Health Systems Resources and Resource Constraints

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Module Goals

• Define, describe, and give examples of physical capital, consumables, and human resources.

• Describe the components of an effective workforce, particularly as it relates to physical capital, consumables and human resources.

• Basic understanding of history and current trends in healthcare personnel, production and distribution.

• Become familiar with the roles of key healthcare professionals.

• Understand recruitment and retention of human resources, including causes and consequences and other components that influence personnel distribution, training and supply.
Module Sections

• Section 1: An Introduction to Health Systems Resources

• Section 2: The Three Branches of Health Systems Resources
  A. Physical Capital
  B. Consumables
  C. Human Resources

• Section 3: Management of Resources

• Section 4: Health Systems Resources and Global Health
Section 1: An Introduction to Health Systems Resources

Learning Objectives: Section 1

This section will introduce you to these questions:

1. What are health system resources?
2. What are the major types of health system resources?
3. Why are health system resources important?
4. How do these resources impact global health issues?
What is a “Good” Healthcare System?

“A good health system delivers quality services to all people, when and where they need them.”

What are Health Systems Resources?

- Health systems resources are the means that are available to a healthcare system for delivering services to the population.
Why are Health Systems Resources Important?

• To be effective and efficient, health system resources must be sufficient and appropriately utilized and managed.
What are The Different Types of Health Systems Resources?

• Healthcare systems resources can be divided into three branches:
  1. Physical capital
  2. Consumables
  3. Human resources

• These branches will be explored further in Section 2.
How are Health System Resources Managed?

• All three branches of health systems resources must be appropriately managed, both independently and in relation to one another.

• This is discussed further in Section 3.
How do Health Systems Resources Impact Global Health Issues?

• The accessibility of resources differs between high and low-income countries.
• This is discussed further in Section 4.
Section 1 Summary

• Health system resources: physical capital, consumables, and human resources.
• Adequate health system resources are necessary for quality services to be delivered to the population.
• Resource constraints in low-resource settings can affect quantity and quality of system resources.
Section 1 Questions

• What are health systems resources?
• What are the branches of health systems resources?
• Why are health systems resources important?
• How do these resources impact global health issues?
Section 2: The Three Branches of Health Systems Resources

Health system resources can be further broken down into the following three branches:

A. Physical Capital
B. Consumables
C. Human Resources
Section 2A: Physical Capital
2A: Physical Capital

- Physical capital is composed of non-human healthcare infrastructure, such as hospitals and medical equipment.
- Examples:
  - Hospitals and clinics
  - Ambulances
  - Furnishings, such as, beds and operating tables
- Infrastructure must both be purchased and maintained
  - New physical capital results in high immediate costs plus continued funding for maintenance, equipment, and trained personnel.
Section 2B: Consumables
Consumables

- Consumables are disposable resources that are used regularly in the delivery of healthcare.
- Examples:
  - Gloves
  - Pharmaceuticals
  - Syringes, sutures, etc.
- Consumables (particularly medications) make up a significant percentage of expenditures in the day-to-day operation of a functioning healthcare system.

Pharmaceuticals

• Pharmaceuticals can be subdivided into two broad classes:
  – Proprietary drugs
    • A new drug with a brand name and patent which ensures the right of the private developer to exclusively manufacture, market and profit from it for a specified period, say, 20 years, from first discovery.
  – Generic drugs
    • A drug which is chemically identical to the proprietary drug. It can be manufactured by anyone following the expiration of the patent, and is typically significantly less expensive.

• The high cost of proprietary drugs has driven some countries to formulate alternative strategies to ensure life-saving medications reach patients who need them.
Conflicts with Patent Law

• Faced with public health disasters, some countries have deliberately violated patent law in order to manufacture medications which would otherwise be prohibitively expensive.
  – Ex. Thailand and Brazil both imported generic Efavirenz to treat HIV patients in 2006 and 2007, respectively, despite outstanding patents.

• Other countries provide loopholes in their patent laws to allow for “compulsory licensing” and the generic production of patented drugs to help fight public health disasters.
  – Ex. Canada: Canada’s Access to Medicines Regime (CAMR) was established in 2004 to allow generic production of medications in response to health crises.
Section 2C: Human Resources
Definition of Human Resources

• Healthcare human resources refers to trained personnel “responsible for public and individual health interventions.”

• Examples of personnel include:
  – Doctors
  – Nurses
  – Allied healthcare professionals
  – Midwives
  – Pharmacists

Healthcare Personnel

• In many low-resource settings, healthcare personnel shortages occur mainly with doctors, and often with nurses.

• Allied healthcare professionals are healthcare workers outside of dentistry, medicine and nursing. Examples include:
  – Physical and occupational therapists
  – Physician assistants
  – Clinical officers
  – Technicians in many specialized areas
Healthcare Personnel

• A common healthcare professional in low-resource settings is the community health worker. The CHW is a lay person trained in basic health education, preventative care, and simple medication treatment regimes.
  – For example, educate patients how to take anti-retrovirals and check patients in the community to ensure they are properly taking medications.

• The use of clinical officers, in low-resource settings, may also help offset resource constraints.
Section 2 Summary

• Physical capital: non-human healthcare infrastructure.
• Consumables: disposable resources that are regularly used in the delivery of healthcare.
  – Issues with pharmaceuticals: proprietary costs, conflicts with patent law, and essential medicines.
• Human resources: trained personnel responsible for health interventions.
• In low-resource settings, training allied healthcare professionals such as clinical officers and community health workers may decrease the workload of strained doctors and nurses
Section 2 Questions

• Give two examples of physical capital, consumables, and healthcare personnel.

• What is the advantage of generic drugs in low-resource settings?

• Why might training allied health professionals such as community health workers decrease the load of doctors?
Section 3: Management of Health Systems Resources

- For a healthcare system to effectively meet the demands and expectations of the population it must have the “right” ..... 
  - Number of healthcare providers 
  - With the right kinds of training and supervision 
  - In the right geographical locations and kinds of facilities 
  - With the right kinds of equipment, medicines and other resources 
  - And who are applying their skills to addressing the predominant health problems
The Goals of Appropriate Management

• The goal of resource management is to optimally invest in each branch to avoid a mismatch of resources.

• A healthcare system will be the most effective when all branches are appropriately balanced.
Example of Mismanagement

• An imbalance between the availability of surgeons, operating rooms, and the necessary tools of surgery (i.e. drapes, drugs, instruments and gloves) will impact surgical productivity.
How Do We Manage Resources?

Systems try to optimize resources by:

• Accurately projecting the demand for resources
• Designing systems which effectively match the demand of resources with the supply
Management of Physical Capital

- All physical capital must be maintained, requiring continued investment and trained personnel.
- The number, size and distribution of physical facilities go a long way to defining the health system. Personnel can be moved, buildings cannot. Upgrades and reconfigurations of buildings is difficult.
  - Careful consideration must be given to the current state of a system as well as future needs before large investments in infrastructure are made.
Management of Consumables

• Management of consumables requires input from other branches of the healthcare system:
  – Production and distribution require infrastructure.
  – Human resources are required to assess need and use of the products.

• Mismanagement of consumables can have disastrous effects on the function of a healthcare system.
  – Ex. A focus on uninterrupted drug access has been identified as a crucial step in preventing the evolution of multidrug-resistant tuberculosis (MDR-TB) into extensively drug-resistant tuberculosis (XDR-TB).

Management of Human Resources

• Most difficult by far is the management of human resources, often abbreviated by HRH (human resources for health).

• A functional workforce requires a sufficient number of appropriately trained workers in a variety of different roles.

• The management of human resources must take into account the training, retention, supply, distribution, and utilization of personnel.
HRH Projections and Planning

• Workforce projections are necessary to “determine the most appropriate balance in the mix, distribution and number of health workers.”

• Based on baseline statistics, trends, policies, and other variables, projections can be made of the health workers required to meet the likely...

  – health care needs of the population
  – demand for services by the population

The Number of Health Care Workers

• Accurate projection of a society’s future needs is imperative to maintaining an effective and efficient healthcare system

• After projecting the required number of health workers, the input and output variables must be considered to ensure that the future workforce is sufficient to meet the future needs of the population
The Number of Health Care Workers

- The total number of workers available is dictated by the:
  - New additions (inflow)
    - Annual new graduates
    - Immigration
  - Active Supply
  - Annual losses (outflow)
    - Retirement
    - Emigration
    - Death
The health system is influenced by various driving forces. These forces influence the workforce and may result in various challenges.

The health system is challenged by various factors. These challenges may inevitably decrease the quality of patient care, particularly in low-income countries where resources are less prevalent.

Task Shifting

- Task shifting is the practice of utilizing the most appropriate healthcare worker for a task. This generally involves utilizing the lowest cadre of healthcare worker that can safely complete the task.
- A common example is training community health care workers (CHW) to educate patients and communities on HIV prevention and to check patients in the community to ensure medications are distributed and properly administered.
Task Shifting

• The main goal is to utilize healthcare workers to their full scope of practice.
  – For example, if a hospital only has 1 physician, it is important to ensure that the physician is completing high-level tasks and is supported by clinical officers and nurses working to their full scope of practice.

• Effective task shifting depends on efficiency and team work as well as on patient and community involvement.

Personnel Training

- Adequate training is essential for effective healthcare
- Training methods used can affect the number and quality of workers available.
- Adequate training and professional development opportunities may decrease healthcare worker migration, especially if workers are trained nationally in local health issues.

Section 3 Summary

• A healthcare system works most efficiently when all branches are appropriately balanced.
• Careful consideration and projections must be used to determine future need for physical capital, consumables, and healthcare personnel.
• Task shifting is commonly used in low-resource settings to ensure healthcare personnel are working in their full capacity.
Section 3 Questions

• How are projections of healthcare personnel made?

• Name three factors that affect the number of healthcare personnel available?

• What is task shifting and give an example of how it may be used.
Section 4: Health Systems Resources and Global Health

• By definition, access to resources is limited in low-income countries. Beyond having less to work with, low-resource settings face additional challenges in the management of health resources. These challenges are most especially true for the management of human resources and the retention of trained personnel.
Challenges in Low-Income Settings

- Management of Capital Investments
- Affordability and Quality of Pharmaceuticals
- Retention of Personnel (Brain Drain)
- Personnel Production and Distribution
Management of Capital

• *Appropriate technology* is a management concept that is especially important in low-resource settings:
  
  - It is defined as innovations which are *“developed, produced, delivered and monitored within a comprehensive framework that takes into account the systems, the individuals, and the community”*.  
  
    • This framework may also be applied to aspects of healthcare resources other than physical capital.  
    
    • This illustrates the importance of taking local factors into account prior to the purchase/donation of goods.  
      

Inappropriate Technology

• The donation of ambulances from North America to the developing world has been quite popular.
  – Not all donors inquire about road conditions, gas prices, availability of local mechanics and spare parts, etc.
  – The sight of a broken-down, abandoned ambulance is all too common.

• “Ambulances bought from abroad tend to be very expensive and may not always be ideally suited to the road conditions with surfaces of varied quality, narrow lanes, or the frequent floods.”

Affordability of Pharmaceuticals

- The cost of medicines is a major expenditure for healthcare systems, particularly in low-resource settings:

“The economic impact of pharmaceuticals is substantial -- especially in developing countries. While spending on pharmaceuticals represents less than one-fifth of total public and private health spending in most developed countries, it represents 15 to 30% of health spending in transitional economies and 25 to 66% in developing countries. In most low-income countries pharmaceuticals are the largest public expenditure on health after personnel costs and the largest household health expenditure. And the expense of serious family illness, including drugs, is a major cause of household impoverishment. Despite the potential health impact of essential drugs and despite substantial spending on drugs, lack of access to essential drugs, irrational use of drugs, and poor drug quality remain serious global public health problems.”

WHO List of Essential Medicines

• To promote the delivery of high-quality, affordable healthcare the WHO regularly publishes a model list of “minimum medicine needs for a basic healthcare system, listing the most efficacious, safe and cost-effective medicines for priority conditions. Priority conditions are selected on the basis of current and estimated future public health relevance, and potential for safe and cost-effective treatment.”

  – The current list (March 2011, 17th Edition) consists of over 300 core (minimum medicine needs for a basic system) and complimentary (essential medicines for priority diseases requiring specialized diagnostics/medical care/facilities) medications.

  – Individual countries are encouraged to publish their own lists taking into consideration the WHO recommendations and local priorities.

Quality of Pharmaceuticals

• The high cost of drugs has also led to pharmaceutical counterfeiting. The WHO estimates as much as 50% of medications in circulation may be deliberately counterfeit, decreasing or completely negating its effectiveness.
  – The WHO has formed the International Medical Products Anti-Counterfeiting Taskforce (IMPACT) to fight counterfeit medications.

• Substandard medication is even more prevalent and can be a result of poor manufacturing standards, poor chemical stability, poor packaging and storage, or contamination.
  – Effective pharmacovigilance systems do not exist in most developing countries – those which are most susceptible to receiving poor quality medication.

http://www.who.int/medicines/events/FINALBACKPAPER.pdf
Examples of Pharmaceutical Counterfeiting

• **High-resource settings:** In 2001 an American pharmacist confessed to diluting thousands of chemotherapy prescriptions prior to their distribution to cancer patients.¹

• **Low-resource settings:** In South-East Asia the prevalence of counterfeit artesunate-based antimalarials approaches 50% and is contributing to growing drug resistance.²

¹ Young D. Pharmacists work to regain public’s trust after Kansas City scandal. Am J Health Syst Pharm 2002; 59(9): 814, 820.
Retention of Personnel (Brain Drain)

• It can be difficult for low-income countries to retain personnel. This concept is known as **brain drain**.

• Brain drain is the recruitment of healthcare workers from one geographical region (often lower resource) to another, thus further destabilizing an often-overwhelmed healthcare system.
What causes ‘brain drain’?

• Brain drain is influenced by many factors
  – “Push” factors
    • Poor working and living conditions, lack of support/supplies, limited potential for advancement and professional development, low salaries, physical insecurity
  – “Pull” factors
    • Higher salaries, more opportunities for advancement, better working and living conditions, greater security, recruiting bonuses, better education for children
Strategies to halt Brain Drain

• Strategies now in use attempt to address both the “push” and “pull” factors
  – Internal policy changes (increase supply, improve working conditions, continuing education and other incentives, bonded service in return for training, improved utilization of skills/staff, incentives to encourage return).
  – External policy changes, like inter-country agreements. The WHO has developed *Global Code of Practice on the International Recruitment of Health Personnel*.

History of HRH Production & Distribution

• Many low-income countries face challenges with healthcare personnel production and distribution. Examples of inequitable distribution:
  – Concentration of personnel, especially doctors, in urban centers.
  – Inappropriate skill mix for the prevailing health problems.
  – Too many specialists, too few generalists.
  – Training institutions based almost entirely in urban centers.

A Case Study: Thailand

- History of inequitable healthcare personnel distribution in Thailand:
  - External brain drain (1960-1975): high demand for doctors in the United States influenced 1500 Thai doctors to emigrate.
  - Compulsory rural contracts: medical graduates were required to work for 3 years in rural public service.

A Case Study: Thailand

- Strategies employed by government to combat maldistribution:
  - Development of rural health infrastructure: ceased urban hospital expansions and shifted funds to rural health development.
  - Educational strategies: implemented medical placements in rural students’ hometowns to encourage returning after graduation.
  - Education reform: redesigned curriculum and placed emphasis on clinical competence, primary healthcare, and community medicine.
  - Specialty training: introduced specialty training to reduce number of Thai doctors emigrating for specialty training.

Section 4 Summary

• There is a smaller margin of error when managing health system resources in low-income countries.
• In a high-resource setting, mismanagement of resources may result in waste and inefficiency while in a low-resource setting mismanagement exacerbates the shortage that already exists.
• Low-resource settings may struggle more with production and distribution of healthcare personnel than high-resource settings.
Module Summary Key Points

• Health system resources consist of:
  – Physical capital
  – Consumables
  – Human resources

• A healthcare system is most effective when all branches are well managed and balanced

• Low-resource settings face a variety of challenges with obtaining and managing resources
Summary 4 Questions

• Explain some of the challenges low-resource settings face in managing physical capital and consumables.
• What is brain drain? Give an example of both a push and a pull factor leading to brain drain.
• Give an example of how a low-resource setting may be challenged regarding healthcare personnel distribution?
Supplementary Reading List


Credits

• Jessica Sleeth MPH, Program Manager Office of Global Health, School of Medicine, Queen’s University
• Paxton Bach MSc, Medical Student Queen’s University
• Alex Summers BScH, Medical Student Queen’s University

• Faculty Mentorship: Dr. Tom Hall, Executive Director of GHEC
End of Module