Policy Brief: Expanding Hospital Access in Rural and Remote Areas

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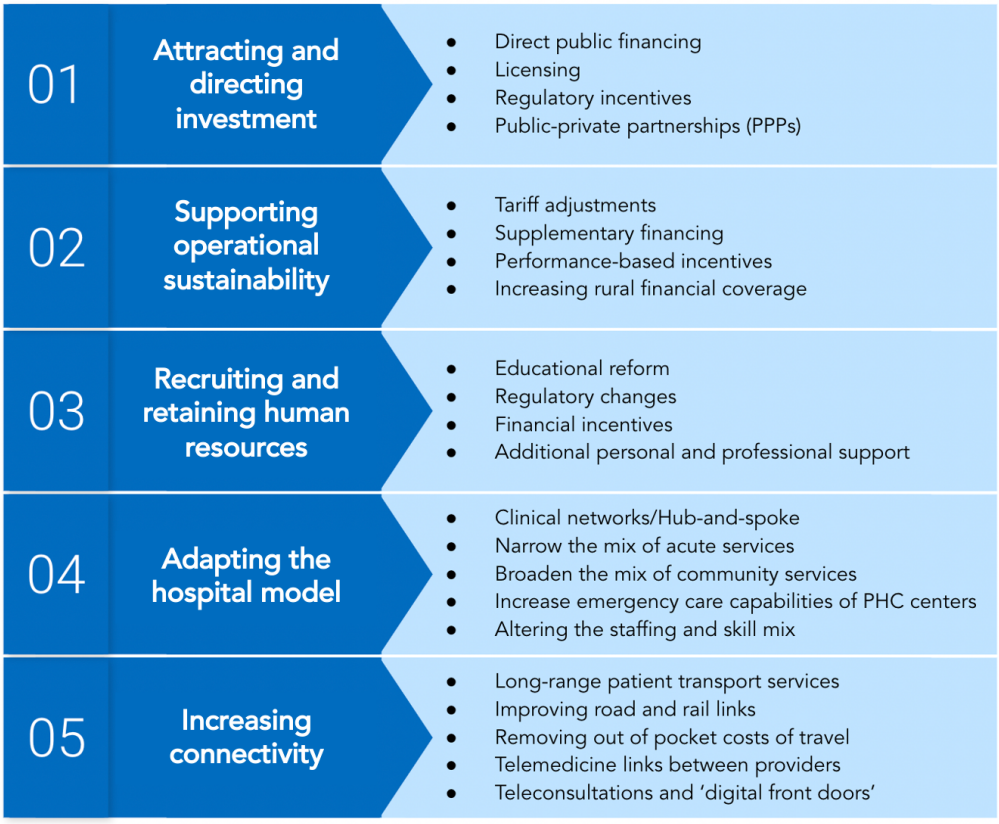
Key Messages

- Around half the population of Asia and the Pacific live in remote and rural areas. For these communities, health systems face an acute challenge getting adequate access to hospital care, which is necessary for a range of time-sensitive and specialist treatments.
- To address this challenge, planners with responsibility for hospital infrastructure should start with an objective analysis of which areas are underserved in terms of access to secondary and tertiary care. This can be done with varying levels of sophistication, but the best approaches use geospatial mapping of travel times against different clinical service groups, coupled with place-based planning approaches. This will enable gaps in geography, in clinical services, and in demand to be understood. Crude approaches that focus on beds-to-population ratios and other 'rules of thumb' should be avoided.
- Having identified and prioritized those communities and areas which are underserved, the barriers which have produced these gaps need to be properly understood. These are typically a complex mutually reinforcing set of cost, quality, and workforce issues: cost because rural hospitals are generally more expensive to run on a per-patient basis, workforce because recruitment and retention are more difficult, and quality because of fewer resources and specialist staff.
- A wide range of solutions are available to bridge these gaps and address the underlying barriers. These fall into five key categories, as shown in Figure 1.

Figure 1: Solutions to increasing access to hospitals in underserved areas



Note: PHC = Primary health care
Source: Aceso Global 2023

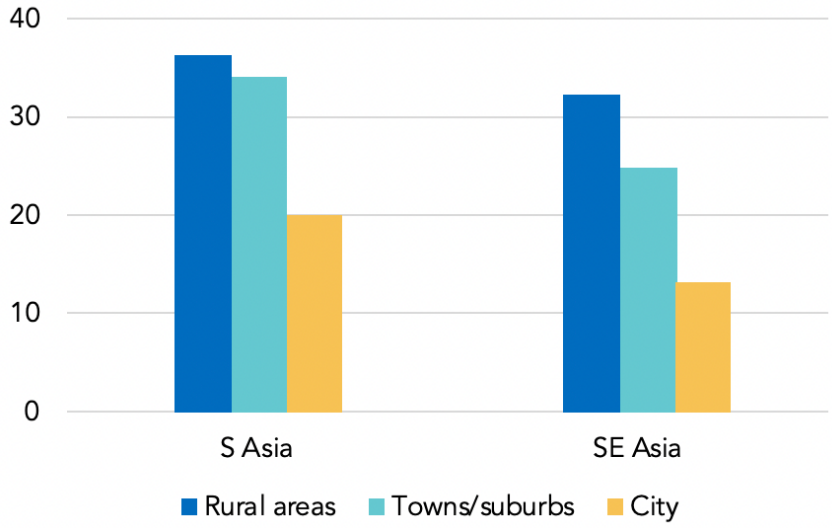
- In designing and deploying these solutions, healthcare planners should prioritize their actions according to the short-, medium-, and long-term needs of underserved areas. Short-term solutions can address the most critical gaps on a project basis. Medium-term solutions can improve the enabling environment for rural and remote hospitals through more comprehensive reform. Long-term solutions should align the system towards a multi-decade vision for hospital provision that takes into account trends in demographics, disease patterns, technology, connectivity, climate risk, and clinical advances.

I. Introduction: The shared global problem of access to hospitals in rural and remote areas

Countries in Asia and the Pacific have made rapid progress towards universal health coverage in recent years, with hundreds of millions of people brought into new healthcare coverage and financial protection mechanisms over the past two decades (WHO 2021; Cotlear et al. 2015). However, coverage on paper does not always mean coverage in practice, and **there have been particular challenges creating 'effective coverage' of secondary and tertiary care for rural and remote communities**, whose inhabitants make up around half the population of Asia and the Pacific (WHO 2022; World Bank 2018). For these and other underserved areas, significant barriers to accessing hospital care remain even when financial hurdles are removed (ILO 2021; Campbell et al. 2013). Problems include:

- Hospitals may be **many hours' or even days' journey** away as a result of being uneconomical to run outside of urban centers;
- Rural hospitals may be **poorly staffed** due to challenges of recruitment and retention, and hence offer lower quality care, leading to patients by-passing them and self-referring to urban centers; and
- Lengthy or repeated hospital visits to facilities far away may be unfeasible or unaffordable for rural patients to **balance with work and caring responsibilities** back home.

Figure 2: Women aged 15-49 reporting not going to a medical facility when sick due to distance by Asia Sub-regions



Note: S Asia = South Asia; SE Asia = Southeast Asia
Source: European Commission 2020b

These gaps are compounded by the fact that in many countries people living in rural and remote areas **suffer from poorer overall health to begin with**, creating a situation in which those with the greatest need get the worst access (Jacob 2021). Rural patients are also more likely to delay seeking care when they need it, further resulting in higher morbidity, mortality, and per-patient

costs of care (Syed, Gerber, and Sharp 2014). Further complications of access may also result from the increasingly severe impacts of climate change, such as floods and storms destroying critical transport links in times of crisis.

The foundation of healthcare provision in rural and remote areas should—as with urban areas—be a strong primary care system. **Primary care cannot do everything**, however, and for a variety of health needs that are above the reasonable capabilities of primary care providers (e.g., **acute time-sensitive** health needs such as serious trauma or **highly specialist** such as interventions for some cancers), all communities need to have access to care in a hospital. Yet as secondary and tertiary care become ever more complex, specialized, and expensive it is increasingly difficult to achieve equal, or even acceptable, hospital care for rural and remote communities.

High-, middle-, and low-income countries all struggle with this problem of how to get the necessary balance of access and sustainability in hospital infrastructure for underserved areas. As Asia and the Pacific healthcare leaders struggle to fill in gaps in their hospital infrastructure, many western countries have been closing rural hospitals at a rapid pace (Vaughan and Edwards 2020). Fortunately, there is a great deal of **innovation and experience globally** with which to inform future policy and political responses to this problem, as shown in the case studies below from the People's Republic of China (PRC) (Box 1), India (Box 2 and 3), United States (US) (Box 4), Pakistan (Box 5) and Australia (Box 6).

This policy paper is intended to summarize common issues and solutions to the challenge of improving access to hospital services in rural and remote areas. It does not cover all possible issues and options in Asia and the Pacific but is intended to clarify and steer conversations between health system actors at a strategic level. To reach a consensus on which are the most effective solutions to deploy, it is structured according to **four key questions** which healthcare leaders need to consider:

1. How to determine which rural and remote areas are 'underserved,' and for which specific services (Section II);
2. What are the barriers that currently prevent access to necessary hospital care in these areas (Section III);
3. What solutions exist (Section IV); and
4. What implementation lessons can be learned from other countries that have successfully tackled this issue (Section V).

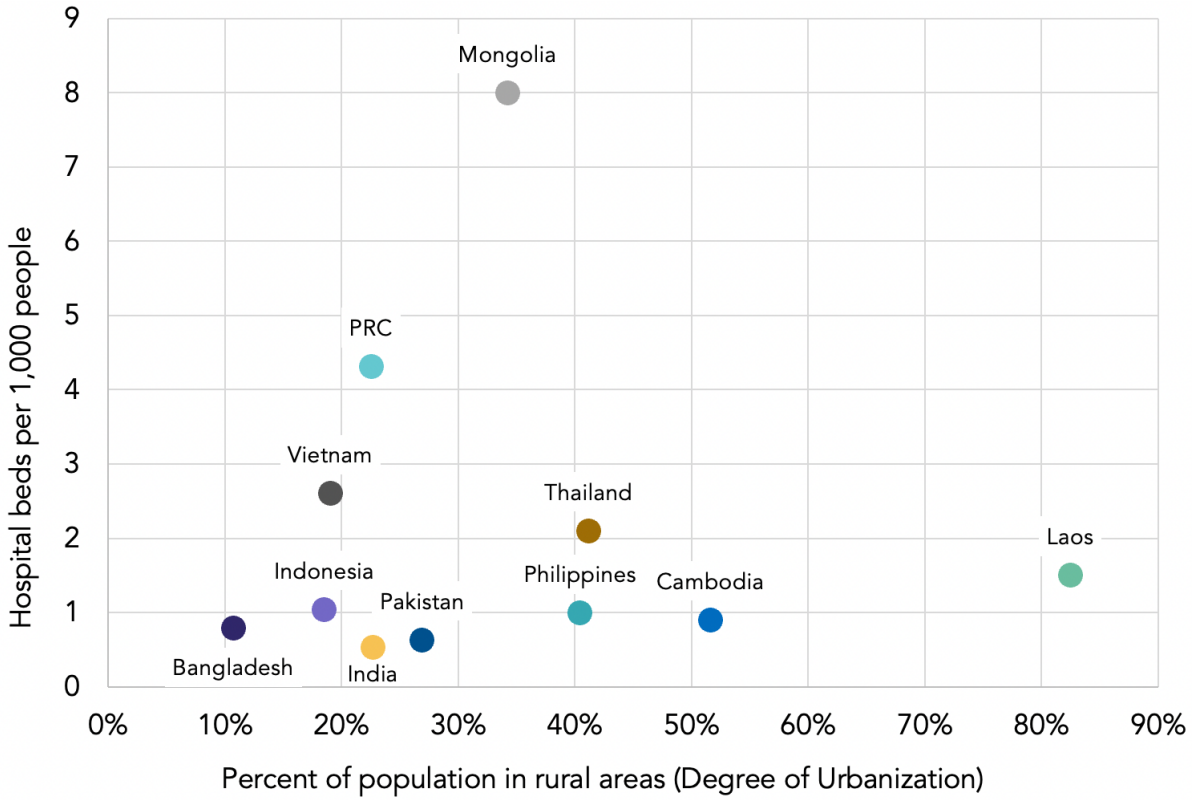
Case studies featured throughout the paper span across these areas, comprising elements of barriers, solutions, and lessons learned from each country's experience.

II. How do you know if an area is 'underserved' or not?

The first and most critical stage in hospital system planning for underserved areas is understanding in greater detail **which areas are in fact underserved and in what ways**. The concepts of 'urban,' 'rural,' and 'remote' lie on a continuum, and countries differ hugely in the definitions they use. For example, across Asia the minimum population size for an 'urban area' varies from 5,000 under India's classification, to 50,000 in Japan's, and 100,000 in the PRC (Dijkstra et al. 2020). Other countries use population density thresholds (e.g., contiguous areas with more than 1,000 residents per km²) or features of the area itself (e.g., proportion of agricultural workers) (OECD 2012; European Commission 2020).

Even using standardized definitions, **countries in Asia and the Pacific are extremely diverse in the extent of rurality and remoteness** faced by their populations (Figure 3). Yet even highly urbanized countries in the region face the same challenge of matching hospital services to population needs in a way that minimizes the extent of underserved areas without creating unnecessary oversupply. For this reason, **it is more helpful to think in terms of areas or communities that are 'underserved' in terms of hospital access, rather than rurality specifically**.

Figure 3: Proportion of population in rural areas and hospital bed ratios in a sample of Asian countries

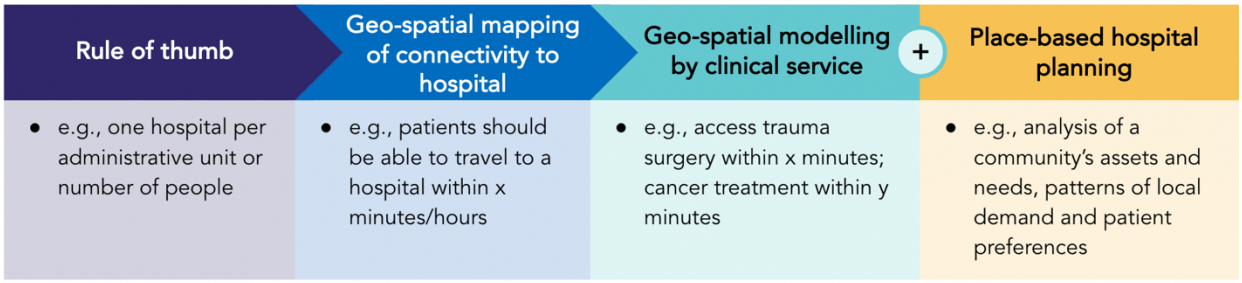


Note: Degree of Urbanization is a statistical measure that uses satellite images and GIS data to classify large areas according to their population density. A 'rural' area is broadly defined as having fewer than 300 inhabitants per km² and not part of a settlement of at least 5,000 people.
Source: European Commission, 2020. Bed ratio from World Bank Statistics, most recent year.

A. Is the problem lack of facilities, lack of services, or lack of quality?

There are several ways in which a particular area might be 'underserved' in terms of access to secondary and tertiary care: there may be no hospital available within a reasonable distance (**geographic gaps**), there may be a hospital but with an inadequate service mix (**clinical service gaps**), or there may be a hospital that patients bypass due to concern about the quality and affordability of treatment they will receive (**demand gaps**). Different approaches should be used to analyze each of these problems in turn, as it is likely that different barriers (and hence solutions) will apply. These analytic approaches build on one another and can be done at different levels of sophistication, as shown in Figure 4, and described below.

Figure 4: Levels of sophistication in hospital capacity planning in rural and remote areas



Source: Aceso Global 2023

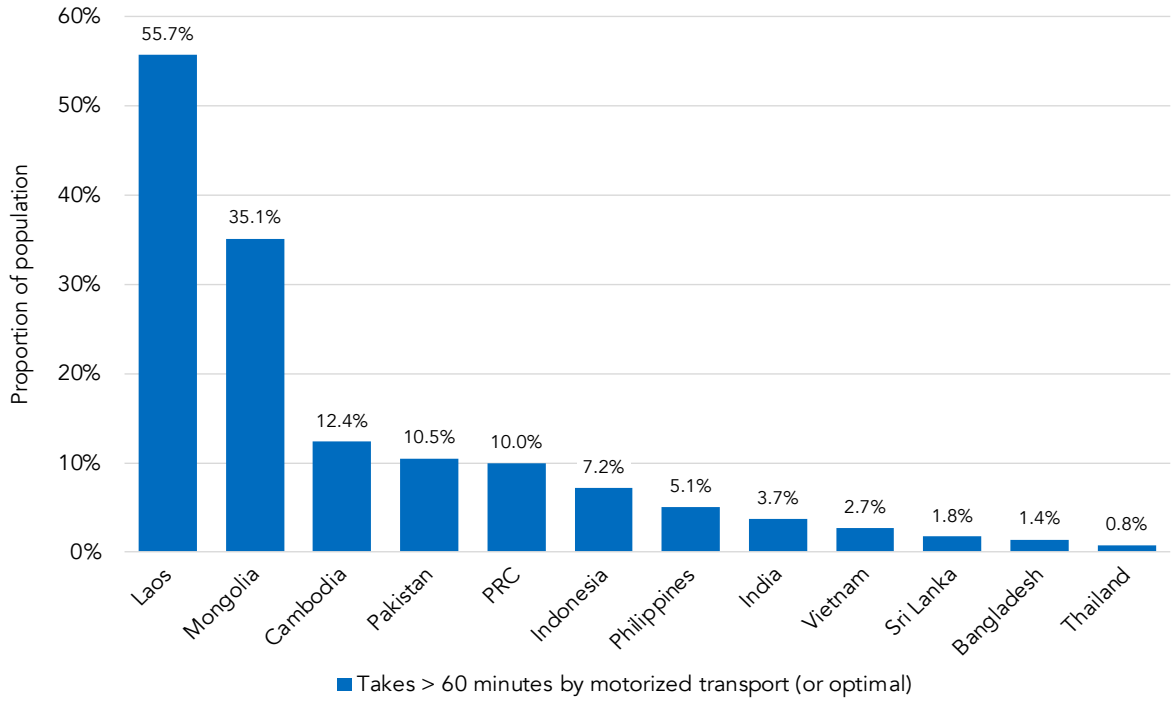
B. Understanding geographic gaps in access

The crudest approach to understanding geographic coverage of hospitals is to simply use a **'rule of thumb'**—for example, that there should be one hospital of a certain size for each administrative unit (e.g., district), regardless of need, demand, or real-world connectivity between communities. A similar approach is to focus on population thresholds, such as having a certain number of hospital beds per capita for each region or locality. Historically, these have the most common approaches to capital planning decisions in health systems globally (OECD 2021 and see PRC case study in Box 1 below).

A more refined method—and probably the most common for hospital planners in emerging markets today—is **geo-spatial mapping of connectivity to hospital facilities** to identify areas of under- or over-supply. Mapping approaches such as the two-step floating catchment area (2SFCA) can be used to analyze travel times of residents to their most easily accessible hospital via the most efficient route (Nagy 2022). The method will depend on existing data mapping systems available but might initially break a region or country into a grid of square kilometers with population estimates for each cell, then build a map of average travel times to existing hospitals using the most efficient form of transport (Carrasco-Escobar et al. 2020). Figure 5 shows the proportion of the population in selected Asian countries who can reach any health facility (not just hospitals) within an hour by motorized transport, calculated using a 2SFCA method.

Many hospital-specific examples are available at the individual country level (Vivid Maps 2023; Carrasco-Escobar et al. 2020; Fadelu et al. 2022; Merciu et al. 2013; and Barbieri and Jorm 2019).

Figure 5: Proportion of the population unable to reach a healthcare facility within an hour if using motorized transport, Selected Asian Countries



Source: Weiss et al. 2020

More detailed analyses might also take account of travel costs, if this is also a potential barrier to patients accessing care (Cheng et al. 2016). Additionally, in some systems it may be important to disaggregate hospitals that are public, donor-funded or empaneled in the network of universal coverage scheme versus those that operate predominantly through out-of-pocket revenue.

Geospatial analysis of travel times to hospitals will reveal geographic gaps that different populations face but will not say what the 'right' level of access and provision should be. To solve this, some countries apply a slightly more informed threshold, such as that all communities above a certain size or population density should have access to a hospital within one hour by vehicle or boat.

C. Understanding clinical service gaps

Analyzing geographic gaps alone is not sufficient to understand in what ways different communities may be underserved, however. **Hospitals are not homogenous**—some services (e.g., obstetrics) are far more time-sensitive than others, and therefore need faster access. Conversely, there are other clinical areas where there is evidence that a longer travel time to visit

a more specialist center may produce a better outcome. The most complex interventions might require a minimum volume of patients that mean rural areas will never be able to provide that service at an adequate level of quality. Furthermore, the requirements for hospital care will also depend on the capabilities available within the primary care system, as the boundary between the two is different across different health systems.

The solution to this problem is to use **geo-spatial modelling of access times to specific groupings of clinical services**—in other words, mapping travel times of patients to particular types of hospital services depending on the scale they need and the importance of providing them locally. This requires more detailed data on the individual clinical capabilities of each hospital but has the considerable advantage of showing specific clinical services gaps. This modelling might reveal, as was the case in PRC for example (see Box 1), that particular access gaps could be more successfully addressed by enhancing the service package of lower-tiered facilities rather than building new full-service hospitals. It also allows for more specific minimum access time targets depending on real-world clinical evidence rather than 'rules of thumb.' For example, different travel time targets for access to emergency versus other types of secondary care, or minimum catchment areas for specific specialist treatments.

D. Understanding demand gaps

Geo-spatial mapping of hospital access is extremely useful at identifying underserved areas—both geographical and clinical—at a high level and helping with prioritization decisions about *where* greater investment is needed. However, at the point where specific decisions about *in what specific ways* to increase secondary and tertiary capacity in a particular area are being made, a more granular, **place-based approach to hospital service planning** is needed. This adds to, rather than replaces, geospatial analysis, and helps to answer more detailed questions of service design, quality, performance, and affordability. Place-based planning recognizes that all underserved areas are not identical—the needs of an isolated mining town may differ considerably from that of a remote agricultural or indigenous community (RAMS 2022; Jacob 2021). Place-based planning approaches involve detailed qualitative work to understand a range of important local factors, including:

- Listening to the **views of local community** members, leaders, and caregivers about what barriers and gaps in access to hospital care they perceive;
- Analyzing existing **patterns of demand** to see why and where patients currently go for hospital care (which is often not the nearest facility), how this is funded, and the extent to which they report distance as a reason for foregoing health care. This will include examining their tolerance for different travel times, which can vary considerably across different rural and remote communities (McGrail, Humphreys, and Ward 2015; Weinhold et al. 2022);
- Examining the **assets and strengths** of a particular community and their potential to create innovative solutions, as opposed to only looking at what they lack; and
- The **performance of existing hospitals** and healthcare providers nearby, for example their waiting times, lengths of stay and occupancy rates.

The findings of such place-based analyses are often that **'distance is relative'** (Buzza et al. 2011). In other words, the picture shown on a geospatial map of travel times may concretely reveal large 'medical deserts' for particular hospital services, but these data may be perceived differently in the lived experience of patients, and do not show much of the key information needed to design an appropriate solution. Equally, place-based approaches are not the same as giving every community what they want. Prioritization and a broad, health systems perspective is still needed, and it will not be feasible to deliver all the requests of every community. Using place-based planning, however, this prioritization can draw on **a more informed cost-benefit analysis** that takes into account the full range of benefits and potential synergies of different options, rather than simply filling in gaps in a map.

Box 1: The People's Republic of China's evolving response to rural hospital systems

The People's Republic of China (PRC) has followed a phased approach to bridging the vast gaps in access to hospital care faced by its rural citizens over the past two decades. The year 2003 was a milestone in the country's journey to universal health coverage, with the creation of the New Cooperative Medical Scheme, which by 2008 had covered more than 90 percent of China's rural residents (Zhang et al. 2021). Today, the benefit package and financial protection given to rural Chinese citizens is almost equivalent to that of their urban counterparts, but still there is highly unequal geographic access—especially to hospital care. There are currently less than half as many hospital beds per 1,000 people in rural areas compared to urban areas in China (Liu et al. 2018), and rural citizens with chronic conditions are 1.5 times more likely to experience catastrophic health expenditures, in part due to the costs of travel into cities to receive care (Si et al. 2017).

Among the key reasons for this disparity is an approach to healthcare planning in which multiple levels of government all develop their own capital investment strategies, often with little coordination, and generally using input-based methodologies. This encourages the disproportionate expansion of large, well-endowed urban hospitals at the expense of poorly resources rural and lower-tier facilities, partly because the former have a more powerful voice across the fragmented planning processes (Cercone and Chawla 2019). Guidance that recommended capital planning approaches be driven by population health needs was issued as far back as 1997, but a recent analysis of planning approaches in three provinces showed that **in reality, beds-per-population was the only documented factor considered in capital investments** (Cercone and Chawla 2019).

In a bid to move towards a less urban- and hospital-centric healthcare system, in 2015 new policy guidelines were issued to rationalize healthcare facility planning. These specified detailed functions and roles for different tiers of healthcare facility, requiring these to be **planned according to changing population needs and, crucially, to be integrated** so that each facility's service scope should be coordinated and evolved in relation to other providers. Still, this does not fully account for the growing role of private hospitals in China, nor the underlying payment system, which rewards high-tech and specialized care to an extent that encourages further hospital- and urban-centric investment.

In more recent years, Chinese healthcare planners have made extensive use of different geospatial mapping techniques to understand gaps in access, comparing travel times to the various tiers of hospital to try and create a more equal system of provision (Cheng et al. 2016; Pan and Shallcross 2016). In doing this**, the focus is increasingly not on location but quality and capability of lower tier**

or rural hospitals, as rural patients very often choose to bypass their most accessible hospital and still travel long distances to seek care in a top-tier urban hospital (Liu, Kong and Bekker-Grob 2019).

Efforts to combat this challenge include **piloting 'medical consortiums'**—vertically integrated provider groups that encourage urban centers of excellence to collaborate with lower-tier and rural facilities. Direct public investments have also been put into **rural hospital infrastructure**, especially their on-site diagnostic capabilities, and encouraging **rotation of staff** between urban and rural facilities. **Bonded scholarships** of free medical education in exchange for six years of rural service after graduation have also been introduced (Zhu et al. 2019). There has also been increasing support for telemedicine solutions, through the concept of **'internet hospitals'**, which includes telemedicine connectivity and interoperability between urban and rural hospitals (Deloitte 2021).

III. What are the barriers to improving access to hospitals in underserved areas?

Having analyzed the various ways in which rural and remote areas might be underserved, it is important to understand *why* these gaps exist—what are the underlying barriers—before designing appropriate solutions (for which, see next section). **Geographic gaps in access are most likely to be the result of a lack of investment in new facilities**. For private hospital operators, this could either be due to opportunity cost—the commercial returns of a hospital serving rural areas being lower than urban ones—or because the market conditions are such that a hospital in a particular area would be financially unsustainable. For the public sector, lack of investment can similarly be driven by opportunity cost—the returns (whether in health, political capital, or some other priority) of an urban center are perceived as greater than a new rural facility. Governments can also get caught in an upward spiral of investment in urban hospitals that reduces the budgetary space for new facilities elsewhere: urban facilities are overwhelmed by demand from outlying, underserved areas, leading to a need to expand, which takes up available capital spending, leading to further inequalities in public funding between urban and rural hospitals.

Clinical service gaps can likewise be the result of under-investment in existing facilities—for example that more specialist technologies and services are financially unviable in a particular setting. Equally, there may be **operational hurdles to sustaining a full suite of secondary and tertiary services**, such as recruiting and retaining sufficiently skilled professionals and maintaining essential supplies. **Demand gaps** can have a variety of immediate causes—from mistrust in the quality of care offered by rural facilities to affordability of those facilities to concerns that the higher performance, specialization, and scope of urban hospitals is worth the additional travel time.

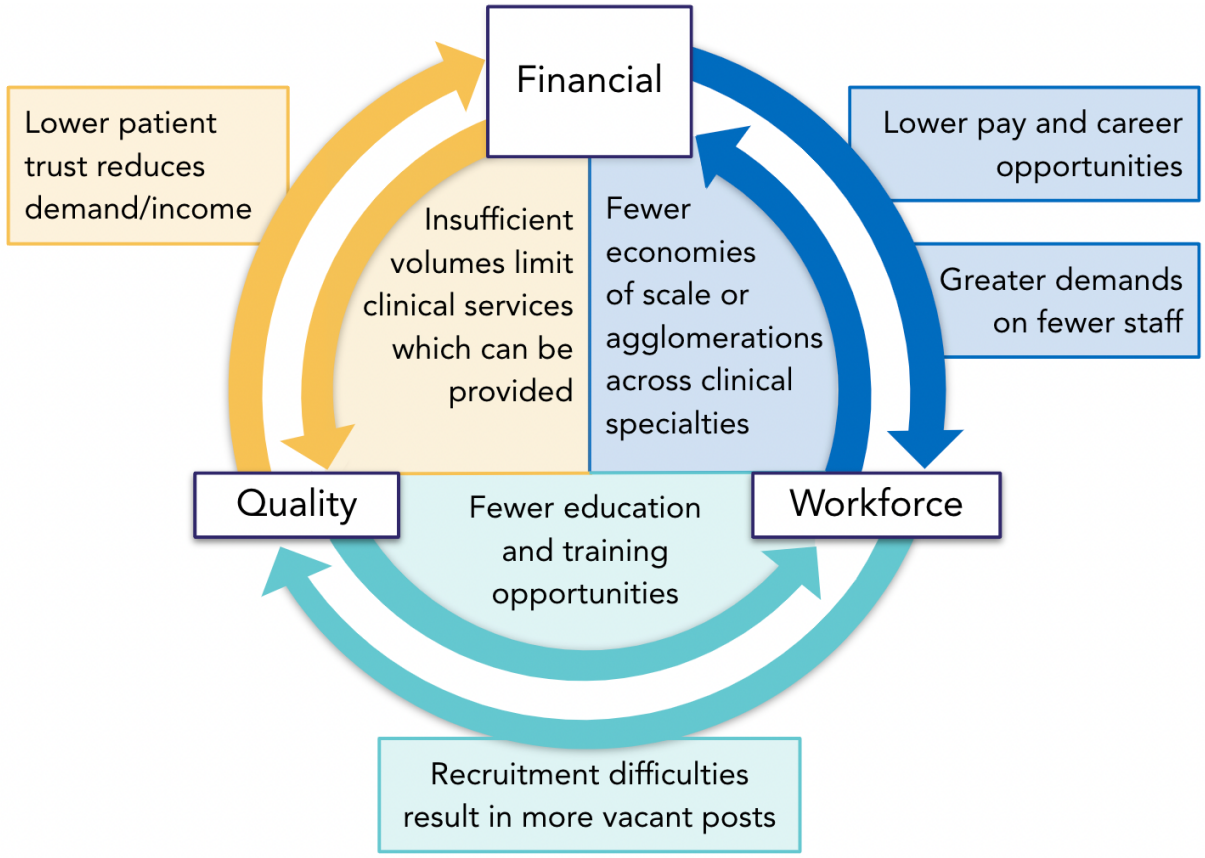
In practice, the ultimate root causes of access to hospitals—whether geographic, clinical, or demand—are **a spiral of three underlying barriers that interact, exacerbate, and compound each other in a negative cycle of financial unsustainability, reduced quality, and more thinly stretched human resources**, as shown in Figure 6, and explored below:

- **Financial barriers,** which include having lower patient volumes (therefore revenue) and a more limited range of departments across which to spread costs, as well as higher overall costs in some areas, such as supply chain;
- **Workforce barriers,** which include difficulties in recruiting and retaining staff, and providing adequate educational opportunities; and
- **Quality barriers,** which include more limited clinical capabilities, lower levels of specialized technology and skills, inefficiencies in operational performance, and the difficulty of maintaining essential supplies.

It is essential to understand how this spiral operates in a specific geography before considering which solutions to deploy. **In many cases, all three barriers will need to be addressed for access to meaningfully improve, whether the key gaps are geographic, clinical, or quality-related**. For instance, incentives for private investment will not work if private operators see that the resulting

hospital will not be financially viable or attract adequate demand. Likewise, public investment without necessary staffing or patient trust will produce 'white elephants.'

Figure 6: Spiral of barriers underlying barriers in access to hospitals in rural and remote areas



Source: Authors' elaboration based on Vaughan and Edwards 2020 and wider literature (below)

A. Underlying financial barriers

Issues with the underlying finances of rural and remote hospitals fall into two main categories. First is **economies of scale**: rural hospitals will have less ability to create efficiencies if they are smaller and/or serving a reduced or more sparsely populated catchment. International literature suggests that below 200 beds, hospitals begin to have higher costs per patient, as the fixed minimum requirements for a hospital (equipment, required staffing levels, etc.) have to be spread across a smaller volume of patients and more variable occupancy rates (Vaughan and Edwards 2020). Second is that rural and remote hospitals **may face higher overall running costs** in some areas than their urban equivalents (Palmer, Appleby, and Spencer 2019). A number of factors may contribute to this:

- Increased supply chain costs to have medical goods shipped and maintained;

- Inability to benefit from agglomerations, whereby urban hospitals may be able to share costs such as lab capacity with neighboring providers;
- Having an older patient population, one with more complex health needs or which delays seeking care until a health issue is more acute—these may be truer of some countries in Asia and the Pacific than others; and
- If providing outreach services from the hospital, rural staff will have greater distances to travel, during which time they are not productive.

How these factors play out depends upon the provider mix that a health system uses for hospital services. In a country where most hospitals are private, firms will face **a less compelling business case** to build or sustain a rural or remote hospital—profitability may be lower and risk higher, resulting in an increased cost of capital. If the region is depopulating, then this will further weaken the financial case for private operators to invest. The same market failures may not exist for public hospitals, but the **pressure to demonstrate value for money** in the provision of publicly funded health services may be just as strong. Conversely, where elected officials have a more direct say in hospital planning there may be **political pressure to build or maintain poor value hospitals** that do not have the required volume and specialization to provide quality of care.

A key solution to these issues of rural and remote hospital costs is to ensure that the payment model for hospital services adequately reflects the value that they produce and accounts for unavoidable additional costs they face (see 'Supporting operational sustainability' in the Solutions chapter (IV), and case study on the United States in Box 4).

B. Underlying workforce barriers

For many countries, it is **staffing rural and remote hospitals that is the number one challenge**, not building or sustaining the actual facility (Campbell et al. 2013). Many countries have the experience of constructing hospitals in underserved areas, only to find that there are insufficient health workers to run them. This results in hospitals that are unable to provide the services they were built for or have long waits or sub-optimal quality.

The barriers to attracting and retaining sufficient health workers in rural and remote hospitals are fairly consistent across countries. As with other regions, clinicians in Asia and the Pacific tend to cite **less good educational opportunities in rural posts, as well as fewer opportunities for professional advancement, lower pay, poorer housing, and personal preferences against rural living** that may be influenced by poor internet coverage, lower quality schooling for children, and other amenities such as entertainment, retail, and banking (Putri et al. 2020).

While the primary focus of most countries is on recruitment and retention of doctors and nurses in rural and remote hospitals, **skilled and sufficient administrators** for these hospitals are also important. Hospitals are complex environments requiring experienced and appropriately trained management. Poorly run hospitals will be less attractive to clinicians and patients. Furthermore,

in the absence of good managers, senior doctors and nurses are required to do the bulk of administrative work, further widening the gap in available time and expertise to care.

Potential solutions to addressing these workforce issues in rural hospitals are described under 'Recruiting and retaining human resources' in Section IV below.

C. Underlying quality barriers

Barriers to quality of care in rural and remote hospitals often compound financial sustainability and workforce issues, as if patients do not trust the safety and expertise of their local rural hospital, they may choose to travel further to visit an urban center of excellence—resulting in underutilization of rural facilities (in turn resulting in lower revenue, then lower staffing etc.).

Rural hospitals must be trusted to be viable and sustainable. Quality of care can be understood in many ways, but the most common concerns around quality of care in rural and remote hospitals include the skills and experience of the staff working there, the availability of modern medical technology, and perceptions of the hospital building itself. Rural hospitals may also face greater challenges of keeping equipment maintained and experience longer outages when technology breaks down while they wait for technical support. There is strong evidence that hospitals performing low volumes of certain complex procedures may have worse outcomes, though as Vaughan and Edwards point out, these form a small minority of what most hospitals do (2020).

Challenges and successes with increasing utilization of rural hospitals in Maharashtra (See Box 2 below) show how quality and trust issues with rural hospitals can be addressed and the downward spiral of declining finances, workforce and trust reversed. Further solutions related to improving quality of rural hospitals can be found under 'Supporting operational sustainability', 'Adapting the hospital model' and 'Increasing connectivity' in Section IV below.

Box 2: Increasing utilization of rural hospitals in Maharashtra, India

The Government of Maharashtra recognized that achieving good geographic coverage of rural communities to hospitals was only part of the access challenge: it was also important that those hospitals were used. **Underutilization was a major feature of the state's rural hospital network**, with 71 percent of its 30-bed rural hospitals having fewer than half of their beds occupied at any one time in 2017, compared to a quarter of beds being empty in non-rural hospitals (many of which were overcrowded) (ADB 2022).

An assessment supported by the Asian Development Bank (ADB) identified two main barriers that were behind this imbalance. First was that **rural hospitals were suffering from diseconomies of scale**. Facilities below 100 beds had higher costs as a result of their limited scope of service and limited complementarily (ADB 2022). Larger hospitals could spread the cost of maintaining a specialty like anesthetics across multiple medical departments, whereas in a small hospital it might only complement obstetrics and general surgery. The second barrier was that rural hospitals were **struggling to reliably maintain critical resources and service availability**. Specialist posts were often

left unfilled, and absences would cause whole specialties to cease operation. A 2013 study found that 52 percent of 30-bed sub-district hospitals were not conducting cesarian section procedures, which should be a core part of their scope of service (Sharma 2013). Critical equipment was also missing.

Between 2017 and 2019 the state managed to significantly reduce underutilization of smaller hospitals (down to from 71 percent of hospitals down to 54 percent) and **boost overall occupancy rates across its rural hospital network**. This was achieved through a multi-pronged strategy of facility strengthening, with interventions including:

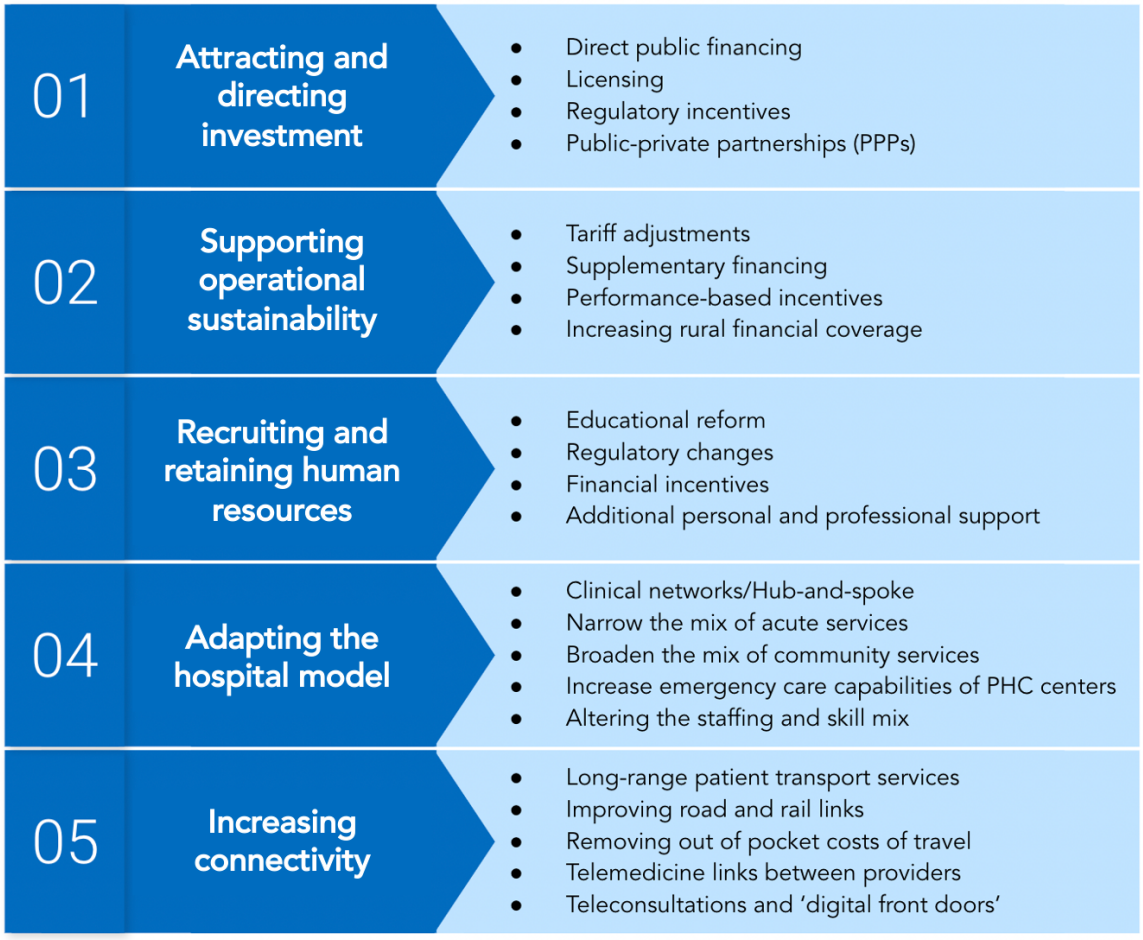
- Upgrading lower tier hospitals to provide a broader range of specialist services;
- Converting single-specialty hospitals (e.g., for TB or leprosy) into more general centers geared towards priority health conditions for those rural populations;
- Increasing staffing levels through greater use of bonded medical officers and ad hoc appointments; and
- Establishing a tele-mentoring network between urban centers of excellence and rural hospitals. For example, the ADB-supported Extension for Community Healthcare Outcomes (ECHO) program created a virtual knowledge sharing network across Maharashtra that provides twice-weekly training sessions between five 'hubs' in urban centers and up to 200 clinicians in rural hospitals and clinics.

Finally, it is important to recognize that in some cases barriers to reforming hospital care lie with **vested interests in the status quo**, however sub-optimal that may be for rural and remote communities. Despite significant gaps in access in some countries, a hospital system that skews toward cities may benefit some powerful actors in the system. Since 1997 the Asian Development Bank (ADB) has been supporting Mongolia's healthcare system reform, which was characterized by an excessive number of acute hospital beds concentrated in the capital, Ulaanbaatar, as well as a large number of unjustified admissions and long lengths of stay (ADB 2021). Significant results in rationalizing this picture have now been made, but this took five attempts at major reform over 20 years to achieve. A key factor behind this was opposition from urban hospitals, who did not wish to see a dilution of their resources, clinicians, who did not wish to be redeployed, and resistance from the Ministry of Finance.

IV. What solutions exist?

Having analyzed the gaps and underlying barriers to hospital access facing underserved areas, solutions can be designed to effectively address them. Typically, these will be needed in combination depending on which gaps (geographic, clinical service, and/or demand) are identified and which root causes (finance, workforce, and/or quality) have produced them. While by no means comprehensive, some of the most common and effective solutions are described below, grouped into five main categories:

Figure 7: Solutions to increasing access to hospitals in underserved areas



Note: PHC = Primary health care
Source: Aceso Global 2023

1. **Attracting and directing investment** involves interventions that will improve the attractiveness of the initial business case for public and/or private investment in new facilities, or substantial upgrading of existing facilities. These include:
    a. A program of **direct public investment** in expanding or constructing new hospital facilities, such as pursued by Thailand in the 1980s where central government decided to redirect money earmarked for urban hospitals towards rural district hospitals instead (Fleck 2014). To sustain these providers, an ongoing additional grant or flat-rate payment may be needed to support particular clinical services that are unlikely to be financially viable given levels of demand/need in an area;
    b. Offering **public-private partnerships (PPPs)** between governments and for-profit or faith-based organizations to share the initial construction costs of new hospitals in underserved areas, as well as guaranteeing their long-term viability. Full-scale hospital PPPs can take a wide variety of forms, from models in which a private sector partner builds and maintains the facility (potentially taking responsibility for clinical services too) for a period of time before transferring ownership to the public sector to models in which the private partner has full ownership but with a commitment of ongoing revenue from government in the form of an availability payment, or guaranteed volume of patient demand (See Box 3). PPPs can also be targeted at specific services that the public sector finds challenging to perform in remote settings, such as managed equipment services partnerships, in which a private company takes responsibility for the purchase, maintenance, and replacement of equipment within public hospitals and is paid on the basis of performance. Whatever the scope, there is rich experience across Asia and beyond about the factors that enable success with healthcare PPPs (IFC 2010; WHO 2023; KPMG 2017; and PWC 2018). These include managing the politics of PPP which are typically every project's greatest risk; taking an active rather than passive approach to market engagement in order to interest the best private partners (especially for rural projects where the project may appear less attractive on paper); and paying close attention to the project fundamentals from multiple perspectives to ensure that the project is *"needed (by the public), affordable (for consumers and the government), attractive (to investors), and legal (without new laws)" (IFC 2010)*; and
    c. Offering **non-financial incentives** to private operators to build new hospitals in underserved areas, such as free or discounted land for development, an easier licensing process, and governmental support with connecting any new hospital with utilities and road infrastructure. On the opposite side, governments may choose to more strictly limit or regulate licenses for new hospitals proposed in urban areas with adequate coverage, so as to 'push' as well as 'pull' future investment.

Box 3: Using Public-private Partnerships to expand hospital capacity in underserved areas of Odisha state, India

Many examples of hospital public-private partnerships (PPP) exist across Asia and the Pacific. Most recently, Odisha state in India has announced a pilot phase of four PPP secondary care hospitals in underserved districts, with plans to expand into further areas if successful (Government of Odisha 2022). These are being jointly commissioned and designed by government and private operators, with the state providing free land, guarantees around patient referrals and tariffs and ongoing Viability Gap Funding (similar to an availability payment) for seven years. The private operators, for their part, will be building, financing, equipping and operating the hospitals (including clinical services) for a period of 30 years, before transferring ownership to the state government.

2. **Supporting operational sustainability** involves improving the ongoing financial viability of hospitals located in remote and rural areas. This is necessary both for attracting investment into new facilities *and* for supporting existing facilities to expand and improve. Solutions in this category might seek to permanently reflect the increased costs and challenges of running rural hospitals (i.e., 'level the playing field' with urban facilities) or support the ongoing viability of specific clinical services such as ICUs. Common levers that are used by different health systems globally include:
    a. A **'bonus' rate above the standard tariff** paid to hospitals in remote and rural areas. For example, an uplift on all diagnosis-related groups (DRG) deemed to be essential to provide in that area, or likely to suffer from diseconomies of scale due to a hospital being unavoidably small or remote (See Box 4);
    b. Ensuring **comprehensive financial coverage for healthcare** of rural populations, so there is adequate local demand for rural hospitals' services. This might be through expanded or enhancing enrolment to national health insurance or enhancing existing coverage to include a greater range of secondary and tertiary care services (both of which have been implemented by PRC since 2004 (See Box 1)); and
    c. Using **pay-for-performance mechanisms** to reward improvements in the operating effectiveness and efficiency of existing rural and remote hospitals. For example, paying on the basis of real-time service levels, reduced absenteeism, lengths of stay, or user satisfaction (See Box 5).

Box 4: Financial incentives to support small and rural hospitals, United States

The United States (US) has extensive experience of using financial incentives to ensure the ongoing viability of rural and remote hospitals**. Different reimbursement policies** have been created for multiple classifications of hospital deemed essential but which might not be financially viable under normal market conditions. These include **Critical Access Hospitals**, which have fewer than 25 beds and are at least 25 miles from the nearest full-service hospital and are paid an additional 1 percent of the typical cost of services reimbursed by Medicare, as well as charging for some treatments on a fee-for-service basis rather than diagnosis-related groups (DRG). Special payment arrangements are also offered by Medicare to 'Rural Referral Centers' (which accept patients from smaller surrounding hospitals), 'Sole Community Hospitals' (which are the only viable facility for a community to reach), and 'Low Volume Hospitals' (who have insufficient patient numbers to maintain particular services) (RHI 2022). Two further classifications that are not rural-specific but are disproportionately awarded to remote hospitals are 'Medicare-Dependent Hospital' (for whom more than 60 percent of patients are Medicare beneficiaries) and 'Disproportionate Share Hospital' (whose patients are more likely to be on low incomes).

The US federal government also made significant progress on demand-side incentives through the 2010 Affordable Care Act, which has **increased health insurance coverage** by more than 30 million people, a disproportionate number of whom are rural Americans (HHS 2022; Holahan, Wengle, and O'Brien 2022). Specific funding streams have also been made available to support innovation and **'demonstration projects' of new models of care** in rural and underserved areas (Bernd et al. 2016).

Box 5: Performance-related financial incentives for rural hospitals in Khyber Pakhtunkhwa, Pakistan

The Khyber Pakhtunkhwa province of Pakistan is home to around 38.5 million people (2021 estimate), over 80 percent of whom live in rural areas. A 2019 health system review commissioned by the Asian Development Bank (ADB) identified a particular need for improvements to secondary care in the province—largely the result of government focus on tertiary hospitals, and international donors supporting primary care services, but leading to **secondary care receiving less attention.**

Physical access to secondary care hospitals was adequate, with 32 inpatient facilities spread across the 35 districts. However, in practice these were underutilized as patients opted instead to travel to tertiary hospitals in the main city of Peshawar over concerns of **poor quality of care in their local facilities.**

To improve this, in 2021 a **new results-based loan** was signed between the ADB and the Government of Khyber Pakhtunkhwa, as part of US$417 million health system strengthening program. Under the terms of this agreement, ADB will disburse US$100 million in financing as the province's 32 non-teaching hospitals achieve a broad range of performance milestones designed to improve clinical quality and public confidence. These **key performance indicators range from basic metrics such as functioning toilets, to meeting more technical standards of safe care** in operating theatres, to demonstrating reduced levels of vacant posts and absenteeism.

The program is planned to conclude in 2026, by which time it is hoped that there will a substantial shift in utilization of these hospitals and resulting improvement in effective access.

3. **Recruiting and retaining human resources** involves strategies to secure a sufficiently staffed and skilled workforce for rural hospitals. There is extensive evidence of effective interventions to achieve this (WHO 2010), with the most successful examples including 'bundles' of coordinated interventions blended together (WHO 2010; Liu, Zhu, and Tang 2018), such as:
    a. **Educational interventions**, such as selecting medical students from a rural background, creating special educational tracks for rural students, adapting curricula with specific rural health content, and situating medical schools in rural areas;
    b. **Regulatory changes**, such as return service agreements that carry a compulsory period of service in rural areas after graduation in exchange for free or discounted medical education (varying from two years in Nepal to nine in Japan) (Shankar 2010; Matsumoto, Inoue, and Kaji 2008). Also creating new cadres of specialist rural doctors to recognize their unique skills, such as the Rural Generalist in Australia (See Box 6 below);
    c. **Financial incentives**, including at a minimum ensuring parity of pay between urban and rural health workers and, if necessary, giving higher pay to health worker roles in understaffed areas. Allowing opportunities to supplement public clinicians' pay through private work (dual practice) may also improve retention in some contexts; and
    d. **Additional personal and professional support**, such as better housing, working conditions in the hospitals themselves (including adequate drugs and equipment), employment opportunities for spouses, and guarantees of permanent employment.

4. **Adapting the hospital model** involves changing the scope of service that hospitals in underserved areas provide, whether by taking out some functions that a full-service hospital might usually provide, adding additional capabilities, or sharing functions with other providers so as to improve quality and/or reduce overall costs. These solutions can help to maintain the financial viability of rural hospitals, as well as improve their quality and mitigate workforce gaps. Different countries have arrived at hugely different solutions for how to configure hospitals in rural and remote areas, showing that there is no one right answer for how to optimize the trade-offs between access, quality, and cost. Solutions include:
    a. Creating **clinical networks between rural and remote hospitals** so that through collaboration they can recreate the scale that they lack individually. This could mean that aspects of one or more clinical service might be shared—either physically or virtually—between different rural and remote hospitals. For example, several rural hospitals might jointly procure medical equipment, jointly employ some staff, or jointly deliver a particular clinical service.
    b. Implementing **hub-and-spoke models**, whereby a central (typically urban) 'hub' hospital with a wide range of services and specialties partners with a number of smaller 'spoke' hospitals, often in more rural and remote areas (OECD 2021). The spokes have more limited capabilities but are still able to benefit from centralization and scale, for example through shared staffing and supervision, clinical protocols, telemedicine links, and referral agreements that allow patients to be rapidly moved between sites as needed. Specialists might rotate between facilities to offer coverage in areas without the scale to be viable as a standalone service or might join consultations between a patient and rural generalist

virtually. The success of hub-and-spoke models relies on clearly defined roles for each facility. In Italy, for example, national policy defines specific levels of hospital according to their capabilities: eight 'hub' hospitals with a full range of acute services, 20 'spokes' that can cope with the majority of acute patients, and eight nodes which have a more limited range for remote areas (including emergency departments) (Garattini, Martini, and Zanetti 2021). At a regional level, this is further elaborated by detailed policies for each clinical specialty defining its functions and the thresholds of complexity at which a patient should be transferred to a higher tier facility (Ugolini and Nobilio 2003).

c. Many countries also **designate or design a different service mix** for rural and remote hospitals than would be viable or permissible in other areas. Often this involves paring down the facility to only offer the most essential services needed locally, which may require special financial support to make them viable. In the US, for example, rural hospitals are most likely to provide obstetrics, emergency trauma, psychiatric, and basic interventional radiology services among their scope (Croll and Gale 2022). Some countries drop the 'hospital' label altogether, instead preferring to equip rural primary healthcare providers with acute care skills. In rural Spain, for example, 'primary health care leads' for emergency care provide 24/7 or on-call accident and emergency care for low complexity cases, while being equipped with ambulances and skills to stabilize and transfer more severe cases (Bernd et al. 2016).
d. Changing the service mix is not always defined by what these facilities *lack* compared to a full-service hospital—they can also have **additional capabilities** not available in their urban counterparts. In Canada, there are more than 330 hospitals in rural and remote regions, averaging around 18 beds each and serving 20 percent of the population who live in these communities. 'Rural Health Hubs' have been created to address the specific health needs that exist in these communities. Alongside minimum critical services such as an emergency department and, in some cases, surgical facilities, the hubs may also have addiction services, mental health, long-term community and home care, rehabilitation, palliative, and complex continuing care. These are in response to the particular needs of Canada's rural populations but create scale for these providers by attaching community, primary, and outpatient care rather than more secondary care capabilities that might be underutilized (Bernd et al. 2016).
e. Adapting the hospital model in these ways often requires **adapting the staffing models** too. In Australia, for example, (see Box 6) many remote emergency and acute hospital departments are staffed on a part-time basis, or by family medicine physicians or nurses with enhanced training, skills, and licenses (i.e., nurse practitioners). Medium-sized hospitals may have fewer consultants per department, and there is greater use of trainees and international medical graduates.

5. **Increasing connectivity** is the final category of solutions and focuses on how to get rural and remote patients the care they need more efficiently without significantly changing the supply or distribution of hospital facilities. There are several ways in which health systems achieve this:
    a. Providing dedicated **long-range patient transport services** to underserved communities, such as air ambulances and vehicles equipped to provide rapid patient transport over long distances. Networks of medical and nominated non-medical vehicles, boats, and aircraft for emergency patient transport are common in many large countries and island communities. A more recent development is the increasing use of technology to begin treatment by the receiving hospital while the patient is en route. Smart ambulances, for example, are now being deployed in Malaysia with high resolution cameras and microphones that enable real-time communication between paramedics and hospital specialists, devices such as electrocardiogram (ECGs) that integrate directly into the hospital electronic medical records, and satellite communication systems to enable connection in areas with poor cellular coverage (Dyangku 2022). These enable diagnosis and treatment to begin as soon as a patient's journey to the hospital starts.
    b. **Improving civil transportation infrastructure** between cities and rural and remote areas. Better road, rail, air, and sea links have the added advantage of creating many non-health spillover benefits, such as economic growth and opportunities for rural and remote communities. This may also be the best value-for-money solution even on purely health grounds, as concluded in one Chinese region where improving transport links was found to be more economical than adding extra hospital capacity to outlying areas (Tao and Wang 2022).
    c. **Removing out-of-pocket costs of patient travel** can be a highly effective intervention for improving access to rural and remote communities (Syed, Gerber, and Sharp 2014) - especially if the distances are long or repeated appointments are needed. The mobile money service M-Pesa is used in several African countries to directly transfer money to patients who need to use non-medical means of transport. One example is the Ambulance Taxi service operating in several remote districts of Tanzania. Mothers in labor are able to call a free emergency telephone line which connects to one of more than 100 taxi drivers licensed to take them on the roughly three-hour drive to the nearest hospital. The full price of the journey is paid directly to the taxi driver using M-Pesa, with no cost to the mother. An evaluation of the programs first year found that it had reduced maternal mortality by 27 percent (Bryan et al. 2017).
    d. **Telemedicine solutions** are increasingly capable of replacing some—albeit not all—care that would previously have required face-to-face interactions in a hospital. While not obviating the need for surgical theatres, Intensive Care Units (ICUs), and other core hospital capabilities, telemedicine can enable the outsourcing of certain functions (e.g., interpretation and diagnosis of digital diagnostics) or mitigation of physician shortages (e.g., telemedicine tools that enable rural hospital generalists to communicate with specialists in urban centers). New tools for telemedicine to transform rural healthcare are emerging all the time, but in areas with poor internet or phone coverage more basic technologies may be equally effective: two-way radios that allow rural nurses and para-

health workers to connect to specialist advice have been used long before the invention of the smartphone (Fryer, Burns, and Hudson 1985).

Box 6: Multi-facetted solutions to Australia's extreme rurality challenges

Few healthcare systems globally face access challenges as extreme as Australia, a country that—despite being one of the most urbanized in the world—also has one of the lowest population densities: 3 people per km², second only to Mongolia in Asia (World Bank 2020). For the 500,000 people living in 'remote' or 'very remote' communities travel times to hospital can be long—with average drive times of up to 11 hours to the nearest hospital for some regions (Barbieri and Jorm 2019). There are additional challenges for those living on its many small islands, some of which are tens or even hundreds of kilometers from the mainland (ABS 1999).

Over many years Australia's state and federal governments have developed a comprehensive range of solutions to these challenges. Five key components of this multi-facetted strategy are: adaptive hospital models, a specialist rural health workforce, flexible health financing, patient transport and local autonomy in service design.

Different states have developed a variety of **adaptive hospital models** for remote areas which preserve the most essential time-critical acute services while keeping scale and cost at a much lower level. Small remote hospitals and emergency care facilities can be staffed by specially trained general practitioners on a part-time or on-call basis, with support from advanced nurse practitioners, while some standalone acute services might be entirely nurse practitioner-led. Clinical departments might have lower numbers of specialists than would be the minimum in urban centers, and there will be greater use of point-of-care testing. Most also have agreements with local ambulance services for paramedics to provide care in hospital when required. Typically, the more remote the facility the more limited its scope of service, however at a certain threshold of remoteness, this changes—due to the challenges of transferring patients from the most rural facilities being so great they are actually more likely to have on-site radiology and lab departments, as well as high dependency units. Even the smallest facilities manage to treat 90 percent of patients without transferring them (Baker et al. 2022).

These adaptive staffing models require a highly trained, **specialist rural health workforce** to maintain quality and patient trust. Australia has implemented a host of strategies to address this challenge, including raising the profile and prestige of rural and remote medicine through the creation of a dedicated College and Medical School for Rural and Remote Medicine. Certain states recognize and offer greater financial reward (on a par with urban hospital specialists) to rural generalists, as well as creating specific professional pathways for them to advance through (Australian Government 2016). There is also an expectation of junior doctors working in rural and remote areas as part of their training, as well as bonded scholarships, but these are supported by training curricula that emphasize the specific skills required for remote medicine (Bernd et al. 2016). For example, Australian doctors cover a greater depth of anesthetics in their training than is typical elsewhere.

Flexible health financing also takes into account the needs of rural and remote services, including a specific funding innovation known as 'Multi-Purpose Services' which allow the pooling of national and state funds for health and long-term care to create more flexible, multi-functional services—for example combining the services of a hospital and aged care facility into one (AgedCare101 2022). Adjustments to the payment model of Australia's largest insurance scheme, Medicare, also promote

telehealth support between hospital specialists and rural residents by paying a higher rate for these services than the same service delivered face-to-face (Bernd et al. 2016).

Rapid movement of patients and doctors through **dedicated long-range transport services** also form a key part of Australia's strategy. Private air ambulance services, long-range road transport and the Royal Flying Doctor Service collectively offer good nationwide coverage.

V. What are the key lessons and enablers of success?

Successfully achieving adequate access to hospitals in rural and remote areas often involves grappling with complex challenges and making difficult choices and trade-offs. Reflecting on the experience of health systems that have attempted to expand access to hospitals in rural and remote areas, a number of key lessons emerge that decision makers should pay attention to.

The first and most important lessons is to carefully analyze the problem before jumping to solutions. Healthcare decision makers need to invest sufficient time and resources in understanding the extent of geographic, clinical, and demand gaps, and to **use as sophisticated an approach to capacity planning as possible.** Crude 'rules of thumb' to guide hospital capacity planning should be avoided, in favor of a broader cost-benefit approaches that take into account travel times, potential to improve health outcomes, and the perspectives of local communities. Thinking should be in terms of clinical service groups, rather than hospitals as homogenous units, and be grounded on real-world evidence of what different groups of patients want and will use, rather than theory of how they *should* behave.

Second, in those areas which emerge as underserved through this analysis, it is important to **properly consider the underlying barriers that have resulted in these gaps**, which are likely to also stand in the way of successful solutions. While it may not be possible to resolve all cost, workforce, and quality issues through a single project or reform, understanding which can and cannot be overcome will help to determine which types of hospital model can be viable. For mixed health systems, this will also help to decide where attracting private investment is a viable option and where market failures are such that a more public-sector financed or delivered solution is needed. Typically, a complex interplay of barriers exists in underserved areas, requiring a blend of solutions to be deployed at once.

Third, **actions should be prioritized in response to short-, medium-, and long-term needs**. For underserved areas with the most significant and urgent gaps, a rapid place-based study can be used to design a mix of solutions that will have an immediate impact locally, and are typically on a project basis, such as investing in new services or investing to improve the capabilities of nearby facilities. Further responses should target barriers that can be addressed in the medium-term—in particular the enabling environment that has led to gaps in access appearing or persisting. These are likely to involve wider reforms to hospital licensing and regulation, healthcare financing and payment models, and workforce training models. Finally, it is important that long-term decisions about future hospital capacity include a sufficiently long-term perspective on the wider environment in which hospitals will exist. New facilities will take many years to complete, during which time other planned physical and digital infrastructure projects may improve connectivity considerably. Population health needs may also change, for example, if an area is rapidly ageing or depopulating or is acutely susceptible to the impacts of climate change, such as rising sea levels. Finally, medical advances may also transform the nature of some clinical care, such as telemedicine, point-of-care tests, and artificial intelligence enabling more specialist care to be provided in the home or local clinics. These impacts should be carefully considered in any long-term hospital masterplan.

Finally, **be innovative and resist the temptation to 'copy and paste' urban hospital models into rural areas.** Planners should think in terms of individual clinical service groups that fit the needs of the local population and be creative in the model they design to meet them. High-performing health systems globally have vastly different understandings of what 'rural,' 'small,' or 'viable' means—not to mention what a 'hospital' is. This suggests there is no optimum service design that should be copied. Rather, the wide range of solutions around the world should be seen as an invitation to innovate and pursue an end goal that fits each systems' unique history and preferences on the many cost-quality-access trade-offs. Demonstration projects can be an excellent starting point to examine new models of innovative acute care delivery in rural areas and see what works.

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Appendix: Abbreviations

ADB	Asian Development Bank
DRG	Diagnosis-related Groups
ECG	Electrocardiogram
ECHO	Extension for Community Healthcare Outcomes
ICU	Intensive Care Unit
PHC	Primary Health Care
PPP	Public-private Partnerships
PRC	People's Republic of China
TB	Tuberculosis
US	United States of America
2SFCA	Two-step Floating Catchment Area Method

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