Four hours West of Sydney, the Cowra District Hospital sits above the town of 10,000 that it serves. Along with the houses of worship and the local council chambers, it is one of the dominating structures of the town, and the only one with more than three stories. I grew up only several hundred metres from its entrance, walking by it daily on my way to school. My brother was born there. When I had pneumonia as an 8-year-old, I walked there with my mother and was looked after in its dedicated paediatric ward. Of the ubiquitous childhood tonsillectomy, mine was performed in Cowra.

Thirty years later, I spent four weeks intimately immersed in the health care machinations of Cowra, this time as a medical student with an interest in general surgery. From a surgical point of view, I was impressed by the services offered, including general surgical, basic ear, nose and throat, and obstetric and gynaecological procedures. While the town did not boast a resident surgeon, surgical lists were performed three days a week by visiting fellows, competently supported by local GP-anaesthetists. Specialists travelled from the local regional centres of Orange or Bathurst, both approximately one hour away.

The standard of surgical care seen in Cowra is comparable to rural and regional services seen in the more populous Eastern states, however further West, where population densities fall, surgical services are typically delivered via solo or two-person practices. With evidence that surgical outcomes are generally better in high-volume specialty institutions and increasing pressure driving consolidation and efficiency within the health budget, it seems reasonable to ask whether or not rural surgical services are in danger of becoming extinct.

Currently, around 30% of Australians live outside of the major cities. Of these, three out of four live in inner regional areas on the Eastern seaboard. One in ten Australians live in outer regional areas and one in forty live in remote or very remote regions. The provision of adequate and equitable surgical services to these citizens is an ideal that is in line with the values of the Royal Australasian College of Surgeons (RACS), and indeed has been codified by The Australian Medical Workforce Advisory Committee’s report of 2005, which said that “all Australian citizens must have access to a good standard of surgical care irrespective of geography and economic status.” While the objective is clear, the means to achieving it may not be, particularly when contrasted with the oft-competing goals of health economics.

In examining the likely prospects for surgical practice in rural Australia, one may consider the influence of national and local factors. On a national level, Australia’s supply of surgeons is being outstripped by growing demand. Furthermore, training programs are moving away from producing surgeons with a skill-set geared for regional or remote practice. On a local level, living and working in regional Australia presents specific challenges to surgeons, including isolation from peers and academia, higher levels of risk and greater workloads, and fewer
opportunities for pecuniary reward. Additionally, the level of infrastructure and the skill-set of support staff within regional and remote Australia provide further limiting factors.

A briefing paper produced by RACS in 2011 characterised the present context of surgical practice across Australia as one of increasing demand in the face of falling supply. It reported that, unless changes are made to the volume of surgical trainees, we will face a critical shortage of surgeons as we move towards the year 2025. Multiple factors including an ageing and increasing population and an ageing surgical workforce are all projected to simultaneously increase the demand for surgical services and decrease the amount of surgeons available per head of population in Australia. Unavoidably, this will lead to ramifications for surgery in rural areas of Australia, where the specialist-per-head ratio is already lower than that seen in the metropolitan areas.

Additionally, surgical training in Australia has changed to reflect the needs of an ageing and urbanized population; one with increasingly high expectations of their health care system. General training programs, while still developing core competencies in a wide range of procedures, now focus earlier on sub-specialization. Contrastingly, general surgeons in regional areas are often called upon to perform procedures outside of the training parameters of a RACS fellowship in general surgery. A 2001 survey of the procedures performed by general surgeons in three rural hospitals in Victoria found that while most of the procedures where within the remit of a general surgeon, some orthopaedics, urological and obstetrics and gynaecological procedures were also required. Similarly, a report on the nature of surgery in regional Australia from 2009 remarked on the necessity for regional surgeons to possess complex plastic surgical skills due to Australia’s skin-cancer burden. When the rural general surgeon is called on for trauma services, the scope of work can extend to emergency neurosurgery. While this variety may indeed be the attraction of surgery in a provincial area, the rural surgical skill-set is less commonly the end-goal of a general surgical trainee. Training for rural surgeons in areas outside of general surgery is typically done in an ad-hoc fashion.

The local factors that influence the desire of surgeons to travel to the bush include the isolation, the increased workload and on-call pressure and the reduced opportunities for career advancement and private remuneration. Additionally, region-specific issues affect the surgical possibilities in each district, including the level of infrastructure such as intensive-care units, and the degree of existing ancillary staff skills.

Isolation in the country may take many forms. The geographical isolation and smaller population base may mean difficulty in successfully recruiting a surgeon’s family to move, effectively stopping an otherwise willing specialist. In particular, satisfactory employment opportunities for a surgeon’s partner are often difficult to find. Even with family support, practice in the country may mean isolation from peers, leading to an over-reliance on one’s own clinical acumen, difficulty in gaining multi-disciplinary input and excessive on-call demands, combing to increase risks to the patient and heighten medico-legal risks for the surgeon. Furthermore, practice in regional Australia may also limit the possibilities one has for academic pursuits and teaching. A
presentation at the 2010 Australian College of Rural and Remote Medicine examined the reasons for the difficulty in attracting surgical trainees to “the bush” and confirmed as much. The list of reasons included perceptions of excessive working hours, the geographical isolation, family issues, inferior mix of cases, lack of sub-specialisations, distance from academic pursuits and remoteness from teaching, meetings and CPD opportunities. This list may be translatable into the reasons for a lack of desire for surgeons to establish practices in regional Australia.

Workload requirements are a major factor limiting the recruitment of surgeons to the country. The RACS position paper on safe working hours states that it is “recognised that surgeons working in rural locations in Australia and New Zealand were particularly exposed to the demands of long working hours, potentially arduous on-call and after-hours commitments, frequent on-call rostering and limited support.” A Monash University research paper from 2003 made similar conclusions, but added that remuneration was also a factor due to poorer private practice opportunities. Rural and regional surgeons are expected to work under more arduous and dangerous conditions, yet are more poorly compensated. Into the future, this issue may have an accelerated impact on the recruitment of rural surgeons. Currently, rural consultant surgeons may endure on-call obligations of 1:2, or 1:1 with fly-in relief, however new surgical graduates come from a culture of work-life balance and an industrial law setting more concerned about safe working hours. It is possible that a1:4 on call roster may be required to induce graduates; that is to say, for every rural surgeon that retires, it may require two new graduates to replace him or her.

Even where issues of isolation, workload and remuneration are addressed, surgery within rural and regional areas is complicated by the systemic decline in skilled ancillary health care workers, such as appropriately trained nurses and GP-anaesthetists, and the closure of health facilities suitable for operative and peri-operative care. These two issues are interlinked and multiplicative, ultimately stemming from Australia’s population drift away from rural and remote areas, towards increasing urbanisation.

With national and local factors negatively impacting the desirability and availability of permanent surgical services in large parts of rural and remote Australia, one wonders as to the current equity of surgical outcomes for people living in those areas. Elective breast cancer surgery is an interesting and illustrative case example. Following on from research that indicated that rural women are diagnosed with breast cancer at a later stage than women living in metropolitan areas, a study from 2006 compared the differences in presentation, management and survival from breast cancer in patient populations from urban and rural locations in Western Australia. It found that women from rural areas were less likely to have breast-conserving surgery, possibly due to reduced availability of radiotherapy. When a surgical intervention was required, urban women were more likely to be treated by a surgeon who performed the procedure regularly, defined as at least 20 new cases a year. The study found that rural women were more likely to die within 5 years of diagnosis when compared to their urban counterparts (HR 1.62, 95% CI 1.10–2.38).
Another demonstrative example may be found in surgical outcomes for trauma and emergency patients in rural and regional Australia. As previously highlighted, the vast distances, low population density and low surgeon-per-capita ratio of rural Australia means the regional general surgeon is often called upon to operate outside of his or her formal training in the emergent situation\(^1\). Furthermore, the National Trauma Research Institute reported in 2012 that trauma in rural and regional Australia has a high propensity to occur after-hours\(^1\). The combined effects of distance, time, after-hours work and non-familiar procedures leads to poorer outcomes for provincial residents suffering trauma. This was highlighted in a study from 2011 concerning major trauma in Western Australia\(^2\). In this analysis of over 3,000 trauma incidents, there was a significantly increased risk of death from trauma if the incident occurred in the rural setting (OR 2.60, 95% CI 1.05–6.53). The study noted that if rural patients were able to be transferred by the Royal Flying Doctor Service to Perth the mortality outcomes were comparable with urban trauma.

In contrast to the negative outcomes discussed thus far, a Monash University study of colorectal surgical practices in rural and regional Victoria and South Australia found that outcomes in those centres were comparable to outcomes in Australian of metropolitan centres\(^3\). One of the key differentiators in this example was the higher volume of colorectal surgical cases and the major focus that colorectal surgery has in the training pathway of general surgeons.

What has been established is that surgical services for much of rural and regional Australia are currently exposed to multiplicative forces, and the outlook could be perceived as perilous. What does the future hold for surgery in rural Australia? Indeed, are rural surgical services in danger of becoming extinct? Predictions about the future are fraught with difficulties, but it is reasonable to examine three possible scenarios; extinction, remodeling, and centralization.

In the first scenario, extinction, is most threatening for remote and very remote regions of the country. Cowra, for instance, has no permanent in-town surgical service, but it is not remote, and can access the excellent facilities on offer in Orange, 50 minutes away. In isolated areas of the country, the retirement of surgeons without adequate succession will leave towns without access to permanent surgical services. Across much of remote Australia, this is already the case\(^1\). The threat of extinction of services can be seen in Port Pirie, an isolated town in South Australia. It has a permanent surgeon, but unless relief is flown in from Adelaide they must maintain an untenable 1:1 roster\(^1\). The “extinction” of permanent on-site surgical services is likely for Port Pirie. The evidence displayed so far suggests that this is likely to affect surgical outcomes for its residents. What can be done to address this inequity? The mechanisms in place for Port Pirie currently include outreach surgical services for elective surgery and emergency cover, with complex cases transferred to Adelaide\(^1\). Additionally, more permanent solutions may be sought by compelling surgeons to work in the area. The requirement of overseas trained doctors to work in an area-of-need provides one avenue for this, as does the Royal Australasian College of Surgeons Rural Surgical Training Programme\(^4\). Another potential solution could be a reinvigoration of the training of GP-proceduralists capable of performing basic and emergency procedures\(^5\).
Despite these efforts, the reality of Australia’s size and population density means that permanent on-site specialist surgical services for many rural and remote areas are unlikely and unreasonable in the near-term. In Queensland, for example, there are only three specialist surgeons who live and provide on-site surgical services more than 100 kilometers from the Eastern coastline\textsuperscript{23}. Outside of questions of surgeon choice and safety, there are issues of cost, resource allocation and patient safety to consider. Centralization is a means of maximizing resources and optimizing care. This is the norm in many parts of regional Australia. The 2011 Surgical Workforce Census Report from RACS found that most surgeons practicing in regional Australia were located in a town of 100,000 people or more\textsuperscript{24}. Evidence suggests that centralization of surgical services does not affect GP referral practices\textsuperscript{25}, and that the higher volume of cases delivered via centralization leads to a better standard of surgical care\textsuperscript{26}. Interestingly, these benefits do not necessarily translate into community acceptance. Research from 1999 on the impact of centralization of surgical services in America found that people were willing to accept a higher operative mortality risk to have their procedure performed locally rather than at a regional centre\textsuperscript{27}. In fact, in this study, 45\% of patients reported that they would still prefer to have their operation performed locally even when that doubled the mortality risk (6\% vs 3\%). The personal financial impact on the patient may be a possible reason for this; Australian data from 2001 suggested that the personal cost of accessing non-local specialist surgeons was more than $1,000 when travel time, distance, lost income and chaperone costs were taken into account\textsuperscript{28}.

A third scenario to consider is the remodeling of the current status-quo. In order to attract skilled surgical fellows to rural and regional areas, a redefinition of the role of the surgeon in these regions may be beneficial, with a focus on improving lifestyle. A systematic review of models of surgical care delivery in 2013 suggested that the remodeling of acute care cover in the surgeon’s roster was critical to allowing time for teaching, research, elective surgery and lifestyle and family commitments, all common barriers for those considering rural surgery as a career\textsuperscript{29}. In this model, they suggest the management of acute care patients be changed from an ad-hoc system that has to fit in around other ongoing commitments, to one in which surgeons were scheduled for uninterrupted periods of acute surgical patient care, supported by comprehensive patient handover. This requires institutional support and a number of surgeons willing to work collectively, but provided a better work-life balance with less out-of-hours work\textsuperscript{29}. The team of Velovski et al. uses this approach as part of their attempts to attract surgical trainees and fellows to Lismore Base Hospital\textsuperscript{15}. They declare that this particular acute care surgery model "improves surgeon’s lifestyles". The change suggested in this model acts as an example of the way in which a rethinking of surgical service delivery in rural areas in response to key recruitment barriers may help to deliver more surgeons to the country.

Which of these scenarios is the most likely? In a country as big and diverse as Australia, there is no one-size-fits-all approach. It is possible that a model based on two distinct zones of remote and regional Australia will be best placed to provide useful predictions.
Firstly, one may consider remote Australia. In areas of the country that are many hours from specialist surgical care, surgical outreach and the forced temporary allocation of overseas surgeons under the area-of-need policy may be the best way to achieve some level of on-site surgical services. Additionally, in conjunction with the RACGP, RACS training of GP’s in basic and emergency procedures may add to the level of service provided. This approach may be useful for large parts of Western New South Wales, South Australia, Queensland, the Northern Territory and Western Australia. Successful surgical delivery in these areas will depend on adequate local resources and skill levels. As such the petitioning of state and federal governments for budgetary support would be critical. In the remote context, there would still be a large role to play for centralization, with air-ambulance support for the transfer of complex cases.

The second case to consider is regional Australia, that is, towns within a reasonable distance of a major regional centre with specialist surgical services on site. Much of the Eastern Seaboard fits this classification. Centralization would play a key role here. Cowra is a fine example of this system, with regular day surgery performed by fellows visiting from Orange, and consistent referral to Orange, Canberra or Sydney for more complex surgical care. It is also in these regional areas where remodeling can make a large difference. For instance, within the large regional centres on which centralization relies, such as Lismore, it is vital that a healthy succession of adequately trained surgical specialists is available. Remodeling of the role of the surgeon in these areas to match the needs of potential new recruits, as much is possible, will ensure that the service delivery in these wide catchment areas remains at the high standard that Australian surgery is renowned for.

In conclusion, the current picture of surgical services in rural and regional Australia is one under pressure from competing forces of urbanization and high community expectation. The achievement of the goal of equitable surgical care delivery to all Australians depends on a combination of outreach services, overseas doctors, RACS rural training programs, centralization and modifications to the rural surgeon’s role. However this must be in the context of significant government support for local training and infrastructure.

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References