

## **Module 9**

# **Studying the healthcare network**

## Contents

The module examines the ways healthcare networks evolve under the effects of disruptive forces. After a broad review of composition, balance and shape of the overall network, relevant aspects – such as geographical distribution, ownership, physical and functional conditions of health facilities – are discussed. The need to disentangle new patterns as they emerge from old distortions, which may worsen during the crisis, is stressed. Suggestions are made regarding how to aggregate available figures into useful indicators for the study of the network. Particular attention is given to hospitals and PHC facilities, as well as to their mutual relationships. The difficulties of planning the recovery of a disrupted health network are sketched, alongside ways to tackle them.

*Annex 9* offers practical guidance on the building of a summary database of health facilities.

### Closely-related modules:

*No 2. Making (rough) sense of (shaky) data*

*No 6. Understanding health policy processes*

*No 8. Studying management systems*

*No 10. Analysing human resources for health*

*No 12. Formulating strategies for the recovery of a disrupted health sector*

## The broad features of the network

In most health sectors, facilities are classified by category, according to the size and services provided. Usually, several categories of health units are clustered in levels of care. Most classifications follow a variant of the one sketched below:

### Health facilities, by level of care

Level of Care	Functional Description	Remarks
Tertiary	Large, specialized, teaching hospitals, usually located in the main towns and often only in the capital city. Equipped with higher technology and mainly devoted to inpatient care. A large proportion of their existing capacity is usually absorbed in delivering first-contact care. Sometimes lower-care facilities located in the capital city are included in this group.	In some health sectors, this level is split into two segments of higher and lower care. This is usually a theoretical, unhelpful distinction that in practical terms can be ignored, particularly in protracted crises, where higher-care capacity is frequently enfeebled and tertiary hospitals stand out for their size and cost, rather than technical standards.
Secondary	First-referral facilities, located in urban and rural areas, usually including basic surgical and emergency services. In many cases, the outpatient component (mainly providing first-contact care) is quite large. Facilities dubbed as "hospitals", but lacking corresponding functions, are often included in this group.	Urban secondary hospitals are advocated as filters of common conditions, to avoid congestion in higher-level facilities. Particularly in degraded urban settings, with undisciplined referral flows, the benefits of this theoretical filter role remain unproven.
Primary	Small facilities, providing mainly outpatient basic care. Rudimentary units staffed by CHWs are often included in this group. Some facilities may be devoted only to special-programme care activities, such as safe motherhood, tuberculosis control or immunizations. Theoretically, these facilities constitute the base for outreach and preventative work.	Level including the largest proportion of ghost facilities in most disrupted sectors.  Underutilization of these health units is very common, particularly in insecure areas.

In some health networks with a tradition of central planning, facilities are built according to standard layouts, particularly at primary level. Their spatial distribution follows some criteria, such as the population to be served, or the country administrative partition. In other situations, where dispersed investment decisions prevailed, facilities are different in size and functions. Also, they may have evolved over time, growing according to local conditions. In between the two models just sketched, the network can be a mixture of standards, each planned from a different point of view. Hence, colonial-era hospitals coexist with facilities built by disease-control programmes, the military, private estates, charities, etc. Clearly, their shape, size, equipment, functions and location differ quite substantively. In some health sectors, the official network structure can appear quite elaborate, with many categories of health units neatly combined in an ideal functional pyramid. However, in most cases the field situation diverges to a large extent from these conceptual constructions of central planners deprived of the means of rationalizing a disparate array of facilities, or of encouraging effective referral flows.

In some cases, the roots of important patterns, such as large geographic gaps in service provision, may be traced back to periods preceding the disruption. Whereas uneven development without adequate redistributive policies is often the root cause of unfair access to health care, in some cases poor health planning may have played a role. This is the case in situations where the main planning criterion has been the country administrative structure, which is usually territorially based. Scarcely-populated administrative units greatly benefit from this approach, to the disadvantage of populated areas. Due to its simplicity, this obviously-flawed planning criterion may be surprisingly popular. It may be uncritically revamped during transitional or reconstruction periods, when information-dependent criteria may seem inapplicable.

Despite the opportunity for change offered by the crisis, entrenched patterns, such as hospital dominance, are usually very resilient. Insiders tend to develop an idealized vision of the situation before the disruption and remain emotionally attached to old models. The existing flaws are easily and mistakenly explained by the crisis and, unrecognized, are not resolutely tackled as they need to be. To disentangle old patterns and trends of a stable nature from crisis-induced, transient ones is one of the most important contributions of an insightful analysis.

Ratios of facilities to population help to infer and compare accessibility across the country. Given the population displacements that take place during protracted crises, these denominators are always questionable and should be handled with the utmost caution. The reported number of functioning facilities is also often unreliable. Beyond the frequent reporting mistakes, in many cases the application of different criteria for classifying facilities helps explain the remarkable fluctuations over time that mark official reports.

Uncertainties notwithstanding, internationally accepted ratios can be used as yardsticks to gauge the gravity of the situation. In poor countries, first-referral hospitals are supposed to serve 150,000 to 300,000 people and comprehensive health centres (expected to provide a full package of basic health services) 10,000 to 20,000. In disrupted health sectors, finding ratios twice or even three times higher is usual. Where bed reports are available and considered fairly reliable, ratios lower than 1 bed per 1,000 population are common. Considering that a large number of these beds can be concentrated in a few tertiary hospitals, actual access to inpatient care is in many cases even lower. Usually, these average ratios hide very large differences across the country, and within the regions composing it. Particularly when a country is partitioned into very large administrative units, disaggregating them into functional sub-units can be necessary to highlight otherwise-hidden imbalances. Comparing the global average figure to the ratios of the most and least favoured areas helps condense the overall picture.

### Some indicators related to the healthcare network, collected in health sectors in crisis

Country	Year	Number of Beds	Beds for 1,000 Population	Skilled Health Workers per Bed	Ratio Referral Hospital to PHC Facilities
Afghanistan	2002	≈ 8,400	0.4	1.4	1 : 8
Angola	1998	≈ 8,000	0.7	3.1	
Mozambique	1991	12,000	0.8	1.5	1 : 30
Sudan	2000	23,000	0.7	2.0	1 : 20
Tajikistan	1998	42,000	6.1	7	
West Bank and Gaza	2008	5,000	1.3	2.8	1 : 8

Note: Given that many 'referral hospitals' are in fact sub-standard units, their ratio to PHC facilities may under-estimate the severity of the situation.

The patterns of the inherited network are profoundly affected by protracted crises. Facilities located in war-affected areas may have been destroyed, looted or just abandoned by scared staff. In the absence of regular maintenance, even active facilities can be in ruins. Health units located in overcrowded areas tend to expand in number and size under the pressure of increased demand and because of the availability of aid funding. New health units built by NGOs may mushroom in secure, operationally convenient areas. Basic functions, such as emergency surgery, are sometimes introduced in facilities that were not conceived for hosting them. In health networks contracted under a crisis, overstaffing of the surviving facilities is a quite common finding.

#### True Story No. 16

#### The composition of the healthcare network in Afghanistan

Over a number of years, WHO Afghanistan, with the collaboration of provincial and regional informants, compiled lists of existing health facilities, lists which time and again presented dramatic inconsistencies, both internally and when compared to previous years. In 2002, a collaborative initiative studied the network across the country, including all the facilities the surveyors were able to reach.

140 facilities included in the WHO database were considered as inactive, whereas 210 facilities not included in the database were found active. Taken together, the facilities missing from or misreported by the WHO database represented about 1/3 of the real total number. The finding of a dramatic mismatch between routine figures and field surveys is rather common in severely disrupted health sectors.

The complex interaction of the forces characterizing the disruption is likely to produce some or all of the following features:

- The crisis-shaped network tends to be composite, inefficient and inequitable. Its composition evolves quickly as the crisis unfolds, old facilities close down or are abandoned, new ones are built, and management and supply relationships change. The arrival of a well-resourced NGO in a given area may boost service delivery, whereas the expiring of an established project leads to service contraction elsewhere. Service provision is therefore in a permanent state of flux. Related figures become quickly outdated.

- The field situation usually diverges dramatically from the information available at national level. Official categories of facilities may be grossly misleading, requiring thorough cross-checking against functional definitions in order to become useful. For instance, a rough and minimalist definition of *Health Centre* might be the following: “A health facility providing basic health services. To that effect, it must be staffed by at least a mid-level health worker and a trained midwife, and must maintain permanent immunization capacity and a basic laboratory”. In different settings, the list of minimum requirements for facilities to be included in this category could be scaled up. The essential feature of the chosen functional definition is that the data required to apply it are available on a routine basis, or are easily collectable (see *Annex 9* in this module and *Exercise 9* in *Module 15* for further discussion and application).
- Official reporting tends to underestimate the gravity of the geographic gaps existing across the country, with facilities still considered as active even when they long-ago ceased to report operations and to be supplied. Health units in remote or inaccessible areas are particularly prone to be misreported by information officers reluctant to drop them from official reports. Figures related to for- and not-for-profit private facilities are often wildly inaccurate. The former proliferate in urban settings, where the health care on offer may greatly exceed the levels reported by central authorities. The latter facilities, owned or managed by charities, may be equally ignored by official statistics.
- The number of hospital beds is a common source of inconsistencies, as bed numbers are reported as stable, even when no inpatient activity takes place because of the derelict condition of the ward. Thus, when the number of hospital beds refers just to an empty shell, the size of the facility would be better estimated by its covered surface.
- The financing crisis that usually affects crippled states, coupled with security and logistical constraints, leads to the progressive abandonment of maintenance work. The physical condition of many facilities deteriorates quickly and equipment breaks down. Destruction and looting (whether caused by fighters, health staff or the populace) compound the damage caused by neglect in some cases. The network may become derelict in the course of a few years of turmoil. Sometimes, the poor quality of improvised maintenance work supported by NGOs undermines its effectiveness. Given the level of dilapidation attained in a protracted crisis, the recovery of the network always entails huge investments, sustained over long periods.
- Overall, technical standards fall at each level of care. Complex high-tech functions, such as diagnostic ones, suffer the most.
- Health facilities may internally fragment, due to vertical interventions. Selected resource-endowed services can flourish alongside neglected, barely functioning areas. The concept of health facility therefore becomes of dubious value. Given this fragmentation, the comprehensiveness of services greatly suffers. This constraint is made more serious by the reduced freedom of users to move in search of the service they need. Serious service gaps, such as the lack of emergency surgery, can therefore coexist alongside duplications of other services, simultaneously provided by several NGOs.
- A troubled, shrinking network can evolve in a direction disconnected from other trends underway in the sector. In some situations, such as Afghanistan and Angola, the privatization of health training led to an expansion of the workforce, which largely surpasses the staffing needs of the surviving facilities.
- In countries partitioned by rival factions and marked by prolonged military stalemates, separate health networks are a common feature. Contiguity or even overlapping of services operated by different agencies on each side of

the front may develop. Competing sides may develop recovery plans blind to events taking place across control lines. Mutual distrust may persist even after the brokering of a peace settlement, barring users from taking advantage of health services provided by or identified with rival health authorities. Compiling side by side available data on the health care on offer and outputs reported by separated health authorities helps to gauge the extent of the split, the gravity of the inequities of access to health care, and the measures needed to bring together these mutually secluded portions of health services. This analysis is habitually politically charged, and should be presented to rival parties in very tactful ways.

Against this landscape, national health authorities, in fact devoted to damage control and *laissez-faire* management, may become singularly attached to (often decades-old) official planning criteria, which are unrealistically defended, despite their disconnection with the field situation. This blurs the already limited understanding of the situation by decision-makers.

### Gaining further insights about the network

For the purpose of analysing the network's main patterns, in most cases it is convenient to consider it as a continuous and evolving spectrum of increasing functions and complexity (from the smallest health post to the national hospital), whereby no obvious, clear-cut levels are discernible. To this continuum, operational – if arbitrary – thresholds can be applied. For instance, reporting the number of hospitals can be of little use in a sector where many of them are in fact large PHC units. Instead, reporting the number of health units with functioning surgical theatres is much more instructive. Obviously, the chosen criteria will depend on what reliable and updated information is available. Population ratios give a measure of the gaps opening up in the sector, once different services are considered. In Afghanistan in 2002, some key services were available according to the following ratios:

1 PHC unit	for 26,000 population
1 Permanent immunization service	for 38,000 population
1 Delivery care unit	for 123,000 population
1 Laboratory	for 59,000 population
1 Tuberculosis DOTS treatment	for 167,000 population
1 Major surgery theatre	for 204,000 population

The available information does not always allow for this disaggregation, or offers only figures related to certain services, sometimes monitored by special programmes. The ratios obtained must be further studied according to regions and provinces, so as to spot the most important imbalances across the country. The causes behind the inadequacy of particular services may include low priority, underfunding, misconceived or unrealistic policies. For instance, in Angola the training of midwives was discontinued for many years, on the assumption that maternal care would in the future be provided by medical doctors and obstetric specialists. In other cases, a concern with quality of the provided service may have hampered its expansion. In these examples, the political crisis is not directly related to the problem. However, by disconnecting central officials from the field and offering a convenient, all-encompassing explanation for the service inadequacy, the disruption may delay recognition of flaws in the chosen policy.

Once functional segments of the network have been identified, the prevailing features of each facility group must be analysed, in light of their size, number, technical assets, distribution, and services offered. In this way, the broad characteristics of the network can be understood, the main flaws and distortions identified, and possible corrective measures conceived. Among the many aspects to be considered, some stand out:

- The balance between the urban and rural components of the network is critical even in normal sectors. In protracted crises, the rural network suffers disproportionately. In many situations, urban and rural facilities of all levels of care present distinctive features. Hence, two sub-sector networks can be recognized. Urban facilities are usually large, heavily-built, endowed with complex equipment, organized by departments or programmes, and often specialized to provide large-scale single services, such as maternal care or tuberculosis inpatient care. Rural facilities tend to be smaller, numerous, associated to the territorial administrative partition, multi-purpose, lightly-built, with only basic equipment, and staffed by general cadres carrying out many different tasks.
- In countries with uneven economic development, health facilities are often concentrated in advantaged areas, which may also enjoy better security conditions. Because of security concerns and operational advantage, factors that greatly affect the investment decisions of aid organizations, border areas can be crowded with health facilities. A striking example of this pattern was the comparative abundance of health services in Eastern Afghanistan, near the Pakistani border.
- The balance between hospitals and PHC facilities influences access, type of health care provided, and costs. Within the public sector, hospital requirements usually take precedence over other concerns, particularly when resources shrink. Thus, during a protracted crisis the PHC component of the public health network suffers to a greater extent. Within the PHC level, the community, voluntary segment, if dependent mainly on national health authorities for resources and support, is the first to feel the brunt of the crisis. Conversely, when this area is backed by aid agencies, it can enjoy comparative privilege over formal services. This was the case of Southern Sudan, where in 2003 PHC units staffed by CHWs and providing only rudimentary health services were predominant.
- The size and infrastructural characteristics of the health facilities may differ by country, ownership, period of building. In the 1960s and 1970s, state-owned facilities tended to be quite large. Mission rural hospitals, often old, can be even larger, with a capacity frequently in the order of 200 beds. Conversely, facilities built by NGOs in recent times are often small. The technical content of a facility has evolved too, with older buildings being often more endowed than recent ones. The typology of the facilities has obvious consequences in terms of recurrent costs, staffing, rehabilitation needs, and services provided. In areas of difficult access, reliance on local building materials may lead to sub-standard features, with obvious implications for service performance, operating costs and maintenance needs.
- The network ownership mix may have changed substantially during the period of disruption. As the protracted Afghan crisis evolved over time, the old dominance of the public sector gave way to NGOs and private for-profit providers. Frequently, property rights are blurred, entitling different players to claim total or partial ownership over a given facility. Even in situations of clear public ownership, management responsibilities may have been transferred to charities or NGOs, without the backing of corresponding legal agreements.

## Hospitals

These facilities play a preponderant role in most health sectors, in terms of visibility, healthcare delivery model, concentration of resources, influence and power. Despite three decades of effort devoted to promoting PHC and reducing the hospital role, these facilities still represent the largest component (in terms of absorbed resources) of many health sectors.

Hospital size varies across countries. Tertiary hospitals account for many hundreds, even thousands, of beds. First-referral hospitals usually range between 50 and 300

beds. Theory suggests that productivity increases with size. In practice, efficiently managing large hospitals has proven difficult. As a result, it is common to find tertiary hospitals split internally into autonomous units of 200–300 beds. At the other end of the spectrum, hospitals smaller than 80 beds are unlikely to perform efficiently, as some fixed assets, such as the surgical theatre, the laboratory and the power generator, are not fully exploited. Given the management weaknesses commonplace in protracted crises, the downsizing of large derelict hospitals as they are rehabilitated, is in most cases a sensible approach.

The relative weight of hospitals is likely to increase under the effects of a protracted crisis, as peripheral facilities close down and health managers confine their attention to the surviving components of the network. Additionally, the demand for surgical and emergency care expands during a war, thus increasing hospital leverage over decision-makers. The growth of these facilities is fuelled by their capacity in lobbying the government for additional resources, as well as of raising revenues through direct user charges, which can attain a sizeable share of their total financing. Hence, a tertiary hospital – or in the aggregate, the hospital capacity of a major city – may emerge from a crisis substantially larger than it would have been if planned in peaceful times. As these events are not the result of stated policies (which usually emphasize hospital downsizing and PHC promotion), but rather of piecemeal decisions, they can proceed unnoticed until the crisis is over. Thus, documenting certain underlying trends before it is too late to correct them can contribute to alleviation of the distortions a recovering sector will have to tackle in the future.

If large, high-tech urban hospitals can comparatively prosper in turmoil, usually rural first-referral ones suffer badly. As security conditions deteriorate, the most qualified cadres flee and supply lines break down. Key services, such as emergency surgery, cease to be delivered. Given that many aid agencies prefer to support the PHC level, this intermediate level of care may end up as the most neglected one. First-referral facilities may suffer also because of botched decentralization measures, which devolve the responsibility for their financing to local authorities deprived of adequate fund-raising capacity and receiving insufficient allocations from the central government. The underperformance of small hospitals may result in their being bypassed in favour of higher-level facilities for even minor conditions, which may attract additional resources. Thus a vicious circle of resource concentration, inefficiency and inappropriate care ensues.

Some first-referral hospitals, enjoying comparatively better security conditions and blessed by the allocation of extraordinary resources provided by emergency-oriented agencies, may enter into a cycle of disproportionate growth. A single hospital may become the centre of a large web of referral flows, often airlifted, covering immense areas. Charities (particularly those most adept at fundraising in the rich world) sometimes sustain the expansion of these facilities, to create hospitals perhaps fully justified during the conflict, but that look worryingly oversized or misplaced in peacetime. See *True Story No. 14* in this module

In many cases, collecting information about hospitals, which enjoy special status and reputation and are prone to develop according to their own internal logic, is difficult. A two-way blindness may therefore develop, with the managers of these hospitals indifferent to developments taking place in the network at large, whereas the policy discussion, as well as the related information, bypasses these self-secluded facilities.

The relative strength of first-referral facilities in relation to tertiary hospitals evolves unfavourably over time, under the forces just mentioned. The network's pyramidal shape, which implies a larger secondary level to offer easy access to first-referral care, disappears to give way to a sort of hourglass, large at the top and at the bottom, and narrow at the middle. In some cases, the disruption has only exacerbated a pre-existing distortion; outside official documents, the pyramid was never really in place.

In health sectors emerging from a crisis, the first-referral hospital level is frequently the most in need of investment. Given the large number of facilities required to grant first-referral services, the long duration of civil works implied, their relative complexity and high cost, revamping this level of care requires high technical capacity and substantial capital financing. Most NGOs are too small to shoulder the necessary commitments, whereas major donors are usually reluctant to cover hospital investments. Consequently, a recovering health sector can grow distortedly, with an expansive PHC level lacking adequate referral backup.

### **PHC Facilities**

A variety of terms is usually included in this group: health centres, health posts, dispensaries, dressing stations, etc. All first-contact facilities should be considered under this umbrella. In most cases, an official description of the functions to be expected from each category of facility is available. The field situation is regularly more blurred, particularly after years of turmoil.

The largest facilities include basic in-patient capacity to treat acute common diseases, such as serious dehydration, pneumonia and severe malaria. In some countries, these facilities are labelled as hospitals and may be included in the intermediate level of care. Additionally, these large PHC units may have a maternity ward and a basic laboratory. Smaller units provide a much narrower range of services. At the lower end of the spectrum, the “health unit” consists only of a single prescriber with some rudimentary training and some essential drugs, such as chloroquine and acetylsalicylic acid. In some special cases related to migrant or displaced populations, no physical infrastructure may be in place. The “facility” in this case may refer to a site visited more or less regularly by a mobile team based at a larger health unit. Thus, to understand coverage, PHC facilities are better disaggregated into groups by the basic services they provide.

Inside the PHC level, the most important practical distinction remains that between professional services and voluntary ones. Some information systems tend to aggregate the two groups, with misleading results. The peripheral network appears in these cases as disproportionately large, just because village health units have been included. Considerations of investment and recurrent costs, management relationships and content of health care militate for the separate handling of the two groups of PHC services.

By their nature, formal health units operated by professional cadres bound by legal contracts tend to be permanent, heavy, expensive, comparatively high-tech, and hierarchically linked. Even if the health facility closes down in wartime, its physical structure tends to survive. Its staff may move away, but they are likely to practice, to preserve their professional status and to maintain a contractual bond with the health services. On the other hand, the village health post is often a temporary structure hosting a part-time volunteer with only short, rudimentary training. Attrition is high, skill retention is low (particularly when support links break down), supply and reporting erratic. After a protracted crisis, usually few volunteers are found still active. Frequently, the active ones are those working inside formal health units, absorbed into the payroll, having over time acquired a sort of professional status.

### **Referral capacity**

Referral flows are usually poorly documented, not only in disrupted health sectors. In many cases, their spontaneous occurrence is anticipated by planners and by concerned providers. Most information systems do not report on the number and nature of referrals. Insights must be gained from field studies, which suggest that in most instances referral flows involve fewer patients than expected. No study of the referral system in a troubled context has been found in the literature.

Generally, referral does not depend on a structured system, but on a potential interaction between facilities of different technical capacity: potential left to the initiative of practitioners and more often of patients. The presence of barriers and norms to discourage the unnecessary use of higher facilities suggests attempts at disciplining referral flows. However, their enforcement must be checked and their impact verified at facility level. When health care at first-contact facilities is perceived as poor, their bypassing is widespread, even in the presence of norms and barriers.

In protracted crises, security constraints and transport shortages cripple referral flows further. Conversely, the concentration of IDPs in secure areas may increase their access to higher-level care. Lack of referral backup is a constant of disrupted health sectors. Patients choose the health unit they will attend, or have no choice in the first place, regardless of the facility's position in the ideal referral structure. The concomitant reliance of NGOs on PHC approaches whose effectiveness heavily depends on the availability of first-referral capacity only stresses its absence.

Establishing or maintaining a functioning referral mechanism in a war-torn environment can be dangerous, practically difficult and extremely expensive, i.e. it represents a realistic option only for a well-resourced international NGO. Conceiving referral as an essential part of a basic, comprehensive health care package, rather than an optional function, ensures that it is taken into account during the planning of an intervention.

Studying the referral capacity across a whole disrupted sector calls for inquiries with multiple players, like the NGOs involved in direct service delivery. Short of specific information, global indicators related to potential referral capacity include the ratio of PHC units to hospitals, average distances, and proportion of health facilities with vehicles, telephone or radio. Ratios of more than 30 PHC facilities per hospital have been found in several war-affected health sectors.

Indicators to be collected at facility level include: a) the proportion of patients referred in the total caseload, b) for self-referral, the proportion of attended patients living beyond a given distance (5 or 10 kms), or within the district where the hospital is located, and c) the proportion of conditions appropriately attended by a facility of a given level.

Even if difficult to study, referral flows should be understood because of their efficiency and effectiveness implications. Referral functions are usually invoked to justify the privileged resource allocations of higher hospitals. To counter-argue with hard evidence of reduced referral caseloads may strengthen the bargaining position of lower-level facilities. Secondly, the expansion of overcrowded tertiary hospitals in fact attending an excessive proportion of common conditions, without offering significant comparative benefits to these patients, can be discouraged. Thirdly, understanding distorted referral flows is central to effective planning.

### **Support infrastructure**

A functioning health network encompasses buildings not devoted to direct healthcare provision, such as offices for administration, training facilities, warehouses, laboratories, research centres. Once considered together, these structures may constitute very conspicuous assets. Many health information systems, however, do not cover these facilities, which are often overlooked in several aspects: they may be ignored when the capital assets of a health sector are estimated; their maintenance may be neglected to a larger degree than that of healthcare facilities; they may not be included in the estimates of the investment needed to revamp the health sector.

### **Average replacement and rehabilitation costs**

Layouts and features, as well as building costs, of health facilities vary dramatically across countries. Discrepancies in the reported costs (across and within countries) can be reconciled (at least partially) by agreeing upon common approaches to calculating

them. For instance, NGOs can underestimate building costs – such as office, supply, warehousing – which are spread across multiple activities, hence not computed as a direct building cost. Sometimes furniture, equipment and supervision costs are not taken into consideration, significantly decreasing the estimated cost of the facility, or its cost appears low only because several important components – such as waste and sewage, water and electricity supply, fencing and staff housing – have not been included in the calculations.

In many countries, small facilities are built according to one or more standard layout(s), which greatly helps in making cost estimates. When this is not the case, a range of different buildings has to be considered to compute the cost of a certain functional category of facility (such as a health centre). In the case of tertiary hospitals, the variety is greater and no standard is usually available. Each hospital needs a specific appraisal. Resulting costs can diverge quite substantially from one hospital to another.

Given the additional costs incurred when building facilities in remote areas, served by poor roads, huge cost differences exist also within countries. At the end of the war in Mozambique, a facility built in a faraway northern area cost near twice as much as an equivalent one built in the south, near the South African border. Ten years later, with improved roads and supply and support systems in the countryside, the differential had gone down to about 50%. Overheads are proportionally higher in relation to small PHC facilities than to large hospitals.

The cost difference between the building of a new facility and the rehabilitation of an existing one becomes negligible when maintenance has been neglected over a long period of time. As a rule of thumb, after more than a decade without maintenance, the rehabilitation cost approaches the replacement one.

### **Estimating the capital value of the network**

Once a reliable if rough picture of the health network has been assembled, an attempt at assessing its capital value may contribute to the policy discussion. To develop this estimate, existing health facilities must be grouped by physical condition. For some units in good shape, the market value would approach their replacement cost. For other derelict facilities, architects and estate agents can offer rough estimates. Obviously, the needed figures are averages for the most important categories of health units. With these averages, the actual value of the present estate can be computed, and then be disaggregated according to some key dimensions: level of care, rural vs. urban, region, ownership.

Based on the total network value, the annual expenditure called for to maintain it in the present physical condition can be easily derived, considering that maintenance costs are usually in the order of 1–2% of the capital value and the replacement investment needed is estimated at 2–4%, depending on the expected useful life of a facility.

The next interesting step might be to estimate the additional investment required to upgrade the present whole network to optimal functioning, without adding or expanding facilities. A further step relates to estimating the investment needed to address the main existing distortions, such as the scarcity of first-referral services, or increasing the coverage of certain under-offered basic services. These computations can influence policy makers, highlighting the (usually underestimated) funding demands of the network and providing a measure of realism to the debate about reconstruction. The lack of such a comprehensive costing exercise, and the ensuing long-term under-resourcing, may have contributed to the defective outcomes of certain reconstruction processes, as witnessed in Cambodia (see *Annex 12* for details).

## Planning the recovery of the healthcare network

Planning may be as disrupted, fragmented and ineffective as other management systems, because of different funding lines, poor information base, players proceeding in isolation, special implementation units, questionable and misinformed donor priorities, etc. The aggregate, information-intensive, top-down, long-term, “rational” nature of classical planning looks out of place in protracted crises. Nonetheless, precisely because of the dramatic changes the disruption inevitably induces in the network structure, the comprehensive planning of its recovery is paramount.

In the contested political environment of a complex emergency, “rational” plans stand a chance of being implemented only when they recognize the political interests of the main parties and offer solutions that look acceptable to most of them. Given the fragmentation of decision making, the pursuit of strict planning coherence (or of the all-out victory of a favoured approach over alternative ones) is likely to elude planners, as dissatisfied actors will opt to implement their preferred programmes in isolation and possibly in open contradiction of the options adopted as “national plans”.

Realistic planning tries to set broad achievable goals endorsed by most implementers, works hard to inspire decision-makers so that most decisions are consistent with the chosen plans, and advocates strongly, and with supporting arguments, against the few key initiatives capable of distorting the whole sector to such a degree as to void the original plans of meaning. An outcome fulfilling a large proportion of the original goals should be considered as successful even in the presence of some major departures from the initial plans.

The detailed inventory of the whole network is often invoked as a precondition for the drawing of a sound reconstruction plan. However, particularly in the case of large countries, this approach is neither efficient nor desirable. In fact, the time lag passing from the infrastructural survey and the start of the actual civil works can become very long, in this way making the collected data outdated, hence useless. Phasing the rehabilitation process into planning clusters or segments is in many situations a sensible option. First, summary information should be collected about the physical condition of all accessible facilities, so as to identify a priority group for intervention, along the lines sketched in *Annex 9*. Rough criteria for prioritizing may include the existence of large populations without services, security concerns, the availability of detailed studies, ease of access, the existence of reliable contractors, etc. During the intervention on this first batch, a detailed structural study of a second batch of facilities can be carried out and adequate financing can be secured. A third batch will be surveyed while the interventions on the second batch are carried out, and so on.

The **most frequent planning flaws** are discussed below, together with suggested approaches to avoid or minimize them (*in italics*).

**Selective planning.** Sometimes, the constraint is self-inflicted, by planning a part of the health sector detached from the rest, as in the case of a special programme backing the strengthening of its target services, in isolation from the facilities where they will be hosted. Fresh distortions and inefficiencies are therefore added to old ones. Planning a single level of care, such as only PHC facilities or tertiary hospital(s), is frequent, due to discrete funding lines, negotiated piecemeal. Another common flaw is planning the public component of the healthcare delivery system, while ignoring – and in some cases competing with – private providers. See *True Story No 14* in *Module 8*.

Also, human resources may evolve disconnected from network development, with serious long-term implications, difficult to correct. No balance among components or respect for resource constraints can be anticipated when this planning approach prevails. Given the propensity of tertiary hospitals for unplanned growth, failure to fix explicit ceilings for them is particularly dangerous. *Area-based plans, encompassing the whole network, elaborated within a single overarching resource constraint, may*

*offer several advantages in terms of balance, internal distribution of resources, equity, long-term sustainability, and operational convenience.*

**Escapist planning.** Plans may cover uncontroversial areas, such as the rural PHC, areas where reaching consensus among stakeholders is fairly easy, while leaving apart (“to be planned later” or “needing further studies”) problematic areas, such as urban health care, which are nearer to the interests of powerful groups. Nonetheless, in countries where the majority of population is urban and urban facilities are derelict, as in the case of Angola, towns will attract the bulk of future investments, whether planned or not. *To address urban healthcare provision by developing an explicit planning model that balances rational criteria with urban power games and vested interests may offer room for acceptable trade-offs.*

**Patchwork planning.** Bottom-up, piecemeal financing, fed by disparate funding sources, invariably results in grossly underserved areas, because of unfulfilled pledges, internal reallocations to cover escalating costs and/or wrong projections. *Developing an overall investment framework may help, provided its composition is adequately defined and disaggregated by province and level of care. The degree of detail must allow managers to check whether discrete investment interventions are consistent with the total framework. Additionally, an investment basket fund helps to consolidate initiatives and to encourage internal competition (provided this is fair, transparent and policy-based). Putting aside a buffer fund helps minimize the unforeseen shocks typical of external funding.*

**Need-driven planning.** Uncapped by resource constraints, plans may evolve in directions totally detached from reality. Given the objective difficulty of forecasting the financial position of a new country or of one emerging from prolonged turmoil, blind planning is often recognizable. When the discrepancy between plans and resources surfaces, decision-makers may spread the latter too thinly across too many targets, with uniform but severe under-resourcing. Conversely, if insufficient resources are concentrated on a sub-set of the network, gross imbalances result. *Serious plans must be obsessively linked to available resources. When forecasts prove over-optimistic, available funding ends up fatally reallocated to cover the investments already under way. Because of this risk, it is prudent to start investments in the areas of the country that are the most neglected and offer the highest returns. If no macroeconomic forecast is available, setting prudent goals is the best option. Indeed, most planning failures are due to over-ambitious goals. The opposite mistake is rarer.*

**Aid-induced planning.** Because of the availability of donor funding, expansive plans can be formulated while the long-term macroeconomic outlook is contractive. In war-affected countries, the common perception of an aid-induced bonanza, waiting to be unleashed as soon as a peace settlement is reached, tends to distort the assessments of health officials. Calls for modest recovery plans are ignored. High-tech policy options hold a particularly strong appeal to local decision-makers. In some cases, an opposite phenomenon is recognizable. Disappointed by misconceived investments in previous recovery processes, donors may refuse to provide the capital needed to revamp a derelict health network, even in the case of investments recommended by solid arguments. The excessive focus on hospitals in the past may give place to their present neglect.

Disrupted economies are likely to present an expansive outburst after the end of the crisis, only to decelerate a few years afterwards. This is precisely when most facilities resulting from reconstruction start functioning. *Spreading available aid over longer planning cycles may minimize this mismatch.*

**One-size-fits-all planning.** Too often health facilities are planned according to fixed ratios (such as one health centre for 10,000 or 20,000 population), without taking into account the spatial distribution of the potential users of the services, or the different patterns of health service delivery needed in urban and rural settings. The mechanical

application of a fixed criterion may lead to disastrous mistakes when IDPs are included in the target population. After the end of the conflict, the resettlement of IDPs leaves in its wake a host of unneeded or oversized health facilities. *Different settling patterns call for correspondingly different health-planning criteria. Where the population is concentrated, fairly large health facilities may provide a comprehensive package of services at acceptable cost, hence adequate returns on investment. At the other end of the density spectrum, health service delivery cannot rely on heavy infrastructure, but rather on a mix of small but numerous health facilities, multi-purpose (mainly female) health professionals, outreach activities and community health workers. The cost of delivering a minimal package of services to dispersed populations is high, a fact to be taken into account during the budgeting process.*

**Conservative planning.** In some health sectors, the standard typology and the functional features of health facilities are shaped by an entrenched tradition. Meanwhile, during a protracted conflict, previously popular service delivery models may have been revised or abandoned due to shortcomings identified by practice in the field. The war-affected health sector may have lost touch with the evolving international policy debate, remaining attached to old models. A case in point is the over-reliance on Alma Ata-inspired, classic CHWs, despite the increasing international awareness of their limitations and the ensuing reduction of the role assigned to them. Policy proposals formulated in Afghanistan and Southern Sudan seem to assign to CHWs critical roles, reminiscent of bygone times.

Alternatively, new facilities may be built or old ones rehabilitated according to established concepts, even when the health problems to be addressed by the health services have changed to such a degree that facilities of a different nature are called for. For instance, in countries with high prevalence of HIV/AIDS, the demand for inpatient care at PHC level increases, particularly in situations where hospitals are few and far apart. *Ways to make basic inpatient care accessible to the largest number of AIDS sufferers should be explored. In rural areas, where the day-hospital model is clearly not a viable option, the multiplication of health centres with basic laboratory, a skilled practitioner, adequate nursing capacity and upgraded drug supply may be worth considering.*

**Aesthetic planning.** Elegant conceptual constructions may capture the imagination of planners, shielding them from political and financial constraints. Brilliant planning documents result from strenuous efforts, in most cases taking place in increasing isolation from field realities. Affordability and feasibility concerns, if affecting the compelling logic of the chosen plans, are downplayed. No bargain with quarters likely to be hurt by the emerging plans is sought. Compromises are rejected as alien to the pursued models. Obstacles are not anticipated. Such immaculate plans stand little chance of being successfully implemented. *Recognizing the political and economic space within which plans have to be implemented is the first step to be taken at the start of the planning process. Meeting with possible opponents helps to understand their concerns, to gauge the degree of resistance likely to be induced, and to adjust plans accordingly. Resourcing the chosen plans adequately (which usually means more generously than originally envisaged) avoids implementation delays and stops, as well as the frustration of participants, thus reducing the chances that plans are opposed, abandoned and forgotten. Staying in touch with field operations fosters useful alliances and reduces the likelihood of conceiving unrealistic plans. Incorporating trade-offs, even if they affect the conceptual integrity of the original plans, may remove otherwise insurmountable obstacles.*

## Recommended Reading

Barnum H, Kutzin J (1993). ***Public hospitals in developing countries: resource use, cost, financing***. Baltimore, Johns Hopkins University Press. Available online at: <http://go.worldbank.org/AJN22SAOK1>.

A classic book, concerned with “a) the allocation of health sector resources between hospitals and nonhospital alternatives, b) the internal efficiency of hospital operations, and c) effective and equitable cost-recovery policies for hospitals”. Well-researched and comprehensive, it studies hospitals within a broader public health framework, and explores ways to strengthen health systems by reallocating resources and integrating hospitals and nonhospital services. The book does not specifically deal with distressed health sectors. Nevertheless, the reader will find in it a wealth of insights, international comparisons, policy options and analytical techniques, useful to approach hospital and nonhospital issues also in violence-affected contexts.

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## Annex 9 Why and how to build a database of health facilities

In many health sectors (not only the war-torn ones), the information available at central level is incomplete, inconsistent and outdated; facts which seriously undermine its usefulness. Cross-checking and consolidating this information is difficult, because it comes from the field as totals aggregated to different degrees, hence impossible to match. Most information is collected according to functional areas, such as personnel or service outputs or available equipment. This set-up makes the assembling of a comprehensive picture of a given facility cumbersome (as many data need to be brought together from different sources and departments) and in some cases impossible. As the main production unit of health services is, at least at PHC level, the health facility, this drawback may reduce substantially the insights to be gained from the gathered data.

Looking at the health sector as a network of health facilities (rather than as a set of programmes) is particularly meaningful in a redistributive perspective. Investment decisions, both in infrastructure and in human resources, take natural precedence over other allocative decisions, which are conditioned today by the investments decided years ago.

An approach to overcome the inadequacy of the available information is to build a nominal database of health facilities. It should be an instrument that guides decision-makers and planners in global decisions, such as: “How many PHC facilities should be rehabilitated in region X in the next Y years?” or “Which are the main geographical imbalances in the PHC network to be addressed if we have enough resources?” or “Which proportion of functioning health centres don’t deliver the expected health care?”.

The proposed database does not replace the specific information needed by special programmes for their detailed planning. Rather, it is a summary tool that brings together data usually collected and kept by different departments. The information contained in the database has to be linked with that coming from other sources (population, financing, other resources, activities, etc.) to be used in a rational way.

The information contained in the database should have the following features:

- It must be regularly updated. Given the fast pace of change at field level, figures should be updated at least annually.
- Included should be key variables relevant to planning purposes, easy to standardize and to collect, providing summary information, but specific enough to characterize the health facilities in terms of their functions (therefore, containing information on relevant resources allocated to each facility).
- It must reach a good level of coverage at country level.

As improving the completeness and quality of the database is a collective effort, the main partners should be involved in advance, through regular meetings at which the status of data collection is presented and the main information gaps are discussed. It must be stressed to all partners that the investment in creating and maintaining the database is worthwhile only if continuity is ensured.

The chosen approach will depend to some extent on the country’s physical characteristics: size, distances, road conditions, natural obstacles, etc., and on the size of the health network. Clearly, the building of an updated and fairly detailed database in Timor-Leste can be largely managed directly from the MoH office, whereas the delegation of fieldwork to formal or informal collaborators is mandatory in large countries such as Afghanistan and Sudan.

### Steps

1. The process is iterative, starting with an initial database and improving its coverage and quality by successive data collection, addition and validation

rounds. In many instances, lists of health facilities with some features attached, such as category, number of beds, etc. are already available, compiled by some bodies (government, UN agencies, coordination forums, relief agencies). The most comprehensive and apparently accurate among the existing lists, which are all likely to be either incomplete, outdated or inadequate, can be strengthened by patient cross-checking with the others to provide an acceptable starting point.

2. The first phase of building the database entails a proportion of exploration and experimentation of the many options likely to be available. Obviously, the routine information systems (general, and those maintained by special programmes) should be exploited to the maximum extent. Some variables can be tentatively added to the database, and subsequently modified or discarded, according to experience. It is unlikely that all the desirable variables will be fed by routine information systems. Therefore, the eventual database will include a mixture of data collected at central level from routine reports and others supplied (upon request) by field authorities, or – in most cases – by field operators.
3. The choice of the database electronic support is important. To make experimentation easy, the use of a spreadsheet with which many potential collaborators are familiar should be considered in the initial phase. The database facility included in state-of-the-art spreadsheets is often overlooked, but it is quite powerful. Tailored database software could be considered for a second phase, when the structure is stabilized. If this is the option chosen, care is needed in ensuring a smooth conversion.
4. Once a preliminary database has been assembled by importing the pieces already available, and tentative definitions formulated for the variables, a few checks are needed:
  - The reliability of the figures collected can be verified during field trips (a very uneven situation can be anticipated in this first sample).
  - Some collaborating NGOs can be asked to field test the database in their areas, feeding back to the database administrators their findings, such as the time needed for data collection, ambiguities in definitions used, and usefulness of the options.
  - Based on the results of the field test, the structure and definitions of the database can be reviewed. Another round of checks is recommended at this point.
5. Once the experimentation phase is over and the database structure is considered acceptable, some formalization of tasks and responsibilities is in order: where the master database is maintained and who has the overall responsibility for it need to be decided. Further decisions have to be made on the procedures for updating, consolidating and disseminating the available information.
6. The consolidation phase can start once the database structure, its electronic format and the routine updating procedures have been finalized. Copies of the database (or relevant parts of it) should be circulated to all partners, with the request to check the information and update it. Surveys and field missions offer a good low-cost opportunity for improving the database.
7. If a continuous and incremental process of validation and updating of the database does not attain satisfactory results, the alternative of a nationwide survey can be considered. This is a costly and time-consuming exercise, requiring preparation, development and testing of tools, training of tens/hundreds surveyors, strong logistic means, supervision and quality control. It can provide more precise information than the first option (if the survey is properly designed and high standards are maintained), but the need for updating and maintaining the

database remains the same. As it is usually impossible to repeat a major field survey frequently, the obtained results are likely to become quickly outdated.

Below, an annotated menu of the variables to be included in the database is offered for consideration. Obviously, it would be desirable to include many more interesting variables, or to maintain a higher degree of disaggregation. The proposed variables represent a trade-off between simplicity and operational convenience on the one hand and completeness on the other. Indeed, even collecting this reduced dataset will prove a tough proposition. Some very important figures, such as healthcare activities (inpatient days, outpatient contacts, attended deliveries, etc.) are not included in the menu, despite their extraordinary value, because of their unavailability and unreliability in most situations, at least at central level. When updated and reliable information of this nature is in fact available, such performance is hardly typical of a “disrupted” health sector.

Starting with a small and manageable dataset and adding variables incrementally, keeping in mind that central decisions are by their nature aggregate, thus needing summary information, is advisable. The same sort of database, maintained at provincial/regional/state level, can and must be richer in detail and further disaggregated. The proposed database is a stop-gap tool, useful until a revamped information system is put in place. This could provide the desired richness of data to manage health services with a high degree of knowledge. The experience provided by designing and operating the summary database will prove precious in conceiving a more ambitious information system.

#### **Variables to be considered for inclusion in a database of health facilities**

Variable	Options	Remarks
Name of the Facility		Beware of misspelling, so as to minimize double entries.
District or equivalent		
Province or equivalent		
Geographic Position		Geographical coordinates provided by GPS.
Status	Operating / Closed	Work out a practical definition of "operating".
Category		Nominal/official, to be compared with the functional one, to be inferred looking at the other variables. The database might include offices, warehouses, training facilities, etc.
Population served		Reliable figures are difficult to obtain. Could be expressed as a range between higher and lower estimates. In terms of physical planning, pre-disruption population data might be more relevant than recent data, heavily influenced by temporary population movements and opportunistic estimates.
Supported by NGO?	No / Yes - Name of the NGO(s)	When several NGOs provide support to the same facility, the most important one should head the list.
Total number of beds		Refer to beds actually existing / functioning / being utilized, and not to the theoretical number of beds.
No. of maternity beds		Optional.

Variable	Options	Remarks
Deliveries with trained midwives in attendance?	Yes / No	"Trained" should mean a professional health worker.
Functioning laboratory?	Yes / No	For each of these variables, a clear operational definition must be formulated.
Functioning EPI fridge?	Yes / No	
Functioning vehicle?	Yes / No	
Functioning motorbike?	Yes / No	
Functioning pharmacy?	Yes / No	
Functioning surgical theatre?	Yes / No	
Functioning X-ray apparatus?	Yes / No	
Water supply?	Pipe / Well / Borehole / Superficial / None	
Toilets / latrines?	Usable / Unusable	
Telephone / radio equipment?	Available 24 hrs / part of the day / None	
Electricity?	24 hours from mains / Generator / Solar panels / None	
Physical condition	New Building/ Totally Rehabilitated/ Partially Rehabilitated/New Extension/Old, Acceptable/Old, Derelict	
Ownership	Government Private For-Profit/ Private Not-for Profit / Firm	The ownership status may be in some cases ambiguous, with shared rights and responsibilities. If legislation is not explicit, an operational criterion, such as one related to the "main owner", is needed.
No. of university-level staff		Staff should be aggregated according to salary levels. Only staff actually active should be counted. Part-time staff could be translated into full-time equivalent.
No. of mid-level staff		
No. of low-level staff		
No. of unskilled staff		
No. of community health workers		If the CHW programme is substantive in size and scope, CHWs should be distinguished between those working at the health facility and those active at village level, but supported by the health facility. In many cases, information is available only for CHWs working at the health facility.

Variable	Options	Remarks
Main referral unit?	Name of the unit	
	Distance of the unit	Using travel time (by vehicle) instead of kms could be more informative in areas with very poor roads.
Date of the last update		
Key qualitative remarks		

### Additional information about hospitals

The summary database sketched above provides decision-makers and planners with a map of the health network. Broad allocative decisions can be taken straight away with the information made available by such a database. Specific components of the network will need further study, due to their cost implications, the variety of facilities they encompass, and the specific functions assigned to them. Hospitals, training institutions, offices and warehouses, all deserve the collection of additional, dedicated information.

In most health sectors, hospitals are limited in number but heterogeneous in features. Averaging them would mask important pieces of information. Informants often hold detailed knowledge of hospital characteristics. Given the conditions mentioned, the assembling of a portfolio of summary descriptions of each hospital is well worth the effort needed. To the baseline information included in the general database, specific variables related to inpatient activities must be added. Additionally, a rough appraisal of the health care provided can be attempted. Prospects for hospital development and subsequent resource implications complete the picture. When good informants are available, such a portfolio can be completed quickly and at low cost. Field visits can later validate and update findings.

The hospital portfolio may need to be diversified into two further groups, composed of:

- a. tertiary hospitals, usually few and complex, thus demanding elaborated descriptions, and
- b. first-referral hospitals, with a capacity of 50–200 beds and providing only basic curative care. Their main features can be adequately captured by a standard summary datasheet. Given that this subset of hospitals is in most cases badly affected by conflict, their recovery (functional and structural) demands special effort. A reliable portfolio can therefore be of special value, particularly at the beginning of a recovery process.