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# STRATEGIC HEALTH WORKFORCE PROJECTIONS

## JORDAN HUMAN RESOURCES DEVELOPMENT PROJECT
## REPORT NO. 7

SEPTEMBER 2005

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Ministry of Higher Education, the Public Sector Development Administration, the Civil Service Bureau, the Private Hospitals Association, the Medical Council, the Nursing Council the Medical Syndicate and the Nursing Syndicate. The knowledge and experience that they brought to the workshop enriched the discussions immeasurably.

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# STRATEGIC HEALTH WORKFORCE PROJECTIONS

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# I. INTRODUCTION

## PURPOSE OF THE STRATEGIC HEALTH WORKFORCE PROJECTIONS

This report covers the work done to complete another phase of the Initiatives Inc. program of work in human resource development (HRD) in the Ministry of Health (MOH) in Jordan. The essence and purpose of this assignment was to conduct a workshop and produce as a result the first strategic projection of staff requirements and supply in the health sector as a whole, with particular emphasis on the public sector, over the period 2004 to 2014.

## BACKGROUND

The Human Resource Development Project (HRDP), funded by USAID and implemented by Initiatives in conjunction with the MOH, is aimed at conducting a series of investigations and assessments that will provide information for MOH decision-making about the future of its human resources for health.

As part of this project, Initiatives assisted the MOH in the implementation of a strategic health workforce projection workshop. The workshop was the first of its kind in the country. It brought together senior officers of the MOH with others from related ministries and agencies (see participant list in Appendix 1). The participants provided the essential views and judgments about the future direction of health care and workforce development needed to create a framework for projecting long-term growth and change.

The workshop was spread over five days (24-26, 28 and 30 June). It employed a powerful planning tool developed for the World Health Organization. This modeling tool provided a means to produce a strategic and quantified human resource projection of future staff requirements and supply covering all aspects of health care in the country. With the benefit of computerization, this projection was systematic and rigorous and provided the means for subsequent amendments as the circumstances of the health sector changed in the future and current uncertainties were resolved.

## OBJECTIVES OF THE WORKSHOP

The specific objectives of the workshop were to:

- Project future public and private health sector growth,
- Develop proposals for health care institutional development,
- Establish staffing standards and workforce requirements into the future,
- Determine the means of meeting the staff requirements of the future including the implications for changes in the type and volume of training of new health workers and,
- Produce a human resource requirement and supply strategic projection which demonstrated the extent to which the proposed development was feasible.

# II. WORKSHOP PROCEEDINGS

The activities related to the workshop were in three parts:

a) Preparation for the workshop;
b) Facilitating the workshop; and
c) Preparing and presenting a report to the MOH Secretary General.

## PREPARATORY PHASE

The preparatory work included the following:

a) Data collection for entry into the model's baseline (2004) component.
b) Finalization of the model data input tables.
c) Data entry.
d) Coaching Ministry of Health technical counterparts to act as workgroup facilitators during the workshop.
e) Training two IT staff from the Ministry of Health and two from the HSS project in the operation and manipulation of the model.
f) Exploring with the Secretary General assumptions and visioning of the future health service.
g) Preparing the workshop program (see Appendix 2) and working with other team members to set up the workshop facilities and loading the computer with the model and data set. (Note: Following our usual practice in countries where the first language is not English, Initiatives commissioned the translation of the model into Arabic. This was tested during the workshop preparation and found to be unsatisfactory. Consequently, the English language version of the model was used during the workshop.)

## WORKSHOP FACILITATION

The workshop facilitation required:

a) Dividing the workshop participants into four working groups, each with a team leader (one of the HRDP technical counterparts) and with a balanced mixture of organizations and expertise.
b) Challenging each of the groups to consider the implications of what they were proposing.
c) Managing the work of the groups to ensure adequate dissemination and discussion between the groups.
d) Summarizing conclusions and upgrading the model on a daily basis to ensure that all the working groups were operating on similar, consensus data.
e) Providing technical HR inputs to working groups to introduce HR techniques and methodology as needed.

## PREPARING THE PRESENTATION TO THE MOH SECRETARY GENERAL

A report on the workshop in the form of a PowerPoint presentation (see Annex 3) was generated through the following: process:

a) The production of a draft report prior to the meeting on the last day of the workshop. The draft was produced by the Initiatives team working with their Ministry technical counterparts.
b) An in-depth review of the model outputs and its translation into a PowerPoint presentation with workshop participants. This review led to a number of amendments both to the outputs and to the presentation. These amendments were applied immediately so that the presentation would reflect a consensus view.
c) A presentation review with questioning and discussion with the Secretary General and other senior figures in the Ministry. The outcome of this was the expressed view that the presentation should also be made to the Minister.

# III. RESULTS

## KEY CONSIDERATIONS

The projections tested out during the workshop excluded consideration of RMS services. Not only was information about services, staff and training not made available by the RMS, but in addition, it was felt that movements of health service delivery staff between the RMS and the MOH was very limited.

It is important to recognize that this was the first attempt in Jordan to make comprehensive projections for the whole health sector and the results must be seen in this light. Planning is an iterative process, with alternative scenarios needing to be explored and tested out before the "best fit" can be determined and used to guide decision-making. As will be seen from the results, even repeatedly revised projections of staffing needs resulted in critical shortages of staff (particularly registered nurses and medical staff). The MOH will need to explore further scenarios to try to ensure that proposed service development is consistent with the availability of human resources. With the first projections using the model completed, subsequent modifications to produce new scenarios are easy to make and can be done quickly. The IT individuals trained prior to the workshop and through the workshop itself are competent to execute changes in the input data to the model. It is, however, likely that some assistance will continue to be needed in analyzing the implications of model outputs.

## POPULATION GROWTH

The data used in the HR Projections model to describe population growth, service development and the human resources in the health sector were modified and adjusted up to and through the workshop to provide the best description of health sector staff available to date. The specialized knowledge of the participants contributed significantly to the quality of the data. This included, for instance, a modification of population growth from 2.7% per annum (a commonly held view) to 2.05% taken from the Jordan family planning projection model which to date has proved to be the most accurate of the population projections in Jordan.

## THE PRIVATE HEALTH SECTOR

The least satisfactory element of the data used for the projections related to private sector staff on which there is only limited public information. It is not clear, for instance, whether the large number of medical specialists identified as working in the private sector are actually working full time in the commonly accepted sense. Nor is there any data on leaving rates in the private sector. However, even if a more normal leaving rate to that of the public sector of 3% per annum is attributed to the private sector staff, it still will leave the sector as a whole under-supplied with key categories of staff.

## PLANNING ASSUMPTIONS

The projections completed during the workshop and presented here were based upon a number of assumptions about the future, namely:

a) Population will increase by 22.5% over the ten-year period with a small shift of the population from rural to urban.

b) Health issues will move in part from endemic environmental diseases to those chronic diseases more commonly associated with modern Western societies.

c) Public sector services will focus on strengthening primary care roles and with stronger links to the private sector in the provision of hospital services.

d) Increased attention to the retention of staff, particularly specialist doctors and registered nurses. The Secretary General of the MOH emphasised at some length in his opening remarks at the workshop the need to improve staff retention. Other elements of the work currently being undertaken by the HRDP should provide some guidance on

potential action to improve motivation and retention. The workshop, however, did not consider changes in retention rates which might occur as a result of management action to improve retention.

## STAFFING OF MOH PRIMARY HEALTH CARE SERVICES

Although primary health care is repeatedly said to be a priority for the MOH, hospital services continue to absorb most of the MOH staff and expenditure. During the workshop, new information about MOH plans for expansion of health center services came to light

In line with the assumptions of the future, there is significant expansion proposed for comprehensive health centers (53 units to 82) and primary health centers (356 units to 443). The current policy of containing MCH centers in primary care units means that there will be no further expansion of separate MCH centers from the thirteen that currently exist. Nor are there plans to increase (or decrease) the present number of village health centers.

Annex 4 presents the projected staff requirements for the different categories of health center by 2014. Staff in primary centers are projected to increase by approximately 50% to address increased workload and expansion of services.

## HOSPITAL STAFFING

Annex 5 presents the staff requirements for public sector hospitals (MOH and University) for the next 10 years. These requirements are defined as staffing standards for individual hospitals and then multiplied by the proposed increase in hospitals and hospital beds to provide total FTE staff needs.

Despite the intention to limit hospital growth in the public sector, decisions made outside the MOH may lead to the creation of seven new MOH hospitals and an increase in MOH hospital beds of 31% above existing. Given the relatively low occupancy rate for public sector hospital beds, a population growth of only 22.5% and a predicted expansion in private sector beds of some 35% in the ten-year period, a further review of public sector hospital bed expansion is desirable.

During the workshop, proposals were made to reduce the staff to bed ratio for key staff in hospitals, particularly medical specialists (from 1:3 beds to 1:5) and nurses (from 1.05 nurses per bed to 0.9 per bed). However staff to bed ratios for MOH hospitals other than Al Basheer and University Hospitals remain high and out of step with staffing levels in these major tertiary hospitals.

There was a concerted effort to change the ratio between registered nurses and associate and assistant nurses with assistant nurse training to be discontinued. As a result of the actions proposed in the projections, this ratio would change from a current level of 33% registered to 67% other nurses to 45% registered to 55% other nurses. While this is seen as a desirable move by nursing organisations in Jordan, the reality is that at the very least associate nurse training will need to be stepped up to meet the projected shortfall in registered nurses. Consequently, the desired nursing ratios may not be achievable in this ten-year period.

## MOH MANAGEMENT STAFFING

Annex 6 presents the results of the decisions made during the workshop in relation to the staffing of the central MOH and the Health Directorates.

There is a projected reduction of 6.7% in the staffing of the central MOH by 2014. This is considerably less than the changes anticipated by the Public Service Development Administration, as presented to participants during the workshop.

The workshop resulted in a projected 3% increase in the staffing of the Health Directorates, but this includes 21 Health Directorates (an increase of one over the 20 in place at the time of the 2004 baseline.

## TOTAL PROJECTED STAFF REQUIREMENTS

Staff in the health sector (excluding RMS) currently number approximately 51,000. The projected requirements in this scenario would see an increase to approximately 73,000 (a 43% increase) over the next 10 years. The proposed staff expansion for the public sector was 24,000 to 36,000, providing enhanced service and staffing to population ratios beyond that currently existing.

The nurse to doctor ratio in the health sector as a whole remains very low and is among the lowest group of countries in the world. Currently the ratio is approximately 1.8 nurses to 1.0 doctors and, with the proposals in the projection, this ratio would reduce to 1.5 to 1.0. Clearly this has implications on nursing activity on whether doctors are doing nursing work or that elements of work normally associated with nurses are not being done.

## PROJECTED PRE-SERVICE TRAINING NEEDS

Annex 7 provides details of the projected training outputs for the different health professions trained in Jordan. For nurses, the projected figures were provided by the Nursing Council and were said to represent concrete plans. For other categories, the annual training outputs were what participants estimated to be possible.

Annex 7 shows that there is the potential to increase the annual number of doctors completing their residency (largely within MOH hospitals) by 48% by 2014. For GPs, the increase is estimated at 25%. For registered nurses, current plans indicate an almost doubling of the number graduating each year from Universities.

The training of Associate Nurses is being scaled down and Annex 7 indicates that the Nursing Council proposes a reduction to less than one third of current outputs from all the training schools in Jordan.

The training of Assistant Pharmacists, which only the MOH trains, is projected to increase by 400%, from 24 per year to 100 year. Similarly, the MOH training program for X-Ray technicians is projected to expand to produce 40% more graduates per year.

Laboratory Technicians (which in the projections include both Baccalaureate Technicians and Associate Degree Assistant Laboratory Technicians) shows an increase of 34% in graduates per year. The largest gap, based on projected needs, is for specialist doctors and registered nurses. The problem here is not simply to meet the expansion of staff requirements but the high loss rates, with many of the most skilled staff emigrating to other countries, most notably those Gulf State countries adjacent to Jordan. A notable exception to the shortages shown for other categories, there is projected to be an over-supply of pharmacists.

## STAFF SALARIES AND BENEFITS

Participants were asked to make assumptions about realistic changes in salaries and benefits over the next 10 years. This was done by proposing differential increases in real income (excluding increases to cover the impact of inflation). The increases incorporated into the projections varied in average terms from 4% per annum in real income change for staff in short supply such as registered nurses down to 1% for staff in adequate supply such as clerical staff. It is not certain whether this is feasible in civil service terms although there is evidence of some differentials being applied in the past to general practitioners.

## OVERALL HEALTH SYSTEM INDICATORS

Annex 9 provides a comparison of indicators for health system performance for 2004 and 2014 based on the results of the projections made. The cost results (for the public sector) are realistic (at 102% of projected increases in public sector allocations).

## IV. CONCLUSIONS

Scenario 1, developed during the course of this workshop, while providing a financially feasible solution which could provide improved services both public and private, was ultimately undermined by the high loss rates from the health services of critical staff categories. The scale of these losses was such that expanding the training output to the maximum possible for new staff, with all the costs that this would entail, was insufficient to meet the projected requirements.

It is the retention of staff issue that will undoubtedly require major attention. However, it is also the requirement side of the scenario which will also need further consideration. The expansion in the number of hospital beds is in excess of the MOH's intentions. At the same time, staffing in hospitals other than Al Bsheer and the University Hospitals is very high and needs to be reassessed in terms of the numbers of medical specialists and registered nurses.

The nurse to doctor ratio appears to be unbalanced with larger numbers of nursing staff required. In the short to medium term, this may well require continuation in the training of associate and assistant nurses given the expected shortfall in registered nurses.

These conclusions, together with the observations in the results section of this report have provided a quantitative framework for human resource development and policy making in the MOH. The modeling instrument for further exploration and development remains in the possession of the MOH and enables them to generate further service scenarios to achieve a balanced human resource supply and requirement for the health sector as a whole. The model also includes an additional table which allows for the strategic projection to be detailed into year to year projections.

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VII. PROJECTED TRAINING OUTPUTS AND LOSSES FROM ATTRITION

VIII. HUMAN RESOURCE SUPPLY REQUIREMENTS COMPARISON SCENARIO 1

IX. KEY OUTPUT INDICATORS SCENARIO 1

# ANNEX I

# MEMBERS OF THE WORKING GROUPS

**Human Resource Strategic Planning (Projections) Workshop**
**24 – 26, 28 and 30 June, 2005**

**Group 1**
**Facilitator: Dr. Safa Qusoos** (IT – Ghaleb Qaswami)

1. Dr Ahmed Abu Al Samen, Head of Prince Faisal Hospital
2. Mr Mohand, Ministry of Health HQ
3. Ms Da'ad Shokeh, Jordanian Nursing Council
4. Mr Ma'an Qaryoti, Ministry of Health HQ
5. Mr Mahmoud Qatawneh, Ministry of Planning

**Group 2**
**Facilitator: Dr. Osama Samawi** (IT – Ahmed Salem)

1. Dr Damen Abadi, Director of Aqaba Health Directorate
2. Dr Ali Abu Hazeem, Ministry of Health HQ
3. Dr Basem Kiswani, Medical Syndicate
4. Dr Patricio Murgueytio, HSS Project
5. Dr Ed Chappy, PHR+ Project

**Group 3**
**Facilitators: Dr. Mohamed Al Ta'rawneh/Dr Afaf Dawood** (IT – Munir Abu-Zeid)

1. Dr Taher Abu Al Samen, Ministry of Health HQ
2. Dr Fawzi Hamouri, Private Hospital Association
3. Mr Mahmoud Assaf, Ministry of Higher Education
4. Dr Jafer Hunati, Jordan Medical Council
5. Mr Mohammad Hatamleh, Jordan Nursing and Midwives Syndicate

**Group 4**
**Facilitator: Dr.Salah Diab** (IT – Ra'ed Fessesi)

1. Dr Ma'moun Maghaireih, MOH HQ
2. Mr Awni Zayadein, Civil Service Bureau
3. Ms Muna Hakooz, Ministry of State for Development of the Public Sector
4. Mr Ma'moun Al Hasi, Ministry of Finance
5.. Dr Salwa Bitar, USAID

**Initiatives Team**

Jenny Huddart, Team Leader
Peter Hornby
Safa Halaseh

# ANNEX II

# WORKSHOP PROGRAMME

**Human Resource Strategic Planning (Projections) Workshop**
**24 – 26, 28 and 30 June, 2005**

**Friday 24 June**

| | |
|---|---|
| 2:00 – 3.00 | Arrival, Check in and Lunch |
| 3:00 – 3:30 | Opening of Workshop |
| 3:30 – 6:30 | Workshop Objectives and Working Process<br>Review of the input Tables of the Model<br>Situation Analysis<br>Assumptions about health care development in Jordan<br>(**Coffee break included 4:30-5:00)** |
| 7:00 –11:00 | Dinner |

**Saturday 25 June**

| | |
|---|---|
| 9:00 – 1:00 | Projection of private and public health sector hospital facilities<br>**(Coffee break included 11:00-11:30)** |
| 1:00 – 2:00 | Lunch |
| 2:00 – 5:30 | Specification of future hospital staffing standards and staffing requirements<br>(**Coffee break included 3:30-4:00)** |
| 7:00 –11:00 | Dinner |

**Sunday 26 June**

| | |
|---|---|
| 9:00 – 12:30 | Projection of primary health care services<br>**(Coffee break included 10:30-11:00)**<br>Specification of future primary health care staffing requirements |
| 12:30 – 2:00 | Check Out & Lunch |
| 2:00 – 4:00 | Other public health sector staff requirements (including central MOH and Health Directorates)<br>Estimates of private health sector staff growth |
| 4:00 | End of 1st phase of the Projections Workshop |

**Tuesday 28 June**

| | |
|---|---|
| 9:00-10:30 | Review of consolidated requirement projection |
| 11:00-1:00 | Projection of likely future supply incorporating existing training capacity and unchanged loss rates |
| 1:00-2:00 | Lunch |
| 2:00-4:30 | Exploration and revision of training output options and loss factors to achieve new supply projection to improve match with requirements<br>(**Coffee break included 3:15-3:45)** |

**Thursday 30 June**

| | |
|---|---|
| 10:00-11:00 | Review of overall comparison between requirements and supply. Identification of major issues still to be addressed |
| 11:00-11:30 | **Coffee Break** |
| 11:30-1:00 | Review and amendment of workshop results power point presentation |
| 1:00-2:00 | Lunch |
| 2:00-3:30 | Presentation and discussion with Secretary General and senior staff in the Ministry of Health |

**Finish**

# ANNEX III

# PRESENTATION MADE TO THE MOH SECRETARY GENERAL

**STRATEGIC HUMAN RESOURCES FOR HEALTH PLANNING WORKSHOP**

**Summary**
**of**
**Key results**

**30 June 2005**

**OBJECTIVES**

1. To project future public and private health sector growth.
2. To project staffing standards and resulting staff requirements for the future.
3. To determine feasible means of meeting the staff requirements within projected likely financial resources.

**PARTICIPANTS**

- Ministry of Health
- Ministry of Finance
- Ministry of Planning
- Ministry of Higher Education
- Public Sector Development Administration
- Civil Service Bureau
- The Private Hospitals Association
- The Medical Council & the Nursing Council
- The Medical Syndicate & the Nursing Syndicate

## IMPORTANT NOTE

RMS health services and RMS staff were excluded from consideration both in terms of the current situation and in terms of future staff requirements.

## KEY PLANNING ASSUMPTIONS

1. Increase in chronic diseases, accidents plus continued diseases related to environmental sanitation.
2. MOH needs to focus more on primary health care.
3. Need for increased collaboration between the public & private health sectors, including contracting out to the private sector.
4. Anticipated growth in public health sector expenditure.
5. The proportion of MOH expenditure spent on personnel costs will increase.
6. Although the MOH should give more emphasis to primary & preventive health care, it is likely that curative, hospital care will continue to be dominant in expenditure terms.
7. The MOH needs to increase its focus on out-patient care.
8. The MOH needs to increase its focus on care for its rural population.
9. The public sector will continue to experience high loss rates of its professional health staff.
10. Changes in health insurance could have a significant impact on public demand for health services.

## PROJECTED POPULATION & EXPENDITURE CHANGES

Population Growth – average of 2.05% p.a. over the next 10 years.

Recurrent Public Sector Expenditure as % of GDP – 30.5% (2004) to 25.0% (2014).

Personnel Costs as % of MOH recurrent expenditure – 73.6% (2004) to 76% (2014).

## CURRENT MOH HEALTH FACILITY EXPANSION PROPOSALS

### HOSPITALS

| | |
|---|---|
| 7 new acute hospitals | + 860 beds |
| 2 replacement hospitals | + 250 beds |
| 1 new psychiatric hospital | + 200 beds |
| Expansion to Al Basheer (2010-2014) | + 162 beds |
| Total Additional Beds | + 1,472 beds |

### HEALTH CENTRES

87 new primary HCs
15 new comprehensive HCs
14 primary HCs upgraded to comprehensive HCs
+ 6 new Health Directorates

## ESTIMATED UNIVERSITY & PRIVATE HEALTH SECTOR EXPANSION BY 2014

### UNIVERSITY HOSPITALS

Increase of 496 beds at the 2 existing hospitals

### PRIVATE HOSPITALS

Increase of 1,360 beds

## FUTURE STAFF REQUIREMENTS FOR THE WHOLE HEALTH SECTOR

| Category | 2004 | 2014 | Change |
|---|---|---|---|
| Specialist Doctor | 5,455 | 7,910 | + 2,455 |
| GP | 4,124 | 7,141 | + 3,017 |
| Dentist | 3,278 | 5,198 | + 1,920 |
| Registered Nurse | 7,493 | 11,432 | + 3,939 |
| Associate Nurse | 1,070 | 4,470 | + 3,400 |
| Pharmacist | 1,727 | 2,672 | + 945 |
| Assistant Pharmacist | 5,409 | 6,265 | + 856 |
| Laboratory Technician | 1,332 | 1,822 | + 490 |
| X-Ray Technician | 768 | 1,318 | + 550 |

## FUTURE STAFF REQUIREMENTS FOR THE MOH

| Category | 2004 | 2014 | Change |
|---|---|---|---|
| Specialist Doctor | 1,140 | 1,522 | + 382 |
| GP | 1,066 | 2,316 | + 1,550 |
| Dentist | 521 | 1,037 | + 516 |
| Registered Nurse | 2,236 | 3,576 | + 1,340 |
| Associate Nurse | 589 | 3,756 | + 3,167 |
| Pharmacist | 220 | 441 | + 221 |
| Assistant Pharmacist | 1,009 | 1,864 | + 855 |
| Laboratory Technician | 932 | 1,286 | + 354 |
| X-Ray Technician | 408 | 786 | + 378 |

## ASSUMPTIONS USED FOR PROJECTION OF 2014 MOH STAFFING REQUIREMENTS

1. Changed specialist : bed ratio from 1 : 3 to 1 : 5
2. Changed the nurse : bed ratio from 1.05 : 1 to 0.9 : 1
3. For MOH hospitals, changed the distribution of qualified : unqualified nurses from 55% : 45% to 50% : 50%
4. Increased the number of Family Medicine Specialists & reduced the number of GPs in hospitals and comprehensive HCs.

## REQUIREMENTS – SUPPLY BALANCE (WHOLE HEALTH SECTOR)

| Category | 2014 Requirements | 2004-2014 Supply | Gap |
|---|---|---|---|
| Specialist Doctor | 7,910 | 3,023 | - 4,887 |
| GP | 7,141 | 5,076 | - 2,065 |
| Dentist | 5,198 | 4,316 | - 882 |
| Registered Nurse | 11,432 | 9,517 | - 1,915 |
| Associate Nurse | 4,470 | 4,980 | + 510 |
| Pharmacist | 2,672 | 5,312 | + 2,640 |
| Assistant Pharmacist | 6,265 | 3,986 | - 2,279 |
| Laboratory Technician | 1,822 | 1,740 | - 82 |
| X-Ray Technician | 1,318 | 590 | - 728 |

## ASSUMPTIONS USED FOR PROJECTING FUTURE TRAINING OUTPUTS

The Nursing Council seeks to reduce training of Associate Nurses and to increase the the training of registered nurses.

1. The projections assume that the Universities can increase their output of registered nurses from 700 in 2004 to 1,400 by 2014.
2. The projections assume that the outputs of Associate Nurses will reduce from 815 in 2004 to 250 by 2014.
3. The projections assume that there will be no change in the annual loss rates of MOH staff.

## GENERAL OBSERVATIONS

**1. The MOH needs to consider ways to to reduce its future requirements for staff, by:**

a) Strictly limiting further expansion of its health facilities;

b) Changing roles & responsibilities of different staff categories (substitution);

c) Improving the effective utilization and the productivity of health staff.

**2. The MOH needs to take steps to increase the supply of health professionals by:**

a) negotiating with non-MOH training institutions an increase in training intakes/outputs for key categories in short supply.

b) consider the employment of foreign health workers where the shortages are acute.

**3. The MOH needs to actively seek ways to reduce attrition from the MOH through:**

a) improving management & human resources management processes and practices;

b) decentralization of authority to hospital and directorate managers and ensuring accountability;

c) seeking ways to improve salaries & benefits ***to reward increased productivity***

# ANNEX IV

## BASELINE AND PROJECTED STAFF REQUIREMENTS BY TYPE OF PUBLIC-SECTOR HEALTH CENTER

| Staff Category | Staff per individual health center | | | | | | | | Total public sector PHC staff | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Comprehensive. H.C. | | Primary H.C. | | M.C.H. Centre | | Village H.C. | | | |
| | 2004 | 2014 | 2004 | 2014 | 2004 | 2014 | 2004 | 2014 | 2004 | 2014 |
| Specialist Doctor | 1.8 | 3.0 | 0.0 | 0.0 | 0.2 | 1.0 | 0.0 | 0.0 | 112 | 260 |
| Medical Resident | 0.7 | 1.0 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 66 | 171 |
| General Practitioner | 3.2 | 4.0 | 1.4 | 2.5 | 0.5 | 1.0 | 0.0 | 0.0 | 686 | 1,449 |
| Dental Doctor | 2.2 | 3.0 | 0.7 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 366 | 689 |
| Registered Nurse | 1.0 | 2.0 | 0.2 | 0.2 | 0.2 | 0.3 | 0.0 | 0.0 | 125 | 257 |
| Associate Nurse | 0.2 | 9.0 | 0.0 | 2.2 | 0.0 | 2.0 | 0.0 | 0.4 | 16 | 1,846 |
| Midwife | 1.4 | 2.0 | 0.7 | 1.5 | 2.0 | 3.0 | 0.0 | 0.0 | 362 | 867 |
| Assistant Nurse | 4.2 | 1.0 | 1.9 | 0.0 | 1.2 | 0.0 | 0.3 | 0.0 | 1,009 | 82 |
| Pharmacist | 0.3 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21 | 82 |
| Assistant Pharmacist | 2.2 | 3.0 | 1.0 | 2.0 | 0.2 | 0.0 | 0.1 | 0.0 | 503 | 1,132 |
| Laboratory Tech. | 1.8 | 2.0 | 0.2 | 0.5 | 0.2 | 1.0 | 0.0 | 0.0 | 181 | 399 |
| X-ray Technician | 1.0 | 1.5 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 61 | 212 |
| Other Technician | 1.4 | 2.0 | 0.1 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 128 | 253 |
| Env'al H'lth Staff | 1.0 | 2.0 | 0.3 | 1.0 | 0.1 | 0.0 | 0.0 | 0.1 | 172 | 634 |
| Tech. Administrator | 1.3 | 2.0 | 0.6 | 0.8 | 0.2 | 0.5 | 0.0 | 0.0 | 296 | 525 |
| Senior Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0 |
| Middle Manager | 0.1 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 24 | 82 |
| 1st L.Mgr & engineer | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 11 | 95 |
| Clerical Staff | 2.8 | 5.0 | 1.0 | 1.3 | 0.5 | 1.0 | 0.1 | 0.1 | 543 | 1,026 |
| Support staff | 12.6 | 15.0 | 4.4 | 5.0 | 3.5 | 4.0 | 0.5 | 0.5 | 2,411 | 3,632 |
| **Total per clinic** | **39.1** | **60.5** | **12.9** | **18.6** | **8.9** | **14.8** | **1.2** | **1.1** | **xxxxx** | **xxxxx** |
| **Total, Location type** | **2,075** | **4,980** | **4,590** | **8,231** | **116** | **192** | **311** | **292** | **7,092** | **13,695** |

Table 14

# ANNEX V

## BASELINE AND PROJECTED STAFF REQUIREMENTS FOR PUBLIC-SECTOR HOSPITALS

| Staff Category | Al-Basheer | | University Hospitals | | Other MOH Hospitals | | Nat. Psychiatric Center | | Total FTEs in public hospitals | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2004 | 2014 | 2004 | 2014 | 2004 | 2014 | 2004 | 2014 | 2004 | 2014 |
| **Av. bed size** | **811** | **973** | **412** | **675** | **92** | **105** | **198** | **198** | | |
| Specialist Doctor | 279.0 | 195.0 | 150.3 | 168.8 | 27.8 | 18.0 | 3.5 | 20.0 | 1,309 | 1,189 |
| Medical Resident | 269.0 | 172.7 | 134.2 | 150.0 | 20.3 | 10.0 | 12.0 | 20.0 | 1,089 | 863 |
| General Practitioner | 17.0 | 19.6 | 0.0 | 0.0 | 28.0 | 25.0 | 1.0 | 3.0 | 747 | 860 |
| Dental Doctor | 27.0 | 31.1 | 21.0 | 24.2 | 1.9 | 2.0 | 0.0 | 1.0 | 118 | 149 |
| Registered Nurse | 434.0 | 400.0 | 388.0 | 446.2 | 56.9 | 45.0 | 66.0 | 75.0 | 2,821 | 3,008 |
| Associate Nurse | 167.0 | 300.0 | 29.0 | 55.0 | 14.0 | 35.0 | 6.0 | 60.0 | 601 | 1,753 |
| Midwife | 58.0 | 66.7 | 5.5 | 6.3 | 15.3 | 17.6 | 0.0 | 0.0 | 468 | 664 |
| Assistant Nurse | 246.0 | 100.0 | 45.0 | 30.0 | 47.1 | 10.0 | 57.0 | 15.0 | 1,674 | 537 |
| Pharmacist | 22.0 | 25.3 | 15.0 | 17.3 | 2.3 | 2.6 | 2.0 | 5.0 | 115 | 161 |
| Assistant Pharmacist | 62.0 | 71.3 | 23.3 | 26.8 | 8.8 | 10.0 | 6.0 | 10.0 | 349 | 487 |
| Lab. Technician | 68.0 | 78.2 | 35.6 | 40.9 | 10.0 | 11.5 | 2.0 | 8.0 | 402 | 566 |
| X-ray Technician | 75.0 | 86.3 | 39.1 | 45.0 | 9.2 | 10.5 | 2.0 | 6.0 | 395 | 543 |
| Other Technician | 141.0 | 162.2 | 76.2 | 87.6 | 15.0 | 17.2 | 9.0 | 10.4 | 700 | 939 |
| Env'al H'lth Staff | 6.0 | 6.9 | 3.0 | 3.5 | 1.2 | 1.4 | 2.0 | 6.0 | 48 | 78 |
| Tech. Administrator | 54.0 | 62.1 | 29.5 | 33.9 | 8.1 | 9.3 | 9.0 | 4.6 | 342 | 452 |
| Senior Manager | 3.0 | 3.5 | 2.0 | 2.3 | 1.0 | 1.0 | 1.0 | 1.2 | 34 | 45 |
| Middle Manager | 26.0 | 29.9 | 15.7 | 18.1 | 4.2 | 4.0 | 5.0 | 5.8 | 175 | 216 |
| 1st L.Mgr & engineer | 18.0 | 20.7 | 9.1 | 10.5 | 3.5 | 4.0 | 4.0 | 4.0 | 134 | 187 |
| Clerical Staff | 122.0 | 140.3 | 69.1 | 79.5 | 16.5 | 19.0 | 19.0 | 16.1 | 728 | 978 |
| Support staff | 160.0 | 184.0 | 136.4 | 156.9 | 39.6 | 40.0 | 35.0 | 40.3 | 1,532 | 1,947 |
| Total per hospital | 2254 | 2156 | 1227 | 1403 | 330.5 | 293.1 | 241.5 | 311.4 | | |
| **FTE staff per bed** | **2.8** | **2.2** | **3.0** | **2.1** | **3.6** | **2.8** | **1.2** | **1.6** | | |
| Total for Public Hosp. | 2,254 | 2,156 | 2,454 | 2,786 | 8,592 | 9,744 | 483 | 937 | 13,784 | 15,624 |

Jordan Strategic Projection

Table 13

# ANNEX VI

## BASELINE AND PROJECTED STAFF REQUIREMENTS FOR CENTRAL MOH AND THE HEALTH DIRECTORATES

| Staff Category | Central MOH | | | Hlth. Directorates (21) | | |
|---|---|---|---|---|---|---|
| | 2004 | % Change | 2014 | Staff per Hlth. Dir. 2004 | Staff per Hlth. Dir. 2014 | Total 2014 |
| Specialist Doctor | 32 | -7.0 | 15 | 1.7 | 2.0 | 42 |
| Medical Resident | 54 | -20.0 | 6 | 1.4 | 1.4 | 28 |
| General Practitioner | 16 | 2.0 | 20 | 3.6 | 4.0 | 84 |
| Dental Doctor | 5 | 0.0 | 5 | 2.5 | 3.2 | 67 |
| Registered Nurse | 16 | -5.0 | 10 | 2.7 | 2.1 | 44 |
| Associate Nurse | 2 | -20.0 | 0 | 0.4 | 5.0 | 105 |
| Midwife | 6 | -8.0 | 3 | 4.8 | 2.0 | 42 |
| Assistant Nurse | 11 | -30.0 | 0 | 9.9 | 1.0 | 21 |
| Pharmacist | 60 | 0.0 | 60 | 2.3 | 2.0 | 42 |
| Assistant Pharmacist | 60 | 4.0 | 89 | 6.4 | 6.4 | 134 |
| Laboratory Technician | 89 | 3.0 | 120 | 7.1 | 4.0 | 84 |
| X-ray Technician | 7 | 5.0 | 11 | 1.3 | 0.5 | 11 |
| Other Technician | 52 | 2.0 | 63 | 4.7 | 5.0 | 105 |
| Env. H'lth Staff | 176 | 1.0 | 194 | 15.6 | 18.0 | 378 |
| Tech. Admin. | 182 | 1.0 | 201 | 7.4 | 8.0 | 168 |
| Senior Manager | 53 | -4.0 | 35 | 0.9 | 1.0 | 21 |
| Middle Manager | 152 | -3.0 | 112 | 5.8 | 6.0 | 126 |
| First L.Mgr & engineer | 96 | 1.0 | 106 | 3.6 | 4.0 | 84 |
| Clerical Staff | 372 | 0.0 | 372 | 22.0 | 25.0 | 525 |
| Support staff | 616 | -2 | 503 | 51.3 | 50.0 | 1,050 |
| **Totals** | **2,057** | **- 6.7%** | **1,926** | **153.7** | **150.6** | **3,162** |

# ANNEX VII

## PROJECTED TRAINING OUTPUTS AND LOSSES FROM ATTRITION

| Profession | New graduates from region | | Net flows into or out of region | | Annual % losses | Total Staff Supply | |
|---|---|---|---|---|---|---|---|
| | 2004 | 2014 | 2004 | 2014 | | 2004 | 2014 |
| Specialist Doctor | 121 | 180 | (72) | (120) | 7.1 | 5,455 | **3,023** |
| Medical Resident | 121 | 180 | (35) | (60) | 2.2 | 1,221 | **1,938** |
| General Practitioner | 240 | 300 | (33) | (50) | 3.0 | 4,124 | **5,076** |
| Dental Doctor | 238 | 250 | (47) | (60) | 2.3 | 3,278 | **4,316** |
| Registered Nurse | 703 | 1,400 | (80) | (100) | 10.2 | 7,493 | **9,517** |
| Associate Nurse | 815 | 250 | (28) | 0 | 2.7 | 1,070 | **4,980** |
| Midwife | 81 | 150 | (11) | (11) | 3.1 | 1,458 | **2,032** |
| Assistant Nurse | | 0 | (40) | 0 | 3.5 | 3,380 | **2,230** |
| Pharmacist | 595 | 500 | (88) | (88) | 2.7 | 1,727 | **5,312** |
| Assistant Pharmacist | 24 | 100 | (56) | (40) | 3.5 | 5,409 | **3,986** |
| Laboratory Technician | 112 | 150 | (42) | (42) | 3.4 | 1,332 | **1,740** |
| X-ray Technician | 36 | 50 | (23) | (23) | 5.7 | 768 | **596** |
| Other Technician | 262 | 300 | (150) | (100) | 8.7 | 1,426 | **1,739** |
| Environmental H'lth Staff | 22 | 25 | (8) | 0 | 1.1 | 757 | **871** |
| Technical Administrator | X | | (11) | 96 | 0.2 | 1,293 | **1,757** |
| Senior Manager | X | | 0 | 3 | 0.0 | 137 | **154** |
| Middle Manager | X | | 0 | 45 | 0.6 | 573 | **789** |
| First L.Mgr & engineer | X | | (55) | 100 | 1.5 | 413 | **679** |
| Clerical Staff | X | | (134) | 570 | 5.3 | 2,609 | **3,901** |
| Support staff | X | | (79) | 980 | 4.9 | 6,868 | **8,760** |
| **Totals** | **3,370** | **3,835** | **(992)** | **####** | **xxxxx** | **50,791** | **63,395** |

Jordan Strategic Projection

Table 6

# ANNEX VIII

## HUMAN RESOURCE SUPPLY REQUIREMENTS COMPARISON – SCENARIO 1

| Staff Category | 2014 | | BALANCE (shortage) | POPULATION / HEALTH WORKER | | | Distribution by Occupation | |
|---|---|---|---|---|---|---|---|---|
| | Supply | Requirement | | Base supply | Target supply | Target Requirement | 2004 | 2014 |
| Specialist Doctor | 3,023 | 7,910 | - 4,886 | 976 | 2,157 | 824 | 11% | 11% |
| Medical Resident | 1,938 | 1,628 | 309 | 4,360 | 3,365 | 4,005 | 2% | 2% |
| General Practitioner | 5,076 | 7,141 | - 2,065 | 1,291 | 1,285 | 913 | 8% | 10% |
| Dental Doctor | 4,316 | 5,198 | - 881 | 1,624 | 1,511 | 1,255 | 6% | 7% |
| Registered Nurse | 9,517 | 11,432 | - 1,916 | 710 | 685 | 570 | 15% | 16% |
| Associate Nurse | 4,980 | 4,470 | 510 | 4,975 | 1,309 | 1,459 | 2% | 6% |
| Midwife | 2,032 | 2,439 | - 407 | 3,651 | 3,209 | 2,674 | 3% | 3% |
| Assistant Nurse | 2,230 | 1,180 | 1,050 | 1,575 | 2,925 | 5,527 | 7% | 2% |
| Pharmacist | 5,312 | 2,672 | 2,640 | 3,082 | 1,228 | 2,440 | 3% | 4% |
| Assistant Pharmacist | 3,986 | 6,265 | - 2,279 | 984 | 1,636 | 1,041 | 11% | 9% |
| Laboratory Technician | 1,740 | 1,822 | - 82 | 3,996 | 3,748 | 3,578 | 3% | 3% |
| X-ray Technician | 596 | 1,318 | - 722 | 6,931 | 10,937 | 4,947 | 2% | 2% |
| Other Technician | 1,739 | 2,072 | - 333 | 3,733 | 3,750 | 3,148 | 3% | 3% |
| Environ'tal H'lth Staff | 871 | 1,294 | - 423 | 7,032 | 7,486 | 5,038 | 1% | 2% |
| Technical Administrator | 1,757 | 1,770 | - 13 | 4,117 | 3,711 | 3,685 | 3% | 2% |
| Senior Manager | 154 | 154 | 0 | 38,855 | 42,377 | 42,469 | 0% | 0% |
| Middle Manager | 789 | 778 | 11 | 9,290 | 8,268 | 8,386 | 1% | 1% |
| First L.Mgr & engineer | 679 | 663 | 15 | 12,889 | 9,609 | 9,831 | 1% | 1% |
| Clerical Staff | 3,901 | 3,874 | 27 | 2,040 | 1,672 | 1,683 | 5% | 5% |
| Support staff | 8,760 | 8,705 | 56 | 775 | 744 | 749 | 14% | 12% |
| **Totals** | **63,395** | **72,783** | **- 9,388** | **105** | **103** | **90** | **100%** | **100%** |

Jordan Strategic Projection

Table 18

# ANNEX IX

## KEY OUTPUT INDICATORS – SCENARIO 1

| Year 2004 | Year 2014 | Assumption or Result | Projection Years = 10 |
|---|---|---|---|
| **DEMOGRAPHIC INDICES** | | | |
| 5,323,200 | 6,520,830 | Total population | |
| ------ | 2.05% | Assumed average annual % change in the population | |
| 79% | 81% | Assumed % of population in urban areas | |
| ------ | 2.3% | Calculated average annual % change in urban population | |
| ------ | 1.0% | Calculated average annual % change in rural population | |
| **GROSS DOMESTIC PRODUCT and EXPENDITURE ASSUMPTIONS** | | | |
| ------ | 7.3% | Annual average rate of change in gross domestic product (GDP) | |
| 30.5% | 25.0% | Total recurrent public sector as % of GDP | |
| 6.8% | 7.8% | Recurrent health expenditures as % of public sector | |
| 73.6% | 76.0% | Personnel expenditures as % of public health sector | |
| ------ | 2.0% | Assumed annual real change in health worker salaries (unweighted) | |
| ------ | 22% | Calculated av. total change in real health worker salaries (unweighted) | |
| **ESTIMATED ECONOMIC FEASIBILITY OF PROJECTED REQUIREMENTS** | | | |
| ------ | 6.9% | Calculated sustainable average annual change in expenditures | |
| ------ | 6.9% | Assumed average annual change in expenditures | |
| ------ | 194.2 | Calculated target year cost of health personnel (000,000) | |
| ------ | 191.1 | Calculated target year funds available for personnel (000,000) | |
| ------ | **102%** | **Calculated Target-Year costs as % of projected T-Year funds** | |
| **PRIVATE SECTOR ESTIMATES AND ASSUMPTIONS** | | | |
| ------ | 3.0% | Assumed average annual change in private sector beds | |
| 3,950 | 5,308 | Number of private sector beds | |
| ------ | 4.0% | Assumed average annual % change in private sector ---> Specialist Doctor | |
| ------ | 3.7% | Assumed average annual % change in private sector ---> Medical Resident | |
| ------ | 4.0% | Assumed average annual % change in private sector ---> G P | |
| ------ | 4.2% | Assumed average annual % change in private sector ---> Dental Doctor | |
| ------ | 4.1% | Assumed average annual % change in private sector ---> Registered Nurse | |

| Year 2004 | Year 2014 | Assumption or Result | Projection Years = 10 |
|---|---|---|---|
| **PERSONNEL INDICES** | | | |
| 105 | 90 | Population per health worker | |
| 95 | 112 | Health workers per 10,000 population | |
| 50,791 | 72,783 | Total health personnel included in scenario | |
| ------ | 3.7% | Average annual % change in health personnel | |
| 976 | 824 | Population per Specialist Doctor | |
| 4,360 | 4,005 | Population per Medical Resident | |
| 1,291 | 913 | Population per General Practitioner | |
| 1,624 | 1,255 | Population per Dental Doctor | |
| 710 | 570 | Population per Registered Nurse | |
| 1.8 | 1.5 | Number of public sector nursing staff per doctor | |
| 1.5 | 1.2 | Number of public sector auxiliary & assistant nurses per qualified nurse | |
| 47% | 49% | % of all health workers in public sector | |
| ------ | 81.7% | % of all public sector personnel in clinical locations | |
| ------ | 1.3% | % of all health workers in academic & training locations | |
| ------ | 7.7% | % of all health workers in non-clinical public health | |
| **INSTITUTIONAL INDICES** | | | |
| 1.6 | 1.8 | Total public and private beds per 1000 population | |
| 8,360 | 11,709 | Total number of hospital beds | |
| 52.8% | 54.7% | % of beds in the public sector | |
| 31 | 39 | Number of public sector hospitals | |
| 142 | 163 | Average beds per public sector hospital | |
| ------ | 3.4% | Calculated average annual change in total number of beds | |
| **HEALTH SYSTEM PRODUCTIVITY** | | | |
| 589,398 | 1,036,424 | Total hospital discharges | |
| 111 | 159 | Hospital discharges per 1000 population | |
| 52% | 53% | % of discharges from public sector hospitals | |
| 74% | 83% | Average occupancy rate in public hospitals | |
| 4 | 3 | Average length of stay in public hospitals (days) | |
| 70 | 86 | Average discharges per bed-year in public hospitals | |
| #N/A | #N/A | Per capita visits by a --> Specialist Doctor | |
| 0.00 | #N/A | Per capita visits by a --> Medical Resident | |
| 0.00 | #N/A | Per capita visits by a --> General Practitioner | |
| 0.00 | #N/A | Per capita visits by a --> Dental Doctor | |
| 0.00 | #N/A | Per capita visits by a --> Registered Nurse | |

Jordan Strategic Projection