mix and qualifications of healthcare is becoming increasingly diverse as more people achieve tertiary qualifications and technological advances promote a shift from agrarian and industrial work to one based on service delivery. A multidisciplinary healthcare approach allows for standard care to be delivered by less skilled workers, while freeing up more skilled workers to focus on advanced care and more complex case types. Multidisciplinary care also enables teams to focus on group problem solving thereby increasing the chances of improved patient outcomes.



New and **advancing technologies** and their impact on services, providing alternatives to current practices such as increased use of personalised and minimally invasive therapies as an alternative to traditional treatment and invasive surgery. Advances in personalised healthcare interventions supported by automated digital systems are reducing the error and invasiveness of treatment and providing a safer care environment for patients. Artificial intelligence supported by biometric computing are increasing the precision of diagnosis and treatment leading to reduced errors and better outcomes.



Ongoing reductions and continued efforts to **manage length of stay** for acute inpatient admissions. Use of case management and care coordination as tools to focus on early discharge planning processes to reduce bed-blockages in inpatient beds. Globally, hospital bed supply rates continue to decrease due higher occupancy rates and reduced length of stay. More care is being delivered in the short stay, home care and outpatient settings with overnight length of stay either plateauing or declining.



Increased use of ambulatory and/or **short stay models** of care, hospital in the home and community-based models of care, with potential to stem the growth in demand for avoidable hospital services.



Ongoing **uptake and expansion of e-Health** and tele-based services to support remote services, mobile and community-based care and networking of facilities and care providers



Greater **clinician communication** and patient transition between community-based services and hospital services to target adverse health behaviours within the community to improve personal wellbeing, reduce the incidence of chronic diseases, and as a means of managing demand for hospital services.



Community health and outpatient services supported by safer and less invasive treatments playing an increasingly important role in hospital demand management and in delivery of chronic, complex, and continuing care in the community to facilitate the shift in the setting of care.



Partnerships with non-government organisations to identify synergies and opportunities in service provision.



An ongoing **focus on aged care service provision**, including provision of assessments and supporting delivery partners to manage increases in demand for healthcare, community and residential support s due to an aging population.

7.5 Setting the Direction for Clinical Service Capacity in Dubai

The analysis presented in this report highlight that an incremental shift is required in the Dubai health system from the current delivery model to a more contemporary specialist model that is supported by appropriate clinical governance policies. The establishment of clinical peer review panels to accredit specialist and consultant practitioners will provide an improved framework for the leadership of healthcare in Dubai, one of the world’s most dynamic and fastest growing cities.

Importantly, if Dubai is to maintain its international exemplar status, its healthcare capacity framework must be at the cutting edge of biomedical and innovative technology systems for excellence in clinical service delivery. The following table summarises the recommendation arising out of the 2018-2030 Clinical Service Capacity Planning exercise.









“The growing demand for medical care in the region is a key driver of growth in the healthcare sector. Therefore, it is important for the future of health care to shift towards adopting innovative smart technologies in order to improve various aspects of patient care, a focus on preventative care and ensure that there we maintain an optimal balance of supply and demand of healthcare services in Dubai”




Dr. Nahed Monsef

Director, Strategy and Corporate Development Sector, DHA

Table 22: Summary of Capacity Planning Recommendations for each Service Type

 Acute Overnight Care	 Acute Same Day care
<ul style="list-style-type: none"> • Distribution of capacity to meet clinical services with significant gaps and to improve hospital occupancy. • Role delineation and referral networks to improve referral patterns and efficient use of infrastructure. • Definitions and frameworks for the better definition and understanding of bed capacity. • Improved bed census reporting to improve capacity and performance management. • Improved collection, coding and reporting of admitted patient health statistics. • Link of future planned supply to clinical service capacity requirements. • Promote hub-and-spoke networks to improve general capacity in high growth Sectors and tertiary centres of excellence • Demand reduction strategies that foster improved prevention, primary care and ambulatory care. • Reduce overnight length of stay through improved discharge management and the adoption of short stay models of care. 	<ul style="list-style-type: none"> • Increasing same day utilization through funding and reimbursement incentive to meet projected demand and address gaps • Develop of guidelines for medical and surgical short stay models of care to encourage more same day service provision. • Promote expansion of short stay surgical units to address growth and supply gaps. • Improve coding standards for definitions to enable clearer reporting and monitoring of different care types • Review growing demand and supply for renal dialysis to ensure that growth can be addressed by the most efficient service delivery

 <h3>Outpatient care</h3>	 <h3>Emergency department care</h3>
<ul style="list-style-type: none"> • An enhanced system-wide co-ordinated approach to improve primary care is required. • Empowering the patient to make better access choices through information (DHA Public Map) on outpatient service availability. • Review licencing and land allocation strategies to address overcapacity of clinics based in Sector 3. • Encourage establishment of Multi-disciplinary teams to support more efficient delivery of ambulatory and outpatient care. • Conduct a utilization review of functional and non-functional capacity of consultation rooms to promote improved occupancy. 	<ul style="list-style-type: none"> • Increase the capacity of high acuity bays in Dubai public hospital emergency departments. • Promote walk-in urgent care clinics for non-life threatening patients in smaller hospitals to reduce pressure on larger hospitals. • Emergency care at specialist referral facilities should be strongly encouraged to provide care by emergency qualified practitioners. • Facility licencing policies be reviewed to limit the development of low-quality and poorly utilised emergency bays in smaller hospitals.
 <h3>Operating theatres</h3>	 <h3>Critical care</h3>
<ul style="list-style-type: none"> • Better capture of Medical Tourism activity to assist in planning and coordination of resources for elective procedures. • Improve understanding of operating theatre occupancy rates and functional capacity to improved capacity for emergency surgery • Review policies for minimum operating theatre rooms a planning stage to reduce unnecessary licencing of elective theatres. • Utilise facility guideline definitions to encourage clinically appropriate use of procedural rooms instead of operating theatres 	<ul style="list-style-type: none"> • Improve long term care capacity and its model of care to reduce unnecessary adult intensive care bed utilization. • Address the growing demand and gap in NICU beds through allocation of additional licences or funding. • Review facility planning guideline and licencing policies for the clearer approval of critical care beds at planning approval stage.

 Non-acute and Long-term care	 Procedural care
<ul style="list-style-type: none"> • Support licence and funding incentives to improve investment in rehabilitation, transitional and long-term care facilities. • Explore public private partnership opportunities for the funding, development of long-term care systems and facilities. • Development of rehabilitation, post-acute and long-term care service delivery models of care to address insufficient supply. • Establish a clearly defined insurance reimbursement framework and process for rehabilitation and long-term care • Explore options for community -based and outreach care to mitigate facility capacity gaps. • Plan for the impact on demand as a result of implementation of DRGs in 2019 on long term care facilities due to payment caps. 	<ul style="list-style-type: none"> • Review planning and licensing requirements to ensure that only necessary capacity is approved at the planning stage. • Establish comprehensive diagnostic centres to reduce unnecessary duplication of services. • Review of policies and requirements to encourage uptake of teleradiology and develop cost-effectiveness incentives. • Enabling diagnostic results to be shared among facilities through a cross-platform solutions to improve efficiency of patient care. • Establishment of specialist Centre of Excellence to reduce outflow for specialist procedural care, such as radiation therapy.
 Workforce	
<ul style="list-style-type: none"> • Workforce licensing to capture working hours status in conjunction with headcount to better represent workforce estimates. • Long-term workforce recruitment strategies should be tied to both activity projection modelling and local benchmarking exercises. • Ensure allocated and utilised distribution of workforce capacity reflects skill set capacity. • Develop and implement strategies to recruit, retain and train National health professionals. • Better capture of Medical Tourism activity to assist in workforce planning and coordination of human resource allocation. • Restructuring of current facilities to improve occupancy and patient throughput to assist with better workforce utilization. • Enabling appropriately qualified nurses to provide independent care under the guidance of a managing physician. 	



CHAPTER 8

APPENDIX

This chapter describes in further detail the technical aspects of the project and its modelling methodology. It outlines the comprehensive modelling performed on population projections, health care capacity supply and demand, as well as a sensitivity analysis to test different scenarios.

8.1 Technical documents

8.1.1 Population modelling

The DCSCP has developed a series of population projections based on probability model from historical estimates for 5-year age and gender groups for a relatively stable but growing number of persons for the year 2010-2016. In addition, the DCSCP has collected from DSC publications the sector estimates for the same period, these were projected using the same probabilistic model. This projection series show a population in 2030 that is smaller than the projection series estimated by official government statistics released by the Dubai Statistic Centre (DSC) and provided in February 2018.

Population projections were conducted separately for each of the nine sectors using best fit probabilistic modelling from historical trends with 2006 as the base year - using sectorial population data provided from the previous version of DCSCP. Holding capacity for each sector was used to determine the capacity for growth in each sector and allow for distribution amongst adjacent sectors if reached in future years.

The proportions of Nationals and Non-Nationals in each of the sectors were weighted for each projection year by the differential proportions for Nationals specified in the previous DCSCP.

The population projections were then scaled back based on the population estimates for Nationals and Non-Nationals provided by an Expert Panel from the DHA for the projection years. Furthermore, the populations of nationals and non-nationals in each sector were then split into gender and age groups based on the proportions also provided by this panel.

Table 23: Medical specialty workforce gap analysis, 2020 to 2030

Scenario	2030 population	Average annual growth rate	Compound annual growth rate
Low	4,042,944	2.5%	2.2%
Medium	4,633,793	4.1%	3.4%
High	5,601,526	6.7%	5.1%

8.1.2 Relative utilisation

Relative utilisation adjustments were performed to ensure that reference files were adapted to local service utilisation rates and trends. This process ensures that both over- and under-utilisation of specific services are captured in both the national and non-national cohorts. It also allows for a regression of utilisation rates over and agreed period to reach closer to international benchmarks in planning for a more efficient and equitable health care service.

This process was performed by analysing Health Statistics 2017 bed days per capita rates by specialty and nationality and then comparing these to the international reference benchmarks. The aggregate effect of this utilisation adjustment can be seen in the second demand scenario 'RU', which adjusts the demand profile to maintain an In-Status Quo situation where future planning is based on the current coverage, utilisation and flow parameters.

After extensive workshop discussions with an Expert Panel, a utilisation adjustment profile was created for each service line that was specific to nationality and year up to 2030. This profile allowed for demand to be adjusted towards local trends in immediate years whilst allowing for a regression closer towards international benchmarks by 2030. This regression was based on discussions of current policies and likelihood of policy change as well as strategic plans set in place by the DHA that could impact service provision and reduction of outflows

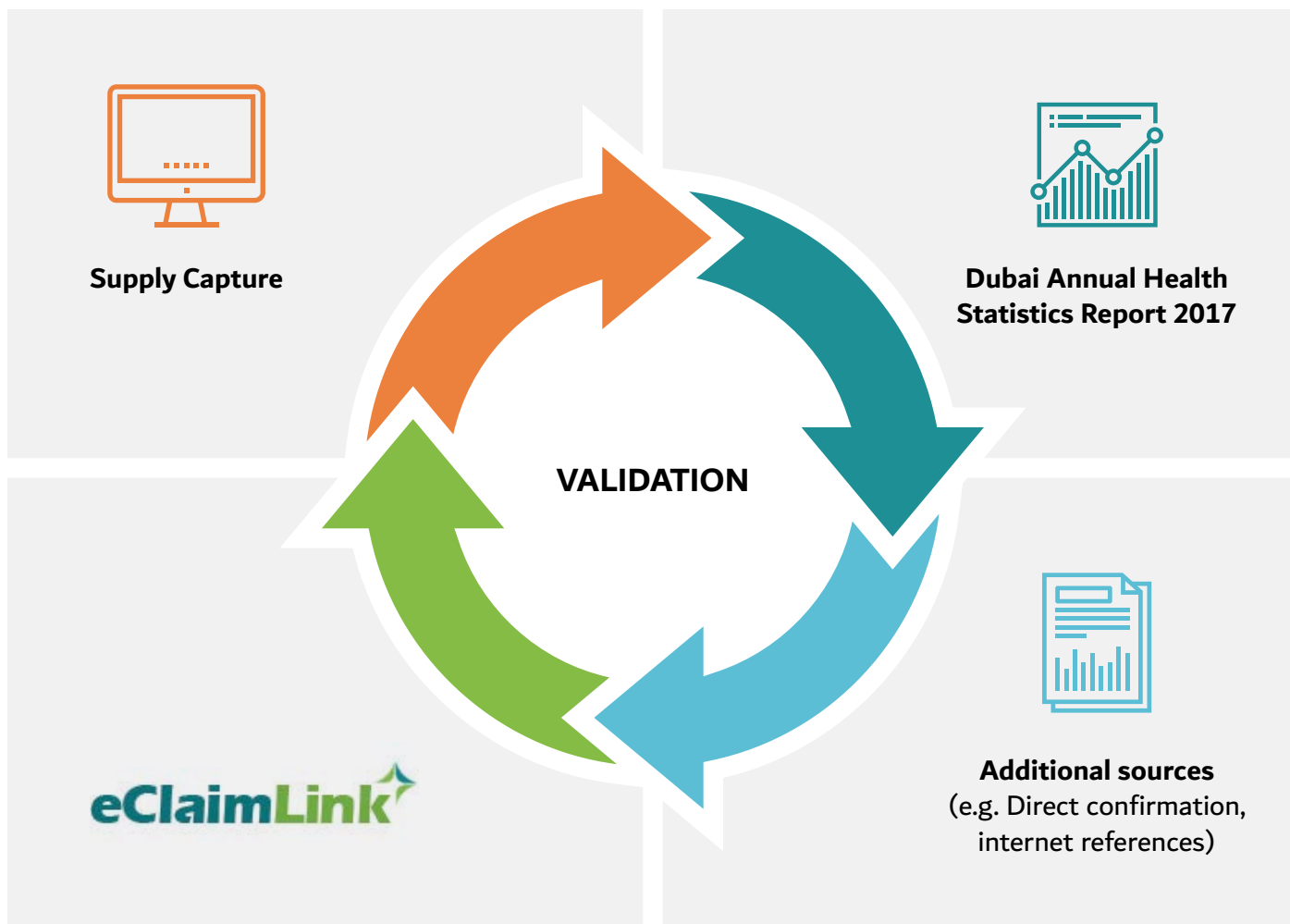
8.1.3 Supply validation

An extensive supply validation was performed to create a comprehensive supply capture of the historical capacity, activity and utilisation levels of the Dubai health care market.

The purpose of the supply validation process was to assess the concordance between the survey responses and the Dubai Health Statistics 2017 report using DHA E-Claims records for the year 2017 as a secondary validation source to align the clinical specialities in the Health Statistics Report.

Initially, the total number of beds, the calculated average length of stay and the number of inpatient and outpatient episodes for each hospital from the Health Statistics Report was compared to the figures provided in the survey. The variance was calculated at an aggregate level for the public and private sector hospitals and separately for each of the hospitals. Where there were large variations in bed numbers, further validations were conducted using publicly accessible official data sources or by recontacting the facility in coordination with the DHA. The survey results were adjusted if the Health Statistics figures were found to be accurate in the additional validation checks.

The validation study also utilised the unit level Health Statistics and E-Claims datasets for the year 2017 to align the DHA allocated specialities to ICD and IRDRG codes-based service lines., however clinical specialties of the service provider were not available in the private sector Health Statistics data. Initially, a mapping reference was developed from the E-Claims and public sector Health Statistics data to proportionally allocate the principal ICD codes in the private sector Health Statistics dataset to each clinical service line. This comparison was done to highlight the discrepancies between the two supply scenarios (allocated and utilised distribution) and compare the magnitude of difference for each specialty.



8.1.4 Sensitivity analysis

A three-phase approach was conducted to assess the sensitivity of the capacity planning findings.

- A population-based analysis is presented to assess the impact of different age distribution on the potential demand for services
- A 70% occupancy rate is applied to the aggregate bed demand for both scenarios. The gaps in supply at 60% occupancy and the 80% occupancy, used for the capacity planning, are contrasted to illustrate the differences for these occupancy assumptions
- The crude per capita rates were calculated and contrasted against other countries in the Western Asia region and the selected high-income regions.

Table 24: Medical specialty workforce gap analysis, 2020 to 2030

KPU Categories	Supply per 10,000 Dubai population	Demand per 10,000 Dubai Population	
	2018	2018	2030
Acute beds (licensed)	16.67	14.59	20.02
Acute beds (functional)	14.51		
ICU beds	1.09	0.37	0.41
NICU beds	0.96	0.75	1.28
PICU beds	0.16	0.09	0.12
ED bays	1.47	1.29	1.36
OT rooms	0.72	0.50	0.57
Outpatient rooms*	16.65	9.01	13.53
Medical FTE's	25.30	23.64	32.17
Nurses FTE's	52.69	53.95	65.30

* Only includes outpatient room categories used in demand modelling

Table 25: Occupancy rate sensitivity analysis, 2018 to 2030

Overnight Beds	2018	2020	2025	2030
Demand profile				
80% occupancy	3,112	3,502	4,610	5,729
70% occupancy	3,557	4,002	5,268	6,547
60% occupancy	4,150	4,669	6,146	7,638
Gap analysis				
80% occupancy	683	1,155	348	-771
70% occupancy	239	654	-311	-1,590
60% occupancy	-354	-13	-1,189	-2,681

Table 26: Gap analysis for low, medium and high population series

Key Planning Unit	Low			Medium			High		
	2020	2025	2030	2020	2025	2030	2020	2025	2030
Overnight beds	1,466	361	-755	955	-311	-1,590	823	-485	-1,806
Same day places	103	-484	-1,235	-41	-714	-1,575	-78	-773	-1,662
Outpatient rooms	1,671	268	-1,179	1,161	-447	-2,106	1,029	-632	-2,346
Non-acute beds	-201	-377	-570	-252	-453	-675	-265	-473	-702
ICU beds	537	530	503	521	510	479	517	505	473
PICU beds	49	36	30	45	30	23	44	28	21
NICU beds	110	-55	-157	76	-116	-233	67	-132	-253
ED beds	118	36	-27	60	-35	-107	45	-53	-128
Operating room	89	54	18	67	26	-15	61	19	-24
Procedural care	302	19	-237	211	-113	-406	188	-147	-450
Medical FTE	339	-2,591	-6,354	-757	-4,116	-8,429	-1,041	-4,511	-8,966
Nursing FTE	-90	-5,830	-10,065	-2,491	-9,069	-13,923	-3,113	-9,908	-14,922

Note: Gap numbers highlighted in red color with a –ve sign represents an undersupply

8.1.5 Definitions and assumptions used in the calculation of key planning units

Each service type has a service definition framework which categorises service lines based on a list of relevant DRG codes, the framework for acute inpatient care used for this report is shown in the table below.

Table 27: Service definition mapping for acute inpatient care

Service line	DRG
Burns	Burns Skin Graft with Burns
Cardiology & Cardiothoracic Surgery	Acute Myocardial Infarction Acute & Subacute Endocarditis Heart Failure Atherosclerosis Cardiac Congenital & Valvular Disorders Cardiac Arrhythmia & Conduction Disorders Angina Pectoris & Chest Pain Syncope & Collapse Other Circulatory System Diagnoses Cardiac Valve Procedures with Cardiac Catheterization Cardiac Valve Procedures without Cardiac Catheterization Coronary Bypass with Cardiac Catheterization Coronary Bypass without Cardiac Catheterization Complex Thoracic Vascular Procedures Cardiac Defibrillator & Heart Assist System Insertion Permanent Cardiac Pacemaker Insertion Cardiac Catheterization Cardiac Catheterization with AMI Percutaneous Cardiovascular Procedures
Chemotherapy	Chemotherapy
Dentistry	Dental & Oral Disease Dental Procedures
Dermatology	Major Skin Disorders Other Skin & Breast Disorders Skin Ulcers
Dialysis	Renal Dialysis
Endocrinology	Diabetes & Nutritional & Misc. Metabolic Disorders Inborn Errors of Metabolism Other Endocrine Disorders

Service line	DRG
ENT; Head & Neck	Epistaxis Epiglottitis-Otitis Media-Upper Respiratory Tract Infection & Laryngotracheitis Other Ear-Nose-Mouth & Throat Diagnoses Other Complex Head & Neck Procedures Sinus & Mastoid Procedures Salivary Gland Procedures Tonsil & Adenoid Procedures Other Ear-Nose-Mouth & Throat Procedures Cochlear Implant Nasal Procedures Myringotomy with Tube Insertion Mouth Procedures Thyroid-Parathyroid & Thyroglossal Duct Procedures
Gastroenterology	Diverticulitis-Diverticulosis & Inflammatory Bowel Disease Gastrointestinal Obstruction Other Gastroenteritis & Abdominal Pain Other Digestive System Diagnoses Cirrhosis & Alcoholic Hepatitis Pancreas Disorders except Malignancy Liver Disorders except Malignancy-Cirrhosis Or Alcoholic Hepatitis Other Biliary Tract Disorders Non-Complex Small & Large Bowel Procedures Complex Small & Large Bowel Procedures Rectal Resection Complex Upper Gastrointestinal Endoscopy Noncomplex Upper Gastrointestinal Endoscopy Pancreas & Liver Procedures Complex Biliary Tract Procedures Other Hepatobiliary & Pancreas Procedures
Gynaecology	Pelvic Evisceration-Radical Hysterectomy & Radical Vulvectomy Abortion Procedures Dilation & Curettage-Intrauterine & Cervical Procedures Tubal Interruption or Removal of Ovaries Uterine & Adnexal Procedures Vagina-Cervix & Vulva Procedures Laparoscopic & Endoscopic Gynaecologic Procedures Other Gynaecologic Procedures Female Reproductive System Infections Menstrual & Other Female Reproductive System Disorders

Service line	DRG
Haematology & Oncology	Coagulation Disorders Blood & Blood Forming Organs Disorders Red Blood Cell Disorders including Sickle Cell Anaemia Other Procedures Of Blood & Blood Forming Organs Nervous System Malignancy & Degenerative Disorders Ear-Nose-Mouth & Throat Malignancy Respiratory Malignancy Digestive Malignancy Malignancy Of Hepatobiliary System & Pancreas Musculoskeletal & Connective Tissue Malignancy & Pathological Fractures Malignant Breast Disorders Kidney & Urinary Tract Malignancy & Renal Failure Male Reproductive System Malignancy Female Reproductive System Malignancy Acute Leukemia Lymphoma & Non-Acute Leukemia Radiotherapy Other Myeloproliferative Disorders & Poorly Differentiated Neoplasm Diagnosis Lymphoma & Leukemia With OR Procedure Bone Marrow Transplantation Bone Marrow Transplantation Autologous
Immunology & Infections	Simple Pneumonia & Whooping Cough Septicaemia Post-Operative & Post-Traumatic Infections Fever Non-Bacterial Infections Other Bacterial & Parasitic Diseases Human Immunodeficiency Virus Infection Allergic Reactions
Neurology	Multiple Sclerosis & Cerebellar Ataxia Non-Specific CVA & Pre-Cerebral Occlusion Without Infarct Viral Meningitis Non-Traumatic Stupor & Coma Seizure Migraine & Other Headaches Concussion Other Nervous System Disorders Disequilibrium

Service line	DRG
Neurosurgery	Head Trauma Craniotomy Cranial & Peripheral Nerve Procedures Pituitary & Pineal Procedures
Obstetrics	Abortion Antepartum Disorders Postpartum Disorders Caesarean Delivery Vaginal Delivery with Procedure Vaginal Delivery
Ophthalmology	Acute Major Eye Infections Neurological Eye Disorders Other Eye Disorders Orbital & Extraocular Procedures Intraocular & Lens Procedures
Orthopaedics & Rheumatology	Fractures of Femur Fracture of Pelvis Or Dislocation Of Hip Osteomyelitis Medical Back Problems Other Bone & Joint Diseases Injuries to Unspecified or Multiple Sites Carpal Tunnel Release Spine Procedures Bilateral & Multiple Major Lower Extremity Joint Procedures Amputation Major Lower Extremity Joint & Limb Reattachment Procedures Major Upper Extremity Joint & Limb Reattachment Procedures Spinal Fusion Procedures for Curvature of the Spine Spinal Fusion Procedures except for Curvature of the Spine Hip & Femur Procedures except Major Joint Foot Procedures Local Excision & Removal of Internal Fixation Device Soft Tissue Procedures Other Musculoskeletal System & Connective Tissue Procedures Knee & Lower Leg Procedures except Foot Upper Extremity Procedures Arthroscopy Septic Arthritis Connective Tissue Disorders Musculoskeletal Signs-Symptoms-Sprains & Minor Inflammations Other Musculoskeletal System & Connective Tissue Diagnoses

Service line	DRG
Neonatology	Respiratory System Problems Arising in Neonatal Period Neonate Birthwt <X000 Grams with Major Procedure Neonate Birthwt 1000-1499 Grams with Major Procedure Neonate Birthwt 1500-1999 Grams with Major Procedure Neonate Birthwt 2000-2499 Grams with Major Procedure Neonate Birthwt >2499 Grams with Major Procedure Neonate Died or Transferred to Another Acute Care Facility Neonate Birthwt 1000-1499 Grams without Major Procedure Neonate Birthwt 1500-1999 Grams without Major Procedure Neonate Birthwt 2000-2499 Grams without Major Procedure Neonate Birthwt >2499 Grams without Major Procedure Mechanical Ventilation with/without Tracheostomy (Neonatal)
Plastic Surgery	Cleft Lip & Palate Repair Cranial & Facial Bone Reconstructive Procedures Skin Graft without Burns Skin Graft without Burns Excluding Hand Skin Graft without Burns to Hands Other Skin-Subcutaneous Tissue & Breast Procedures Breast Procedures
Psychiatry	Organic Disturbances & Mental Retardation Schizophrenia Major Depression Personality & Impulse Control Disorders Depression Neuroses except Depression Childhood Mental Disorders Compulsive Nutrition Disorders Other Mental Disorders Other Mental Disorders with ECT Alcohol & Drug Rehab &/Or Detox Therapy Drug Rehab &/Or Detox Therapy
Rehabilitation	Rehabilitation

Service line	DRG
Renal Medicine	Hypertension Kidney & Urinary Tract Infections Urinary Stones Kidney & Urinary Tract Signs & Symptoms Other Kidney & Urinary Tract Diagnoses
Respiratory Medicine	Respiratory Failure Pulmonary Embolism Major Chest Trauma Respiratory Infections & Inflammations Chronic Obstructive Pulmonary Disease Asthma & Bronchiolitis Interstitial Lung Disease Pneumothorax & Pleural Effusion Respiratory System Signs-Symptoms & Other Diagnoses Mechanical Ventilation with/without Tracheostomy Mechanical Ventilation with/without Tracheostomy for Nervous System Disorder Mechanical Ventilation with/without Tracheostomy for Respiratory System Disorder Mechanical Ventilation with/without tracheostomy for Circulatory Systems Disorder Mechanical Ventilation with/without Tracheostomy for Infectious and Parasitic Disorder Mechanical Ventilation with/without Tracheostomy For Trauma Poisoning or Toxic Effects Complex Respiratory System Procedures Non-Complex Respiratory System Procedures Bronchoscopy
Transplantation	Heart &/or Lung Transplantation Liver Transplantation Kidney Transplantation
General Medicine	Deep Vein Thrombophlebitis Cellulitis Complications of Treatment Other Injury-Poisoning & Toxic Effect Diagnoses Signs & Symptoms Other Factors Influencing Health Status Poisoning & Toxic Effects of Drugs Trauma to The Skin-Subcutaneous Tissue & Breast

Service line	DRG
General Surgery	Peritoneal Adhesiolysis Hernia Procedures except Inguinal & Femoral Appendiceal Procedures Non-Complex Stomach-Oesophageal & Duodenal Procedures Other Digestive System Procedures Anal Procedures Colonoscopy Cholecystectomy except Laparoscopic Laparoscopic Cholecystectomy Lower Limb Procedure with Ulcer/Cellulitis Lower Limb Procedure without Ulcer/Cellulitis Adrenal Procedures Other Endocrine Metabolic And Nutritional Procedure Obesity Procedure Endoscopic and Investigation Procedures for Metabolic Disorder Circumcision Male Sterilization Procedures Spleen Procedures OR Procedures for Infectious and Parasitic Diseases OR Procedures Injuries to Unspecified or Multiple Sites OR Procedures Injuries to Hand Or Procedures Injuries to Lower Limb
Urology	Male Reproductive System Diagnoses except Malignancy Complex Bladder Procedures Upper Urinary Tract Procedures Bladder & Lower Urinary Tract Procedures Urethral & Transurethral Procedures Extracorporeal Shockwave Lithotripsy Cystoscopy & Urinary Tract Endoscopy Penis Procedures Non-Complex Prostate & Scrotal Contents Procedures Transurethral Prostatectomy Other Male Genital Procedures
Vascular Surgery	Extracranial Vascular Procedures Vein Ligation & Stripping Other Circulatory System Procedures Amputation for Circulatory System Disorder Create-Revise-Remove Dialysis Device Extracranial Haematological Procedures

8.1.6 Expo 2020



إكسبو 2020
دبي، الإمارات العربية المتحدة
DUBAI, UNITED ARAB EMIRATES

Health service demand projections are estimated for domestic visitors from UAE (excluding Dubai residents) and International visitors from the regions of Africa, America, Australasia, Eastern Europe, South Asia, South-East Asia, Western Asia, Western Europe. Demand projections for Dubai residents are excluded from all the healthcare services in this analysis to remove a double count. Medium scenario modelling assumptions include:

- 3 Expo visits and 5 stay days per international visitor assuming 100% of international visitors will stay overnight in Dubai during Expo
- 4 Expo visits and 2 stay days per domestic visitor assuming 50% of domestic visitors will stay overnight in Dubai during Expo

Table 28: Projected Expo 2020 peak demand requirements

Peak demand (2021)		Capacity demand
Visitor demand per day	Domestic	6,052 / day
	International	27,260 / day
Overnight Beds	Domestic	155 beds
	International	800 beds
Same Day Places	Domestic	29 places
	International	167 places
Outpatient Rooms	Domestic	7 rooms
	International	55 rooms
Procedural Rooms	Domestic	29 rooms
	International	159 rooms
ICU beds	Domestic	25 beds
	International	89 beds
ED places	Domestic	34 places
	International	151 places
Emergency Operating Theatre	Domestic	6 theatres
	International	30 theatres

8.1.7 Medical Tourism



Through local initiatives and the Dubai Health Experience (DXH), Dubai has developed into an emerging global health tourism destination. Medical and wellness tourism is a growing phenomenon which sees patients travelling outside their local area of residence to receive healthcare services that are more readily available, less expensive or of higher quality than local options. Medical tourism is focused on the medical treatment of pre-existing conditions whereas wellness tourism is a holistic, preventative service looking to maintain or improve overall health. This spectrum of care places cosmetic and dental surgery for aesthetic reasons, weight-loss management and other holistic-styled clinic treatment between wellness and medical tourism

The global medical tourism market is driven by affordability and accessibility of good quality healthcare services along with assistance from tourism departments and local governments. In addition, availability of latest medical technologies in medical tourism hubs, throughout the world, is expected to fuel the market growth.

Medical tourism inflows present an additional scenario to health care demand for the Dubai health infrastructure, medical patients typically receive outpatient consultation(s) and depending on their purpose of travel may also include use of an operating theatre, inpatient bed or same day place.

Medical tourism inflow results have been driven by findings and assumptions in the DHA Health Tourism Strategy 2018-2021. Future demand figures have been derived from medical tourism targets, distributed across specialties by their current activity proportions. It is reported currently that roughly 50% of all health tourists arriving in Dubai seek medical care, split amongst the specialties of Orthopaedics, Gynaecology, Neurology & Neurosurgery, Cardiology, Fertility, Ophthalmology, Oncology, Dentistry & Plastic Surgery

The medical tourism requirements are outlined below, generated by the following assumptions:

- All medical patients will require 2 outpatient consultations
- A small proportion (10-30%) of patients will require overnight care (at specialty specific length of stay periods), with the remainder requiring the use of a same day place

Table 29: Medical Tourism requirements, 2018 to 2030

	2018	2020	2025	2030
Medical Tourists	134,500	250,000	375,000	500,000
Overnight Beds	395	734	1,101	1,468
Same Day Places	299	556	835	1,113
Outpatient Rooms	77	143	214	285

8.2 Acknowledgements

The DCSCP and its results have been tested with in depth stakeholder consultations and collaboration across various departments and sectors. Sincere gratitude and appreciation go to the public and private facilities and other stakeholders for their cooperation in providing information to the surveyors, filling out the survey forms and actively participating and providing feedback during the consultation workshops and the initial presentation of the results.

The authors of this report recommend its adoption as a fundamental basis for health sector strategy and its implementation. It is also recommended that this document be regarded as live, subject to updates every three years to align with prevailing conditions, changes to the healthcare industry, technology and Government policy



PROJECT LEAD

Fatima Abbas Ahmed Mohamed
CEO | Strategy & Corporate Development

HEALTH REGULATIONS SECTOR

Dr. Marwan Mohd Saleh AlMulla
CEO | Health Regulation

STRATEGY & GOVERNANCE DEPARTMENT

Dr. Nahed Abdul Khaleq Monsef
Director | naMonsef@dha.gov.ae

Dr. Eldaw Abdalla Mohamed Ali Suliman
Advisor | EASuliman@dha.gov.ae

Elham Muse Ashkar
Specialist | EMAshkar@dha.gov.ae

OTHER DEPARTMENTS

Dr. Hisham Hassan Alhammad
Director - Health Licensing

Dr. Hanan Ali Mubarak Obaid
Director - Health Policies & Standards

Dr. Ibtesam AlBastaki
Director | IIALBastaki@dha.gov.ae

Khamis Al-Alawy
Consultant - Health Policies & Standards

Ahmed Faiyaz Sait
Advisory - Investments & PPPs Dept.

Dr. Meenu Soni
Specialist - Health Insurance Corp.

TAHPI CONSULTANTS

Mr. James Brown
jbrown@healthpi.com.au

Mr. Matthew Brunson
mbrunson@healthpi.com.au

Mrs. Sahar Bawker
sbawker@tahpi.net

Mr. Robert Martin
rmartin@healthpi.com.au

Dr. Santosh Khanal

Mr. Tristan Franks

Mr. Anish Titus

