ASSESSING THE CURRENT SITUATION

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At its core, HWF planning consists in forecasting the evolution in the supply of and in the demand for healthcare services, the two main drivers of the healthcare market in any of its possible forms: a decentralized and free market; a government-sponsored insured market with both private and public-run hospitals; or a centrally planned national healthcare system. A more comprehensive analysis would also factor in the skills of the workforce, their geographical distribution, the impact of technological progress, the epidemiological needs of the population or the kind of services provided, but the underpinnings of sound HWF planning is a credible and reliable forecast.

Healthcare workforce forecast models function by projecting supply, demand, or both. To determine the evolution of supply, the initial stock of physicians, nurses, or any other health care professional is considered. The current health workforce is then updated according to the evolution of the factors known to affect it, like changes in the mortality and retirement rates, migration flows, medical school intakes, etc. Forecasting demand is arguably more complex, mostly due to a higher uncertainty over the estimate of the underlying parameters. Common economic factors like the evolution of demography, income or the GDP growth rate influence the demand for healthcare services, but epidemiological factors, or needs, also play a major role[84]. How all these factors evolve and the interactions within the system will then be used to obtain an estimate of future supply and demand, so that a gap analysis between the two forces of the market can be conducted.

Ideally, the starting point of HWF forecasting would be to assess the present situation by performing a gap analysis of the de facto supply and demand in order to find current imbalances, as these imbalances profoundly influence the outcome of the projections. In fact, the World Health Report 2006: Working together for health estimates that 57 countries, developing and developed, already face an absolute shortage of 2.3 million physicians, nurses and midwives[85]. Estimates for 2015 point to a dramatic shortage of physicians in the WHO African region alone[86]. On a global scale, WHO estimates that at

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(84)   Birch, S., Sutton, M., Mason, T., & Whittaker, W. (2013). *Not enough doctors or not enough needs? Refocusing health workforce planning from providers and services to populations and needs* (pp. 1–22).

(85)   *The world health report 2006: working together for health*. Geneva: WHO; 2006.

(86)   Scheffler RM, Liu JX, Kinfu Y, Dal Poz MR. (2008). *Forecasting the global shortage of physicians: an economic- and needs-based approach*. Bull World Health Organ.;86(7):516-523B. PubMed PMID: 18670663; PubMed Central PMCID: PMC2647492.

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least 15% more doctors are needed[87].

Imbalances in the health workforce

From an economic perspective, an imbalance occurs when the quantity of a given skill supplied by the present workforce at a given market or government-stipulated price is insufficient to attend to the quantity demanded by patients. Such imbalance is in fact a disequilibrium between the demand for and supply of labour in the health market.
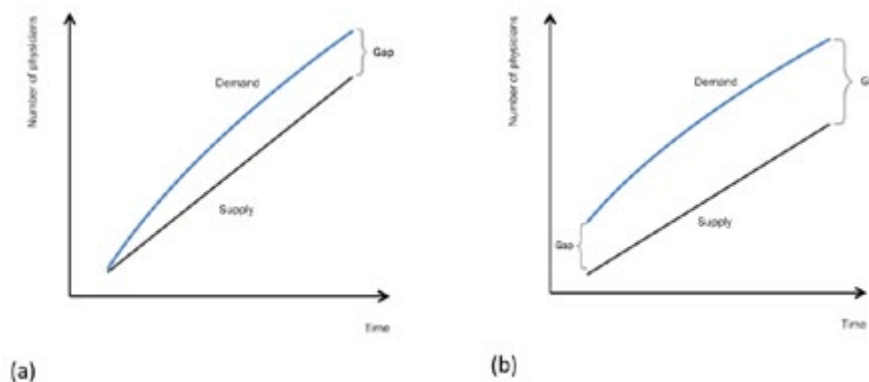
Crisp, N., & Chen, L. (2014). Global Supply of Health Professionals. N Engl J Med, 370(10), 950-957. doi:doi: 10.1056/NEJMra1111610

Alternatively, imbalances may also be measured by value judgment or professional determination by experts in the field, extending the economic definition of demand effectively observed or measured with the perceived biological needs of the population that ought to be attended to[88]. Such normative stance is usually not bounded by any budget constraint of either the individual agent, the insurance company or of the national healthcare system, as the objective is to pinpoint the "unmet care needs".

The cost of ignoring initial imbalances

Evidence in several countries suggests that some are already in the presence of shortages or surpluses, but despite this growing concern, few HWF planning models actually

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(87)   Crisp, N., & Chen, L. (2014). *Global Supply of Health Professionals. N Engl J Med*, 370(10), 950–957. doi:doi: 10.1056/NEJMra1111610

(88)   Zurn, P., Dal Poz, M. R., Stilwell, B., & Adams, O. (2004). *Imbalance in the health workforce*. Human Resources for Health, 2(1), 13. doi:10.1186/1478-4491-2-13

consider the presence and magnitude of these imbalances[89]. Instead, most models assume that the market is in equilibrium, i.e., there is no shortage or surplus of health human resources, and depart from there, which will affect the estimated gap both in the baseline year and throughout the projection period. Some models perform the forecasting so as to guarantee that current worker-to-population ratios are maintained; other models assume that demand, indirectly measured through the current levels of utilisation, will stay constant, providing no statement or assessment whether such levels of utilisation already satisfy all the needs of the population.

Regardless of the method applied, the key point is to identify current labour shortages or surpluses in the health market, as they may have a considerable impact in the welfare of the population. A surplus in the supply of medical professionals is known to lead to economic inefficiencies, misallocated resources, unemployment, inflated costs or supply-induced demand. Conversely, a labour shortage may result in lower quantity and quality of medical care; work overload of the available physicians and nurses, which may cause sleep-deprived professionals and expensive overtime wages; or queues and waiting lists[90]. All these anomalies in the health labour market may, in the end, compromise patient safety[91] and even lead to avoidable patient deaths[92].

SHORTAGE	SURPLUS
- LOWER QUANTITY AND QUALITY OF MEDICAL CARE - WORK OVERLOAD WHICH MAY RESULT IN SLEEP-DEPRIVED PHYSICIANS AND NURSES - INCREASED MEDICAL COSTS DUE TO RAMPANT WAGES - QUEUES AND WAITING LISTS - PATIENT SAFETY IN JEOPARDY WITH POTENTIAL PATIENT DEATHS	- ECONOMIC INEFFICIENCIES AND MISALLOCATED RESOURCES - UNEMPLOYMENT - INCREASED EDUCATION COSTS - SUPPLY-INDUCED DEMAND TO COMPENSATE FOR POTENTIALLY LOWER PRICES AND WAGES

The cost of not tackling imbalances.

Contrarily to a competitive market where supply and demand tend to adjust to

(89)   Ono, T., Schoenstein, M., &Lafortune, G. (2013). Health Workforce Planning in OECD Countries (Vol. 62). doi:10.1787/5k44t787zcwb-en

(90)   Amorim Lopes, M.; S. Almeida, A.; Almada-Lobo, B. (2014). Handling health care workforce planning with care: where do we stand?. Journal of Human Resources for Health (publication pending).

(91)   Williamson, A.M., Feyer, A.-M.: Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. Occupational and Environmental Medicine 57(10), 649–655 (2000)

(92)   Steinbrook, R. Private Health Care in Canada. N Engl J Med 354(16), 1661–1664 (2014)

equilibrium, with prices and wages adjusting accordingly and the market clearing, **the healthcare sector exhibits rigidities** that may preclude immediate or complete adjustment[93]. For instance, institutional and regulatory arrangements and government-fixed prices may prevent automatic price and wage adjustment, implying sticky prices; imperfect market competition under the form of monopsony, as in some countries hospitals are the single buyer of healthcare services, although empirical evidence is mixed and does not fully sustain this hypothesis[94][95]; monopoly power of the health providers and labour unions, especially physicians, may restrict supply and impose price-fixing[96][97]; access to universities severely conditioned by numerusclausus controlled by the government; long and demanding licensure processes that create a delay in the time required to educate physicians; etc., may all prevent self-adjustment. Under these circumstances, where the market is subject to a considerable amount of intervention and rigidities, and therefore unable to adjust automatically, **imbalances are static**, requiring further intervention to promote the adjustment.

- *Institutional and regulatory arrangements preventing price and wage adjustment (sticky prices);*

- *Market concentration in the hospitals (monopsony);*

- *Monopoly power of health providers and labour unions;*

- *Government-fixed numerusclausus restricting access to medical universities;*

- *Long and demanding licensures that create a delay in formation of new professionals.*

Potential cases when the market may be unable to self-correct for shortages or surpluses of health resources.

Considering this, it is of paramount importance to effectively **monitor the current situation and identify any imbalances** that may condition the forecasting, so as to

(93)   Mavromaras, K.; Healy, J.; Richardson, S; Sloane, P.; Wei, Z.; Zhu, R. (2013). *A System for Monitoring Shortages and Surpluses in the Market for Skills*. National Institute of Labor Studies, Australia.

(94)   Staiger, D.; Spetz, J.; S. Phibbs, C. (2010). *Is There Monopsony in the Labor Market? Evidence from a Natural Experiment*. Journal of Labor Economics, University of Chicago Press, vol. 28(2), pages 211-236, 04.

(95)   Feldman R, Wholey D. *Do HMOs have monopsony power?* Int J Health Care Finance Econ. 2001 Mar;1(1):7-22. PubMed PMID: 14626004.

(96)   Seldon, Barry J.; Jung, C.; Cavazos, R. (1998). *Market Power Among Physicians in the U.S., 1983-1991*. Quarterly Review of Economics and Finance, Vol. 38, No. 4.

(97)   Mossé P., Tschobanian, R. (1999). *France: The restructuring of employment relations in the public services*. In Public service employment relations in Europe: Transformation, mordernization or inertia?London: Routlege; pp. 130-163.

include it in the analysis. Failure to do so may give origin to valid but useless projections, as they will tend to perpetuate current imbalances. The latest report from OECD on HWF planning stresses this point as a necessary condition, although not sufficient, to obtain useful forecasting models.

Typologies of imbalances

Imbalances may occur at several levels and are more complex than a simple mismatch in the number of professionals. To this purpose, several categories should be considered:

1. *Profession/specialty imbalances cover disproportions between different professions, like physicians and nurses, but may also expose shortages of a particular type of specialist;*
....

2. *Geographical imbalances reveal asymmetries between cities, regions or states, with urban-centres usually benefiting from a significantly larger workforce than the countryside. In average, the headcount may seem appropriate, but without a fine-grained analysis of the distribution of professionals, some regions may end up with an excess of human resources while others strive to fill vacancies;*
....

3. *Institutional and services imbalances reflect the differences in the endowments of health care facilities and services, with separate health service units providing disparate quality of service;*
....

4. *Public/private imbalances may assist in revealing divergences in the allocation of professionals between the private and public sector, a phenomenon ever more common in mixed economies. With disparaging wages between the two sectors, health labour tends to flow to the sector capable of providing higher wages, creating a potential deficit in the other sector;*
....

5. *Gender imbalances relate to disparities in the male/female distribution of the workforce, which may be a fundamental criterion in countries where the human sex ratios differ considerably.*
....

Measuring imbalances in the health workforce

If labour shortages or surpluses are a critical determinant to the accuracy of HWF planning, the question of how to measure these imbalances then arises. Theoretically, such exercise should be straightforward. In practice, there is no single indicator capable of providing an instant snapshot of the health market, and so several proxies have to be used and weighted against each other to achieve an estimate of the current gap.

Some countries analyse current imbalances by incorporating data on the available vacancies for physicians in the hospital sector6. Others consider also the distribution of general practitioners in rural areas, anticipating a potential imbalance in the geographical distribution6. Alternatively, a survey of the main healthcare providers, hospitals, private-run clinics and long-term care facilities, was undertaken in order to obtain information on potential difficulties in recruiting physicians or nurses.

In other specific studies, current demand for a given speciality is estimated using three indicators[98]:

1. *Increase in office visits in previous years;*
   ....

2. *Waiting times in comparison to other specialties;*
   ....

3. *Health Maintenance Organizations (HMOs) benchmark on the future requirements for that particular specialty. Also, benchmarking the current situation against a needs-based estimate is also common practice in models where present imbalances are accounted for.*
   ....

> *In fact, the combination of which indicators to use will mostly depend on the typology of the market and the type of healthcare system.*

In fact, the combination of which indicators to use will mostly depend on the typology of the market and the type of healthcare system.

Countries with a large private sector can use **economic indicators** like real wage rates and rates of return of the market as signs of abundance or scarcity. Highly paid specialties may signal a small supply and, therefore, the lack of market-driven competition; on

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(98)   Rizza, R.; Vigersky, R.; Rodbard, H.; Ladenson P.; Young, W.; Surks, M.; Kahn, R.; Hogan, P. (2003). *A model to determine workforce needs for endocrinologists in the United States until 2020.* J ClinEndocrinolMetab. 88:1979-1987.

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the other hand, low wages combined with high unemployment rates may suggest an excess of that specific profession given current demand. Complementarily, **operational indicators** obtained from hospital units and other health facilities may also provide insightful information. Unfilled vacancies, waiting lists, surveys to the hospital board of management, hours of overtime work, etc., are all suggestive of a mismatch in the health labour market. Additionally, simple **benchmarks between regions or countries** using physicians and nurses to population ratios may also be used, although this a very unreliable comparison, as experience suggests[99].

In *Table 3* we provide a list of the economic and operational indicators, along with the advantages and disadvantages of each approach. They are a critical asset to uncover potential imbalances, but complications may arise when using multiple indicators[100]. For instance, two indicators may exhibit negative correlations between them, yielding conflicting conclusions. Furthermore, the same indicator may present negative autocorrelations between observations in different moments in time, complicating its interpretation. Finally, indicators may also be changing as a response to cyclical adjustments or a temporary peak in demand, and as a result it may not correctly portray the structural trend in the long term.

In the end, these indicators do not provide a definite answer to the problem, but rather a building block on the likelihood of a shortage or a surplus to exist. Continuous monitoring and calibration may enhance the quality of the assessment. In fact, the repeated incidence may in fact suggest a distortion in the market, originating more robust results. Consider, for instance, a country where the following is observed at the same time in the health sector: rising wages; low unemployment; high or persistent vacancies; increasing use of overtime work; increasing use of temporary workers; waiting lists; increasing use of non-traditional workers (retirees, foreign doctors, etc.). These relevant indicators are highly suggestive of a shortage[101].

It is also worth noting that there is a positive correlation between health professionals density and positive health status and outcomes[102]. Such empirical evidence helps

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(99)   Bloor, K.; Maynard, A. (2003). *Approaches to human resources in health: an international comparative review.* Canadian Health Services Research Foundation, 1–34.

(100)   Veneri, C M. (1999). *Can occupational labor shortages be identified using available data?,* Monthly Labor Review 122(3): 15-21.

(101)   Richardson, S. (2009) *What is a skill shortage?,* Australian Bulletin of Labour 35(1): 326-354.

(102)   Joint Learning Initiative, Human Resources for Health, 29–32.

to support the proposition that a shortage and a surplus have different degrees of importance, as we have already stressed in the beginning of this chapter. In this sense, if an exact balance is difficult or impossible to attain, it is better to err on the side of caution and have a skilled and available workforce to attend to the needs of the population at any time rather than a shortage of health professionals. That is even more so in the extreme case of pandemics, where all the assistance from healthcare professionals is critical.

INDICATORS	ADVANTAGES	DISADVANTAGES

I. Economic indicators

OCCUPATIONAL UNEMPLOYMENT RATE	ALMOST ALL COUNTRIES COLLECT EMPLOYMENT AND UNEMPLOYMENT STATISTICS.	DOES NOT DISCLOSE THE SPECIALTY.
GROWTH OF THE WORKFORCE (VS POPULATION GROWTH)	CAN BE APPLIED TO ANY HEALTH PROFESSION AND HEALTH SYSTEM.	DIFFICULT TO ASSESS IF THE GROWTH OF THE WORKFORCE IS A RESPONSE TO A PREVIOUS SHORTAGE.
REAL WAGE RATE	EASY TO OBTAIN FOR STATE-RUN HEALTHCARE SYSTEMS.	ONLY USEFUL FOR COMPETITIVE MARKETS WITHOUT PRICE FIXING; PRIVATE HOSPITALS WILL BE RELUCTANT TO SHARE CRITICAL BUSINESS INFORMATION.
RATE OF RETURN	PROVIDES INFORMATION ABOUT THE NUMBER OF SUPPLIERS AND THE COMPETITIVENESS OF THE MARKET; MAY ALSO BE USED TO COMPARE RELATIVE WAGE DIFFERENTIALS WITH OTHER LABOUR MARKETS.	HARD TO CALCULATE AND TO CONVERT INTO NUMBER OF PERSONNEL.

II. Operational indicators

VACANCIES (UNFILLED POSITIONS)	EASY TO MEASURE; WIDELY USED.	INFORMATION MAY NOT BE AVAILABLE FOR PRIVATE PRACTITIONERS.
WAITING LISTS	EASY TO MEASURE.	DIFFICULT TO CONVERT INTO SUPPLY NUMBERS.

OVERTIME WORK	EASY TO MEASURE AND QUANTIFY.	MAY BE A RESPONSE TO A SPIKE IN DEMAND; IT MAY REFLECT A DELIBERATE POLICY; UNDERSTANDING WHETHER IT IS A CONTINUOUS PRACTICE IS REQUIRED.
TURNOVER RATE	EASY TO MEASURE.	TURNOVER MAY DEPEND ON OTHER FACTORS OTHER THAN LACK OR ABUNDANCE OF PROFESSIONALS.
TEMPORARY WORKERS	EASY TO MEASURE.	LIKE THE OVERTIME WORK, IT MAY BE A RESPONSE TO A SURGE IN DEMAND, OR A WAY TO AVOID WORK CONTRACTS AND REDUCE COSTS.
LEVEL OF SUBSTITUTION	PROVIDES INFORMATION ON WHAT PROFESSIONALS ARE DOING WHAT.	VERTICAL AND HORIZONTAL SUBSTITUTION MAY BE A MANAGEMENT DECISION, NOT A LACK OF PROFESSIONALS; SOMETIMES IT MAY BE HARD TO MEASURE WHO IS QUALIFIED FOR WHICH TASK.
FOREIGN DOCTORS	RESORTING TO FOREIGN DOCTORS IS USUALLY A GOVERNMENT-ENACTED POLICY, SO IT IS EASY TO GET AN EXACT NUMBER.	MAY BE MISLEADING IF CONFUSED WITH IMMIGRANT PROFESSIONALS.

List of indicators that can be used as a proxy to assess current imbalances in the healthcare market

An example: nurses in the US

As an example of the application and of these multiple indicators, we provide an example in Table 4 with data collected in the United States referring to the labour market of registered nurses. In this particular case, indicators are well-aligned and exhibiting valid correlations. If vacancies for nurses are increasing, it is expected that unemployment in the sector should be reducing as well. This goes inline with the yearly growth of the population, far behind that of the population, and the low turnover rates, typically low in markets where human resources are scarce.

INDICATORS	VALUE (YEAR 2000)	SHORT-TERM TREND

I. Economic indicators

OCCUPATIONAL UNEMPLOYMENT RATE	13%	▼
YEARLY GROWTH OF THE WORKFORCE	1.4%	▲
YEARLY GROWTH OF THE POPULATION	15%	▲
REAL WAGE RATE	23 369USD	=

II. Operational indicators

VACANCIES	13%	▲
VACANCIES	1%	▼

Imbalance indicators for registered nurses in the United States

Summary and key policy implications

1. *Forecasting is one of the fundamental tools of sound HWF planning. For the forecasting model to be accurate it needs to properly account for current imbalances between supply and demand for healthcare services. Future initiatives in HWF planning need to properly assess these potential imbalances.*

   ....

2. *Failure to account for imbalances has several consequences, in the limit putting patient safety in jeopardy. Identifying shortages or surpluses of healthcare professionals is,*

therefore, critical not only for good HWF planning but also to ensure a sane and functional healthcare system.

....

3. *There are several indicators that can be used as proxies to identify imbalances. Some can be retrieved from economic indicators; others concern operational activity of the health providers. Nevertheless, they should always be interpreted with care and continuously monitored, as statistical anomalies may lead to erroneous interpretations.*

....

4. *It can be argued that the consequences of a shortage far exceed those of a surplus. Therefore, if a policy is to be enacted, a shortage should be altogether avoided, even if it comes at the cost of a potential surplus.*

....