

Table 2 Key findings in the six domains of surgical, anaesthesia and obstetric care

Domain	Key findings	Comments
Infrastructure	<ul style="list-style-type: none"> Public secondary-care hospitals can serve as frontline providers for emergency surgical, anaesthesia and obstetric care (11); however, some districts such as those in Gilgit do not have any secondary-care facilities (62). Other districts such as Bahawalpur, Gujranwala, Multan and Muzaffargarh did not meet the United Nations recommended standard of one facility for emergency obstetric and neonatal care per 500 000 (49,53,64). Four studies highlight indicators of poor access to surgical, anaesthesia and obstetric care, lack of availability of surgical, anaesthesia and obstetric care within 10 km (69), long distances between hospitals (38,52), and delays due to late or multiple referrals, long distances or unavailability of transport (43). Minimum equipment required for surgical, anaesthesia and obstetric care is lacking in most public sector secondary-care hospitals (21,34,52,64). Quality of ambulance services varies by province and type of provider. Private providers have a large network but lack trained paramedical staff and life-saving equipment (15,37,45). 	Findings from various facility assessments are not recent. Facility and health services mapping can help identify infrastructure deficiencies objectively.
Workforce	<ul style="list-style-type: none"> Official physician density is 0.96 per 100 000 (2017) (18). Estimate includes the 2011 national estimate of 150 neurosurgeons (12), 2011 estimate of 300 anaesthetists and 200 anaesthesia postgraduate trainees (20) and 2009 national estimate of 2000 trained ophthalmologists (14). Official combined density of nurses, midwives and lady health workers is 0.49 per 100 000 population (18). Official national count is 107 medical schools and 2145 nursing and midwifery schools (18); author estimates are 49 training programmes for general surgery, 32 for ophthalmology, 27 for orthopaedics, 23 for ear, nose and throat, 17 for neurosurgery, 11 for plastic surgery, nine for cardiac surgery, and only three for paediatric surgery (26). Reports indicate specific shortages of gynaecologists and anaesthetists at district headquarters hospitals (21), female staff (13,29,58), nurses and paramedical staff (10,18), and frequent migration of trained specialists to other countries (10,26). Reports and evidence highlight: lack of resuscitation-related knowledge among medical officers and postgraduate trainees; (40) unprofessional practice of self-referrals to private clinics among public sector doctors (29); and discriminatory practices against patients who are poor or belong to religious minorities (29). Long working hours, high burn-out rate and job dissatisfaction are reported among gynaecology residents (47) and anaesthesiologists (20). 	Estimates from policy documents are official estimates. Estimates from authors are unreliable. A national registry of the health workforce is needed.
Service delivery	<ul style="list-style-type: none"> A 2011 annual volume of surgery estimated 85.9 to 1200 surgeries per 100 000 population (11) and a 2010 annual volume of cataract surgeries estimate of 310 752 surgeries (14). The Demographic and Health Survey 1990–2013 estimated a home-based delivery rate of 48.3%, a community-based caesarean-section rate of 15.8% and facility-based caesarean-section rate of 29.0%–31.2% (23). Lack of adequate equipment, suboptimal use of existing resources and understaffing are reported in secondary health care facilities (21,49,53,58,63,64). High dependence on tertiary care with minimal use of secondary-care hospital leads to complicated, late and mismanaged patients (43). Most (70%–75%) of the population access health care at private facilities (10,29,42); a private facility provides services in Gilgit (62), while free-of-cost surgical services and transplant surgeries are provided at large private centres in Karachi (28,35,66). Poor compliance with the surgical safety checklist reported at 10 tertiary facilities (44), and a high rate of preventable critical incidents at a large centre (33) in Karachi. 	Estimates of annual surgical volume by authors are unreliable and outdated. Rates of caesarean section from the Demographic and Health Survey are reliable but are based on data from 2013.
Information management	<ul style="list-style-type: none"> Government reports show the district health information system is inefficient, paper-based and not correctly used by doctors (10,55). Maternal death and complication registers are non-standardized, underutilized or completely ignored at public hospitals (57,65). National health review and examination survey and mortality surveys are lacking (10); private electronic trauma registry project in Karachi was discontinued due to shortage of funds and lack of institutional interest and incentive. (32). 	Data from government reports on use of the district health information system are considered official. Community- and facility-based registries to track surgical cases are needed.
Finance	<ul style="list-style-type: none"> Pakistan spent 3.1% of its gross domestic product on health in 2015–2016, a per capita health expenditure of 4 688 Pakistani rupees (US\$ 45) (67). Public sector funds financed 33.9% while private sector funds financed 64.4% of the overall national health care spending (67). Patients incur substantial out-of-pocket expenditure even at public sector facilities (60,68) leading to disparities in demand for surgery and facility-based deliveries (16,42). Transport costs are a major burden for patients (29). Private sector non-profit service providers, philanthropic funding and private–public partnership are financing models used in Pakistan (10,28,35). 	Financial spending data from National Health Accounts report are official statistics.
Governance	<ul style="list-style-type: none"> Health care policy, financing, service delivery and regulation have been devolved to provincial governments since 2011. Health workforce and national health system planning is the responsibility of the Council of Common Interest which consists of federal and provincial government representatives (17). National Health Vision 2025, the most recent, comprehensive national health policy document was published in 2016 (19). This was followed by the Pakistan: Human Resource for Health Vision policy document in 2018 (18). Surgical care challenges have not been addressed specifically in these documents. Administrative monitoring and evaluation visits to secondary-care facilities are lacking according to a survey in 2012 (21). Three 5-year plans under the National Eye Health Programme successfully improved ophthalmology care capacity in Pakistan (14). 	Facility-level governance and administrative deficiencies are based on 2012 facility assessment. A new facility assessment is required to evaluate monitoring and evaluation processes at hospitals.