

EXECUTIVE SUMMARY

TURKISH SURGICAL SOCIETY REPORT ON GENERAL SURGERY MANPOWER WORKFORCE AND WORKLOAD 2009

In Turkey, workforce and workload planning in the field of health is not adequate. Databases in this field are not sufficient. Debates are not based on scientific reports and facts. Unless supported by significant studies, it is not possible to improve surgical health services merely by claiming insufficiency of number of general surgeons in Turkey and trying to increase number without considering other factors.

One of the main tasks of the Turkish Surgical Association (TSA) is to work for improving surgical health services in Turkey. TSA believes that a general surgeon needs an appropriate team and adequate infrastructure and equipment in order to provide well-qualified surgical care.

This report was developed by the TSA General Surgery Workforce and Workload Working Group established under the Turkish Surgical Association in August 2008. The group worked for a year until August 2009 for this purpose. The report aims to assess current state of affairs particularly in terms of number of general surgeons and their distribution across the country, bring recommendations for efficient use of available manpower and develop estimations on future manpower requirements.

Studies on manpower in general surgery

International literature suggests that many countries try to predict requirement for surgeons and train specialists in necessary numbers accordingly. The most remarkable studies on General Surgery are conducted in the United Kingdom, Australia, New Zealand and United States of America^[3-26]. The said countries have National Health Workforce Advisory Boards, which publish annual reports.

In general, four methods are used in health manpower planning, i.e. according to requirements, health service targets and demand and population ratios. In order to use one of the first three methods in surgical manpower planning, it is necessary to simply estimate needs of the served community (requirement for surgical procedures and surgical burden of disease in the community) in this field and relevant workload of surgeons (number of daily/emergency/elective surgeries in a year, number of outpatients or inpatients who receive surgical care, weekly/monthly working hours of surgeons, number of active and emergency shift hours and average duration of work as a surgeon, taking into account trends of retirement or withdrawal from active working life) to meet those needs. In addition, the national health authority of every country needs to have specific goals to achieve in line with set priorities and available resources. The number of general surgeons required could be calculated in accordance with these criteria. It is a well-known fact that many general surgeons in Tur-

key are supposed to work in conditions that are far from being optimal and without having the opportunity to enjoy the adequate support of other specialists, ancillary health staff and proper medical / surgical facilities most of the time. Another common fact is that the majority of general surgeons in Turkey work in devotion and usually beyond legal working hours despite these unfavorable conditions^[27].

Unfortunately, it is not possible to make international comparisons when planning workforce in the field of health. Direct comparisons pertaining to manpower will not be valid now that health systems of countries differ^[12].

Specialists of certain fields work at primary level in various countries. In the USA, for example, internists, pediatricians and obstetricians are involved in primary level health services. That is not the case in many European countries and Turkey.

Moreover, the surgical workload of general surgeons varies in different countries.

Duration of undergraduate medical education in medical faculties, duration of postgraduate medical education in general surgery and thus the age of becoming a general surgeon as well as time spent as an active surgeon also vary among countries^[28-31].

Differences in population characteristics of countries are yet another barrier to international comparability. The level of surgical treatment requirements of aging population particularly including the over-65 age group is quite high in developed countries, Western Europe and Northern America. A study in New Zealand found that the over-65 population requires surgery three times more than the average population^[33]. The shortfall in the number of surgeons suggested by surgical manpower calculations in the USA arises from the proportion of the elderly population and increased surgical treatment requirements of this population group^[32].

Countries differ from one another significantly in the production and use of medical technology. Despite global interactions, use of medical technology is closely related with the health system and general welfare status of any country. Therefore, another restriction of health workforce studies, which conduct estimations for the future is the fact that changes in medical and surgical techniques can not be predicted exactly.

Cultural differences (e.g. tolerance to symptoms, accepting risk of surgery and differences in style across surgical circles) among societies affect rate of surgical procedures significantly^[34]. This rate may vary as high as three-fold even among comparable countries^[12]. Number of annual surgical procedures is considerably different among countries. In 2004, for example, the number of surgical procedures was 148 per 100.000 population in Ethiopia but 23.369/100.000 in Hungary^[34].

There is a significant correlation between the number of surgical procedures and per capita health expenditure^[34]. Among 56 countries, which have data for 2004, 172.3 million (73.6%) of the total 234.2 million surgical procedures took place in countries with middle or high health expenditure level. Only 3.5% of surgical procedures were performed in the poorest countries (34.8% of population). There is a significant correlation between health expenditures and number of surgeries procedures in countries. This fact renders international comparisons meaningless in surgical workforce planning.

For all this reasons, every country needs to be specific in planning its own health workforce.

Equity of distribution of surgeons across the country is a common problem. In Australia, the number of

general surgeons is highest in the north and lowest in the south^[8]. A survey carried out in the USA in 2007 found that 34% of general surgeons work in metropolitan towns (population >250.000), 35% in suburban towns (population 50.000 – 250.000) and 3% in rural areas (population <50.000)^[35]. OECD reports suggest considerable inequities in the nationwide distribution of general practitioners and specialists in Mexico and Turkey^[1, 36].

Database of the Study

The data on general surgeons that are or are not members of TSA were updated in March 2009 for the purposes of this study and the resulting TSA General Surgeons Database was taken as a basis in the study.

The TSA General Surgeons Database was checked against the Ministry of Health (MoH) data on provincial basis in order to ensure data reliability.

The numbers of general surgery residents were obtained by TSA in March 2009 from department heads and clinical chiefs of general surgery clinics of university hospitals and MoH training and research hospitals.

The data about General Surgical Operations in Turkey 2003-2009 are based on data covering the 2003-2009 period provided to the TSA by MoH General Directorate of Curative Care.

In addition to the above, databases of MoH, Turkish Statistical Institution (TurkStat), State Planning Organization (SPO), the United Nations (UN) and Organisation for Economic Co-operation and Development (OECD) were utilized. References are made to relevant databases in the text. December 2003, December 2007 and March 2009 were taken as a basis most of the time in the report for comparison purposes and data belonging to said dates were compared. Demographic and geographical data were compiled from TurkStat, human development index of the UN and socioeconomic development index of the SPO. Numbers of surgeons and surgeries were taken from OECD data. Although the protocol between the Ministry of Health and General Staff sets the quota for admitting civilians to military hospitals at 5%, military hospitals were included in the study now that retired military staff receives commonly surgical health services from these hospitals in civilian status.

Methodology of the study

In general, four methods are used in health manpower planning, i.e. according to requirements, health service targets and demand and population ratios. Considering the constraints in accessing data pertaining to the other methods in Turkey, the method of general surgeons was used in this study as in many other countries especially including the United Kingdom.

The number of surgeons required per 100.000 population is 4-7 in the international literature. Medical literature on health workforce indicate that the most regular, consistent and quality reports are produced in the United Kingdom^[2-6]. All these reports set the ratio of general surgeons to population at 1/25.000^[2-6].

In the USA, the general approach for general surgery workforce planning is taking actual numbers as a basis and making predictions depending on changes in population by years rather than setting ideal standards. The Graduate Medical Education National Advisory Committee (GMENAC) recommended 4.7/100.000 in 1980^[15]. In his study, Poley takes a figure lower than 4.7/100.000^[25].

In this study, we used the 1/25.000 ratio as we focused on general surgeons and because pediatric surgery, cardiovascular surgery, orthopedics and traumatology are, unlike some other countries, separate specialties and thus not part of the workload of general surgery.

The primary purpose of this study was to establish the number of active general surgeons in Turkey accurately. We defined an active general surgeon as a physician under 65 years of age with a diploma in general surgery but without a subspeciality and currently working in any institution. Professors, associate professors, assistant professors, clinical chiefs, (consultants) deputy clinical chiefs and senior registrars (attending surgeons) who work as trainers in academic centers were also considered to be active general surgeons.

The secondary purpose was to explore whether the total number of general surgeons in Turkey and number of general surgeons assigned in provinces based on provincial population is sufficient according to the 1/25.000 standard. Then, the distribution of general surgeons in the public and private sector to provinces across the country and urban-rural discrepancies were examined. After establishing distribution of general surgeons, the compatibility of the human development index/socioeconomic development index, number of hospital beds in the cities with the distribution of general surgeons was looked into.

Findings and Analysis

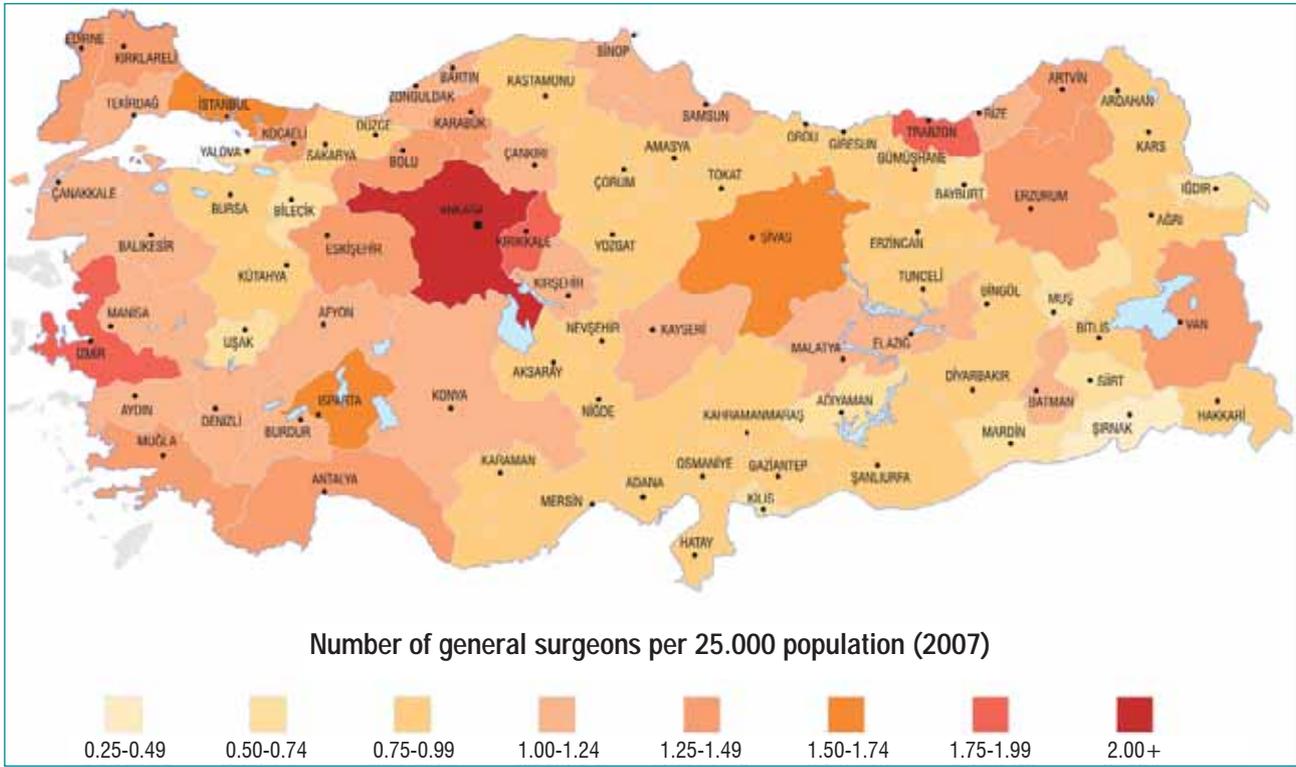
Distribution of general surgeons

As of December 2007, the number of active general surgeons in Turkey is 3594.

- General surgeons accumulate in metropolitan cities. Although such accumulation is common in many countries, the magnitude of the situation is significant in Turkey:
 - More than one-fifth of general surgeons in Turkey work in İstanbul.
 - 40% of general surgeons in Turkey work in İstanbul, Ankara and İzmir.
 - More than half of the surgeons in Turkey accumulate in 8 cities, i.e. İstanbul, Ankara, İzmir, Antalya, Bursa, Konya, Kocaeli and Adana. 56% of surgeons work in 8 cities (44% of total population) and 44% work in other cities (56% of total population).

Standards

- Based on the standard of 1 general surgeon per 25.000 population:
 - This value is 1.27 in Turkey, which is 27% higher than the standard in total.
 - The ratio of general surgeons per 25.000 population in the public sector alone is 1.09. The number of general surgeons in the public sector is sufficient by the standard.
- The distribution of general surgeons per 25.000 population indicate cities with excess or shortfall of general surgeons:
 - The level of shortfall in Şırnak, Siirt, Muş and Uşak cities is grave (50%).



- Aydın, Tekirdağ, Kırşehir, Zonguldak, Rize, Afyon, Batman, Kayseri, Manisa, Çanakkale, Çankırı, Samsun, Bartın, Konya, Denizli, Malatya, Balıkesir, Elazığ, Sinop and Burdur cities appear to be below Turkey average in terms of number of general surgeons per 25.000 population. However, the numbers are above the needs when the standard is considered.
- Excess of general surgeons per 25.000 population is highest in Ankara, İzmir and İstanbul. This ratio is 200% in Ankara.

The inequity of distribution has a huge impact on the population:

- The number of general surgeons per 25.000 population is sufficient for 15%, insufficient for 33% and excessive for 52% of the population.
- The study was scaled up to district level in İstanbul as the population of the province is big and accumulation is highest there. As the study scale gets smaller, the incredible abnormality in distribution gets clearer: the number of general surgeons per 25.000 population is 40 times higher than necessary in Kartal, 80 times higher in Kadıköy, 106 times in Şişli and 157 times in Fatih district. The reason for this abnormal situation is that university and training & research hospitals as well as private health institutions accumulate in these districts and the districts serve as a “health center” as a whole. However, what needs to be queried here is not the reason but “necessity” of such accumulation. The problems in access to health services this unusual accumulation cause needs further probing especially considering the earthquake risk İstanbul faces.
- The correlation between the number of general surgeons per 25.000 population and the Human Development Index (UN) and Socioeconomic Development Index (SPO) of the cities is also defective.

Health infrastructure and other health workers

Among health infrastructure indicators, the only usable one is the number of hospital beds.

This indicator is expressed in terms of number of physicians per 1.000 population or 100 hospital beds in internationally comparable studies. Taking number of hospital beds per general surgeon suggests important results:

- Cities that rank lowest in the list of hospital beds per capita naturally rank low in the list of hospital beds per general surgeon.
- The number of both hospital beds and general surgeons is low in provinces such as Şırnak, Mardin, Ağrı and Hakkari. When considered together with the socioeconomic development index, this fact provides a clearer picture at provincial level: The infrastructure problems accompanied by the low number of general surgeons in Yalova and Adana have nothing to do with the socioeconomic structure of the province; there is an excess of general surgeons in Ankara, İzmir, Kocaeli and İstanbul, which is not in accord with the health structure of these provinces; the infrastructure is inadequate and number of general surgeons insufficient in Hakkari, Mardin, Ağrı, Şanlıurfa, Kars, Şırnak and Ardahan.
- Another indicator, which needs to be taken into account in the health infrastructure, is the ratio of general surgeons to total health workers (including dentists, pharmacists and ancillary health staff).

The distribution of general surgeons in provinces follows the same pattern of distribution of all other health workers.

The number of general surgeons is insufficient in Şanlıurfa, Ağrı, Antep, Hakkari, Mardin, Bitlis, Kars, Muş, Şırnak, Kilis, Adıyaman, Iğdır and Siirt. The same is true for other health workers.

- The ratio of general surgeons to specialists is an important indicator.

The distribution of general surgeons follows the same pattern of distribution of physicians.

Van, Batman and Artvin rank lowest in terms of number of specialists per 1.000 population. However, there is a surplus of general surgeons in these provinces. Both specialists and general surgeons are in excessive numbers in Kırıkkale, Isparta, İzmir, İstanbul, Edirne and Ankara. The reverse is true for Şırnak, Kilis, Uşak, Siirt, Bayburt and Yalova.

- The ratio of general surgeons to specialists provides a clear picture in terms of their distribution:

Both physicians and general surgeons are insufficient in number in Şanlıurfa, Bitlis, Kars and Çorum. The number of physicians in Tunceli, Erzincan, Adana, Bursa and Yalova is higher than Turkey average; however, the number of general surgeons is lower than necessary in these cities. The number of both physicians and general surgeons is far more than necessary in Sivas, Edirne, Ankara, Isparta, İzmir, İstanbul, Kırıkkale and Trabzon.

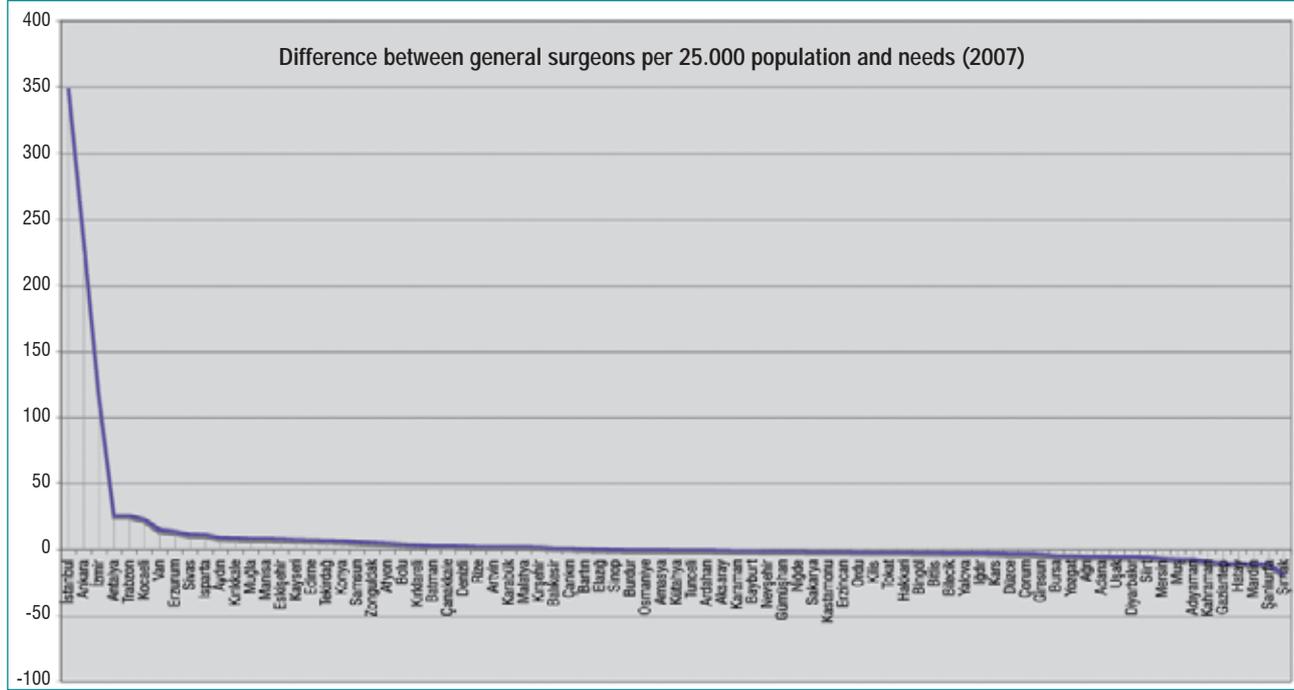
- Information on surgical infrastructure collected on-site by TSA in June 2009 is self-explanatory. For example:
 - Nearly 100.000 people in Şanlıurfa, 75.000 people in Yozgat and 30.000 people in Muş are deprived of operating theaters.
 - Nearly 100.000 people in Yozgat, 60.000 people in Şanlıurfa and 60.000 people in Muş lack anesthesiologists or anesthesia technicians.
 - None of the district centers in these cities has pathologists, intensive care units or blood banks. In other words, a total of 1.300.000 people in these three cities have to go to city centers in order to access the mentioned health services.

Input of new surgeons

As of 2009, 1.002 physicians receive postgraduate medical education in general surgery in Turkey. About 60% of them (625) work in university hospitals and 40% (380) in MoH Training and Research Hospitals.

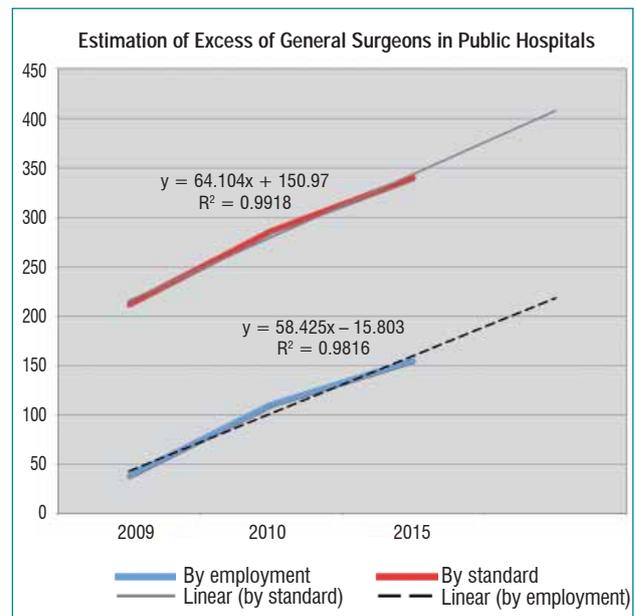
The future and estimation

As seen in the chart below, the address of inequity of distribution and excess is İstanbul, Ankara, İzmir and Antalya.



The number of general surgeons per 25.000 population in 2007 is even higher than the need in 2009. In 2009, 2.876 general surgeons are needed for the population of Turkey. 2007 data suggests that 3.594 general surgeons are active. In other words, the number of general surgeons in Turkey according to 2007 data is 700 more than needed.

- As mentioned earlier, the Ministry of Health has a dominant role in the employment of general surgeons. Therefore, it is necessary to look into the responsibility of MoH in this unbalanced distribution: in the 2003-2007 period, MoH has employed an average of 220 general surgeons in its institutions every year.



- A minimum of 3.400 general surgeons will be working in the public sector by 2020. This number is expected to reach at least 3.800 considering retirements and residents completing their training by the end of this period. TurkStat estimates the population of Turkey at 81 million by 2020. In this case, Turkey will need 3.200 general surgeons by that time according to the standard of 1 general surgeon per 25.000 population. In short, the number of general surgeons to be redundantly included in the health system by 2020 will be at least 250 by employment and 400 by the standard.

Distribution of general surgeries in Turkey

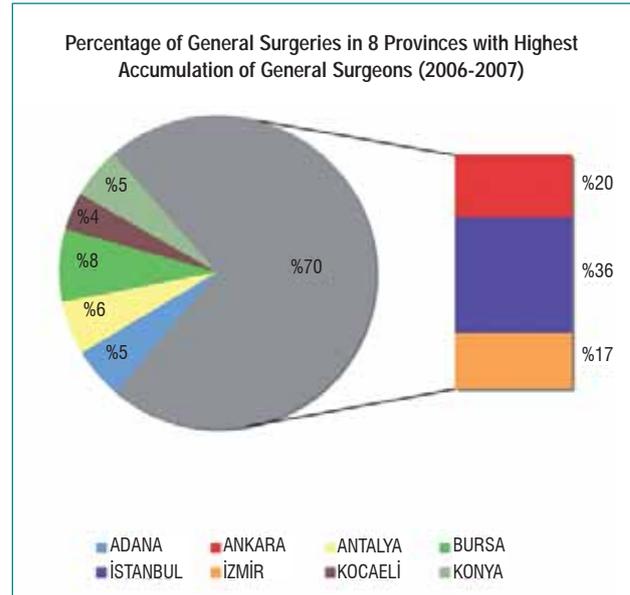
- Almost half of general surgeries are major operations (average of the last five years is 48%).
- The total number of general surgery operations has increased from 350.000 to over 1 million in the past five years. The total rate of increase in this period is 192%. Minor operations have increased fivefold in the 5-year period.
- Unlike other years, the data of 2005 and 2006 is complete and gives a clear idea about distribution of general surgeries by province:

- 51% of general surgery operations are performed in 8 provinces with highest accumulation of general surgeons.

- In the distribution of total general surgeries, the proportion of the three major cities (i.e. İstanbul, Ankara and İzmir) is 70% in the said 8 provinces and 37% in Turkey.

- However, this picture has changed after 2007. The proportion of general surgeries in other provinces has reached a percentage of 54%.

- There has been a conspicuous increase in minor surgeries in Antalya, Konya and İstanbul in the last three years: 2.5 times, 2 times and 2 times, respectively.



Operations per general surgeon and population

The number of surgeries has increased 2 times per general surgeon and 2.5 times per 25.000 population in the past 5 years. However, this increase is not equal among cities. In 2007 for which year, the data is relatively complete:

- The number of operations per general surgeon in all of the 8 cities with highest accumulation of general surgeons is lower than other provinces.
- The number of operations per general surgeon in İzmir, Konya, Adana and Bursa is 50-100 more than the Turkey average.
- Among the 8 cities with highest accumulation of general surgeons, the number of operations per general surgeons is lowest in Ankara and İstanbul.

Overall, in Turkey:

- The average number of general surgeries per 25.000 population is 325.
- Bitlis (42), Batman (42), Niğde (48), Muş (58) and Şırnak (81) rank lowest in the number of general surgeries per 25.000 population.
- Bolu (632), Gaziantep (607), Eskişehir (599), İzmir (553) and Burdur (526) are on top of the list of the number of general surgeries.
- The average number of operations per general surgeons is 255.
- The provinces with the lowest number of operations per general surgeon are Batman (36), Bitlis (50) and Niğde (53).
- The cities with the highest number of operations per general surgeon are Bayburt (744), Gaziantep (728), Siirt (539), Burdur (528) and Uşak (517).

Conclusion and Recommendations

In Turkey, there is not a shortfall in the number of general surgeons but anomaly in their distribution across the country accompanied by defects in the health infrastructure.

- In Turkey, health workforce and workload studies are needed for use in planning at central level. These studies need to be taken into consideration by the national health authority. The basic problem is not the shortfall in the number of general surgeons but problems in their distribution around the country. The focus should be placed on correcting unbalanced distribution in order to improve health services in the field of general surgery.
- Many general surgeons have to operate and care for patients in inappropriate and mostly unsafe conditions. Deficiencies in infrastructure (e.g. operating theatre usage hours, number of intensive care beds, number of nurses, number of surgical patient beds, equipment deficiencies) should be remedied in order to improve quality and quantity of health services delivered in the field of general surgery. Moreover, priority should be given to providing surgeons with working environments that would enable them to work with full capacity and in modern conditions.
- Planning of general surgeons should include team planning, i.e. nurses (operating theater, ward and intensive care nurses), ancillary health staff (laboratory workers, anesthesia technicians etc.), medical and administrative secretaries and other specialists (e.g. anesthesiologists, pathologists, radiologists, oncologists) with a particular emphasis on nurses that are currently very low in number.

Kaynaklar

1. Füsün Sayek TTB Raporları 2008 Sağlık Emek-Gücü: Sayılar ve Gerçekler 1. Baskı, Türk Tabipleri Birliği Yayınları Ankara 2008.
2. Kılıçturgay S. Türk Cerrahi Yeterlik Kurulu Deneyimi. Ed. Terzi C. Türk Cerrahi Derneği Genel Cerrahi Uzmanlığı Eğitimi ve Yan Dalları. Ankara, 2009 s. 22-30.
3. The Royal College of Surgeons of England. The Surgical Workforce in the New NHS. November 2001 – Review date: 30 November 2002, London 2001. Available at: <http://www.rcseng.ac.uk/services/publications/pdf/surgworknhs.pdf> Erişim Tarihi 15 Temmuz 2009
4. The Royal College of Surgeons of England. The Surgical Workforce 2006. Interim report and policy update. October 2006, London Available at: <http://www.rcseng.ac.uk> Erişim Tarihi 15 Temmuz 2009
5. The Royal College of Surgeons of England. The Surgical Workforce 2007 update., August 2007, London Available at: <http://www.rcseng.ac.uk> Erişim Tarihi 15 Temmuz 2009
6. The Royal College of Surgeons of England. Giddings AEB, Cripps J. Developing a Modern Surgical Workforce. January 2005. Review date: January 2008., London, Available at: <http://www.rcseng.ac.uk> Erişim Tarihi 15 Temmuz 2009
7. The Royal College of Surgeons of England. Workforce Summary – General Surgery. September 2008 – England only. London, Available at: <http://www.rcseng.ac.uk> Erişim Tarihi 15 Temmuz 2009
8. Australian Medical Workforce Advisory Committee (1997). The General Surgery Workforce in Australia, AMWAC Report 1997.2, Sydney.
9. The Royal Australasian College of Surgeons. The Surgical Workforce 2005. Melbourne: Royal Australasian College of Surgeons, 2005.
10. Medical Council of New Zealand. The New Zealand Medical Workforce in 2005. Wellington: MCNZ, 2005.
11. Australian Medical Workforce Advisory Committee. The Surgical Workforce in Australia: An overview of supply and requirements 2004-15. Sydney, AMWAC Report 2005.
12. The Royal Australasian College of Surgeons – New Zealand National Board. Raymont A. Projections of Surgical Need: An analysis of the future need for surgery in New Zealand. November 2006, Sydney.
13. Raymont A. Simpson J. Projections of surgical need in New Zealand: Estimates of the need for surgery and surgeons to 2026. NZMJ, 2008;121:11-18.
14. Raymont A. Simpson J. Surgical workforce in New Zealand: Characteristics, activities and limitations. ANZ J Surg. 2009;79:230-234.
15. The American College of Surgeons and The American Surgical Association. Surgery in the United States: A summary report of the Study on Surgical Services for the United States (SOSSUS), Baltimore, 1975.
16. Graduate Medical Education National Advisory Committee (1980). Report to the Secretary, Department of Health and Human Services, Geographic Distribution Technical Panel Vol III. (DHHS Publication No. HRA 81-653) Washington, DC. 1980.
17. Jonasson O, Kwaka F, Sheldon GF. Calculating the general surgery workforce. JAMA 1995;274:730-735.
18. Advisory Council for General Surgery. Kwakwa F, Jonasson O. The General Surgery Workforce. 2001. American College of Surgeons web site. Available at: <http://www.facs.org/about/council/advgen/gstiltlg.html>. Erişim Tarihi 15 Temmuz 2009
19. Sheldon GF, Schroen AT. Supply and demand-surgical and health workforce. Surg Clin North Am 2004;84:1493-1509.
20. Sheldon GF. Surgical workforce since the 1975 study of surgical services in the United States: An update. Ann Surg 2007;246:541-545.
21. Association of American Medical Colleges. The physician workforce: Position Statement: February 22, 2005. Available at <http://www.aamc.org/workforce/12704workforce.pdf>. Erişim Tarihi 15 Temmuz 2009
22. Sheldon GF. Workforce issues in general surgery. Am Surg 2007; 73:100-108.
23. The Council of the American Surgical Association. The Health Workforce. A Position Statement. Ann Surg 2007; 246:525-526.
24. Williams TE, Ellison CE. Population analysis predicts a future critical shortage of general surgeons. Surgery 2008;144:548-554.
25. Lyng DC, Larson EH, Thompson MJ et al. A longitudinal analysis of the general surgery workforce in the United States, 1981-2005. Arch Surg 2008;143:345-351.
26. Poley S, Belsky D, Gaul K. Et al. Longitudinal trends in the U.S. Surgical Workforce 1981-2006: Overall growth has stalled; General Surgery supply contracting. ACS HPRI Fact Sheet 1 - FINAL[1], 2009
27. Joyce C, McNeil J, Stoelwinder J. Time for a new approach to medical workforce planning. Medical Journal of Australia 2004;180:343-346.
28. Ağalar F, Saygun O, Aydınuraz K. Genel cerrahi uzmanlık alanında yan dal ihtisası raporu: Çeşitli ülkeler ve Avrupa Perspektifi. Ed., Terzi C. Türk Cerrahi Derneği Genel Cerrahi Uzmanlığı Eğitimi ve Yan Dalları. Ankara, 2009 s. 57-77.
29. Öztürk E. Bölümleşme ve birimleşme perspektifinde mezuniyet sonrası genel cerrahi eğitimi: ABD raporu. Ed., Terzi C. Türk Cerrahi Derneği Genel Cerrahi Uzmanlığı Eğitimi ve Yan Dalları. Ankara, 2009 s. 34-56.
30. Collins JP, Civil ID, Sugrue M, Balogh Z, Chehade MJ. Surgical Education and Training in Australia and New Zealand. World J Surg 2008 32:2138-2144.
31. Shen BY, Zhan Q. Surgical Education in China. World J Surg 2008 32: 2145-2149.
32. Liu JH, Etzioni DA, O'Connell JB et al. The Increasing Workload of General Surgery. Arch Surg 2004;139:423-428.
33. Bryant J, Sonerson A, Tobias M et al. Population ageing and government health expenditure. Wellington: New Zealand Treasury, 2005.
34. WeiserTG, Regenbogen SE, Thompson KD et al. An estimation of the global volume of surgery: a modelling strategy based on available data. www.thelancet.com Published online June 25, 2008 DOI:10.1016/S0140-6736(08)60878-8.
35. Locumtenens Web site. Available at www.locumtenens.com Compensation and employment survey general surgery 2007. Available at www.locumtenens.com Erişim tarihi :15 Temmuz 2009
36. OECD web site. OECD Regions at a glance 2007. Erişim tarihi :15 Temmuz 2009