PHYSICIAN STAFFING AT ISRAELI HOSPITALS AND FAMILY HEALTHCARE

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ABSTRACT

Israel's public hospitals need to add thousands of physicians and beds.

A new standardization model for physician staffing at hospitals was developed 2005 for the Israeli medical association. The model has recently been implemented on 21 different hospital disciplines and family healthcare. For each discipline a specific model was developed. Inserting a wards output for each working area (e.g. ward's night beds occupancy, operations and visits to outpatient clinics) into the model, resulted in required Full- Time Equivalents - FTE's for 2010.

The results showed an alarming lack of physicians, related to the 1977 agreements revised by Goldberg 1983 and Barabash 1997 and related to the present attendance. The old agreements relate the number of physicians to the number of beds in hospitals and not to number of patients. Because of over occupancy, most of hospital managements' have budgeted from various sources, additional FTE's providing higher present attendance than the 1975 approved norms. The measured physicians worked hard over long periods, under mental stress, sometimes performing precision tasks e.g. operating. Measured rest times were very low related to the recommended allowances in Israel, not to mention the fact that interns work continuously 25 hours when on night shift. It is recommended to change the night shift structure to three 8 hour shifts or two 12 hour shifts.

Studying 2010 statistics showed that the average yearly bed occupancy is around 100%, occupancy reaching 140% during stressed periods. Thereby patients are laid down in corridors and/or extra beds are clammed into existing rooms. As equipment

and nursing are also related to beds in Israel, these too were found missing. Analysis indicated re- hospitalization related to lack of beds as well as short hospitalization due to stress and method of accounting between hospitals and communal care, causing incomplete diagnose and treatment. Instead of being diagnosed and treated in sequence during the first hospital stay, patients are sent back to communal healthcare for medical examinations.

It will take 5-20 years for the state to bridge the gap, educating thousands of missing physicians and building more wards and installing beds.

1. INTRODUCTION

The goal of this study was to recommend physician full time staffing requirements (FTE) for each and every ward in 21 different hospital disciplines and family healthcare in Israel based on 2010 throughputs.

The study was based on a general standardization model [1]. For each and every discipline, an advisory board consisting of professors from different hospitals and employers, as well as Israeli medical association representatives and work measurement experts assembled. The advisory board supervised over the study sliced the different wards into clusters based on working procedures, equipment or patient characteristics, advised which activities were to be measured and the wards representing the clusters that were to be measured.

Hospital disciplines are generally divided into hospitalization e.g. Internal, Cardiology; clinics with or without tests e.g. Radiology, Gastro, Pathology; or others e.g. Anesthesia.

The Israeli medical association in collaboration with the different discipline's associations initiated this study following the previous one from 2005 that developed the general standardization staffing model.

2. __METHOD__

Each discipline was divided, if necessary, into clusters by the advisory board. Representing wards to be studied and measured were chosen. Activities to be studied were divided into direct activities dependent on hospitalized patients and indirect activities e.g. research and rest. Work sampling every 5-10 minutes was applied to determine the proportion of time invested for each activity. The chosen sampling interval is considered sufficient as literature suggests intervals e.g. 15-20 minutes [2]. In some cases, work sampling was not suitable, therefore direct measurement was applied.

Measured physicians were requested to subjectively rate the amount of time they think they invested on the different activities. The measured and subjective times were compared and tested using Kolmogorov-Smirnov test. After establishing the relevance of the measured times, physicians from the same cluster that were not measured, filled the subjective questionnaire, to maintain the relevance of the standardization model to wards that were not measured.

If the subjective activity times correlated, it is assumed that the non-measured physicians are working with the same processes and are of the same cluster, as the ones that were measured and that the standardization model is relevant for them and therefore applicable.

Monthly ward outputs from each and every work area were collected for the 2010, e.g. bed occupancy, average hospitalization days, operations, clinic visits, no shows, re-hospitalization or tests, waiting time, errors, as well as the number of FTE's (specialists and interns).

The general staffing standardization model of Ben-Gal et al. [1] was adjusted to the different disciplines and clusters and applied based on the 2010 outputs. Each ward got a staffing recommendation that was correlated to its existing FTE's.

In some cases the expert group suggested new working procedures that were usually derived from benchmarking. The estimated activity times were simulated for a so called "Best Practice" staffing model.

3. RESULTS

The study of all the 21 disciplines is yet to be completed. This publication will concentrate on results of 8 disciplines that have been completed, in parenthesis the number of wards that got a staffing recommendation. The specific names of disciplines were omitted due to confidentiality issues. The results are presented according to:

a. Disciplines recognized for being under acute stress: Discipline VII (18), Discipline I (31), Discipline IV (20) and Discipline II (90).

b. Hospitalization disciplines: Discipline II (90), Discipline III (17) and Discipline I (31).

c. Clinical disciplines: Discipline IV (20), Discipline V (16) and Discipline VI (11).

d. Non categorized disciplines: Discipline VII (18) and Discipline X (6).

Clusters were relevant only for two disciplines. Discipline I was divided into two clusters: 30 and 60 beds. The other discipline (Discipline V) was divided to two clusters.

Measured physicians rest time was alarmingly low and varied in most of the disciplines between 3% to 6%. Only in one discipline (Discipline V) did we measure 11%. This is one of the few relatively small disciplines that physicians are seldom in direct interface with patients. The table below presents the measured discontinuity- rest times related to the recommended rest allowances.

Table 1: Recommended and measured rest

Discipline Type	Discipline	Recommended Rest	Measured Rest [1]
Hospitalization	Discipline I	15%	5.0%
	Discipline II	14%	3.5%
	Discipline III	17%	6.0%
Medical Institute	Discipline IV (Doctors only)	17%	4.5%
	Discipline V (Doctors only)	15%	11.0%
	Discipline VI	14%	7.0%
Other	Discipline VII	15%	3.0%
	Discipline X	12%	3.7%

[1] Discontinuity percent is presented in a heat table:

Red: 10% > Rest > 15%

Green: 10% < Rest < 15%

3.1 Number of physicians

The staffing model is first and foremost aggregated by the outputs e.g. number of patients. The measured direct activities related to the number of treated patients, as can be seen in the table below was between 67% and 92%, thereby all the indirect activities including rest times that are not aggregated by patients were between 8% to 33%.

Table 2: Rate of direct activities by discipline

Discipline Type	Discipline	Rate of Direct Activities
Hospitalization	Discipline I	79%
	Discipline II	67%
	Discipline III	74%
Medical Institute	Discipline IV (Doctors only)	80%
	Discipline V (Doctors only)	75%
	Discipline VI	81%
Other	Discipline VII	80%
	Discipline X	92%

The staffing FTE recommendation for 2010 is compared to the present staffing norms, related to the 1977 agreements revised by Goldberg 1983 and Barabash 1997 and compared to the present attendance (specialists and interns). Discipline II is the only discipline that displays present attendances lower than the present staffing norms. It is here for clear that Discipline II is heading the list of disciplines recognized for being under acute stress.

The gap between existing staffing and governmental standaridzation by discipline

| 190% | -3% | 18% | 137% |

Existing staffing | **Governmental standardization**

The relative gap between existing and governmental standardization

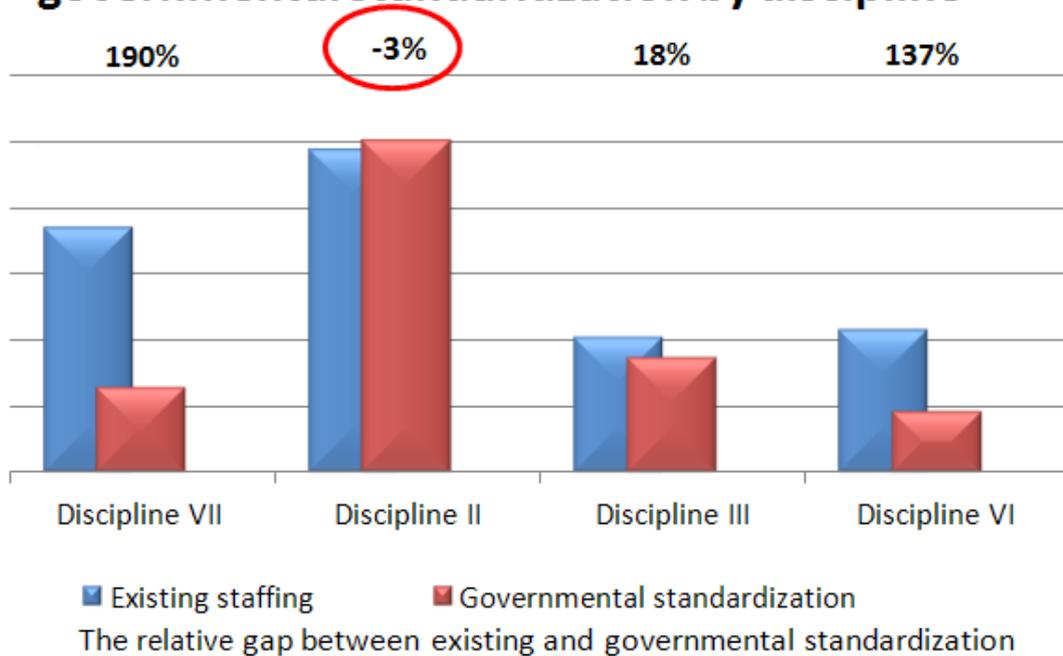Discipline VII | Discipline II | Discipline III | Discipline VI

Fig. 1: The gap between existing and governmental standardization by discipline

   Analysis of the number of interns related to the number physicians expected to retire in the coming five years showed that in most of the disciplines the present shortage of physicians is not going to worsen. As seen in the following figure, to maintain the present staffing rate, a problem might occur in Discipline V. In Discipline VII we see that hospital managements have provided 90% more than governmental allowed norms.

Interns versus expecting to retire by discipline

| 46% | 3% | 18% | 25% | 6% | 38% | 4% | 10% |

Discipline VII | Discipline IV | Discipline III | Discipline VII | Discipline V

Number of interns (existing staffing) | **Number of doctors expecting to retire (existing staffing)**

The rate of interns in discipline | The rate of doctors expecting to retire in doscipline
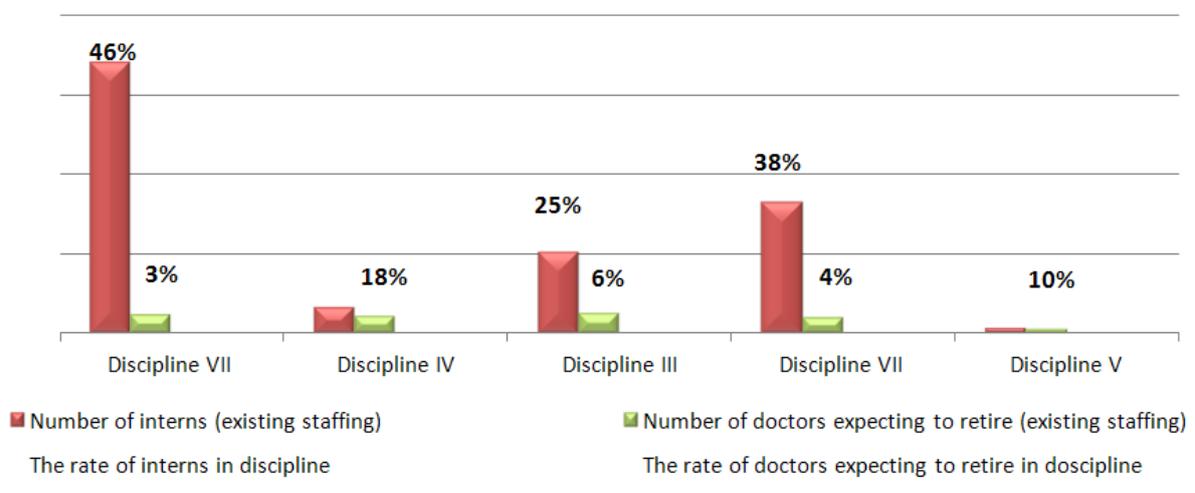
Fig. 2: Interns versus expecting to retire by discipline

The most important finding of this study is the shortage of physicians based on our recommendation compared to existing staffing levels, which are higher than the governmental budgeted staffing. The shortage shown in Fig. 3 presents the number of physicians missing related to the actual present staffing budgeted from government and additional staffing budgeted according to the hospitals ability to raise additional money.
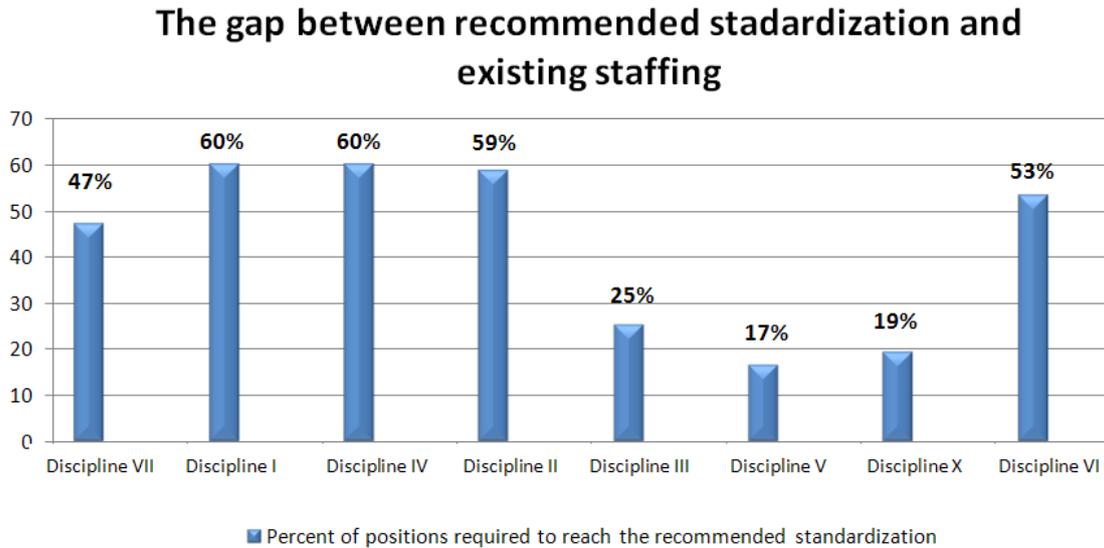

Fig. 3: The gap between recommended standardization and existing staffing

Note: Discipline IV and V relate only to experts

It is clear from the Figures above that Discipline II need 59% increase of existing FTE's, while Disciplines I and IV need 60%, Discipline VI 53% and Discipline VII 47%. These are alarming shortages. In all cases there are not enough interns, after reducing retirement, to bridge the gap.

All in all 1,941 FTE's are missing in the 8 disciplines to reach our staffing recommendations related to present staffing.

The following figure projects the severity of the missing recommended FTE's. The horizontal axis, presents the number of missing FTE's to bridge the gap between existing and recommended FTEs. The vertical axis presents the disciplines relative lack of staffing out of the total lack of the presented disciplines. The percent of missing recommended staffing related to the existing staffing is represented by the diameter.
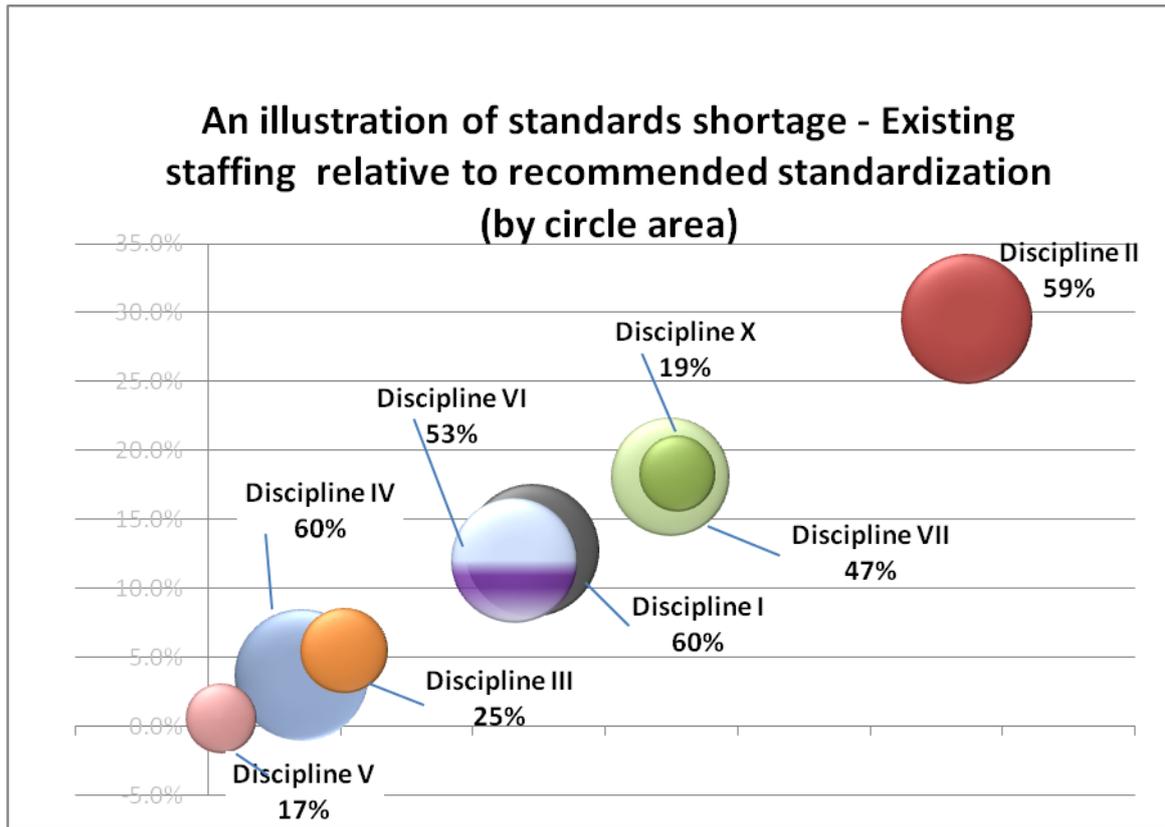
Fig. 4: An illustration of standards shortage – existing staffing relative to recommended standardization

3.2 Best Practice staffing

The expert groups defined best practice procedures, in some cases the best practice is derived from leading western medicine and norms. Best practice was analyzed only for six out of the eight disciplines.

The gap between best practice standard and existing staffing
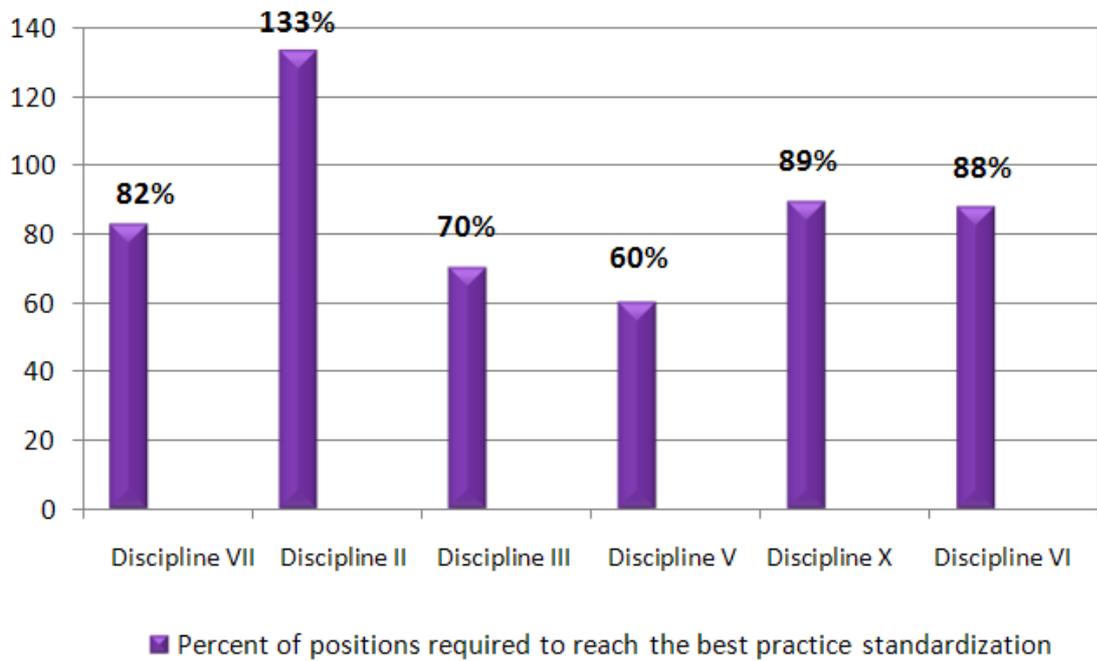

Fig. 5: The gap between best practice standard and existing staffing

The following Figure projects the severity of the missing recommended FTE's relative to BP. The vertical axis presents the disciplines relative lack of staffing out of the total lack of the presented disciplines. The percent of missing recommended BP staffing related to the existing staffing is represented by the diameter.

The greatest shortage of recommended FTE's is in Discipline X, followed by Discipline II suffering from a relative higher shortage, 133% of the existing staffing.
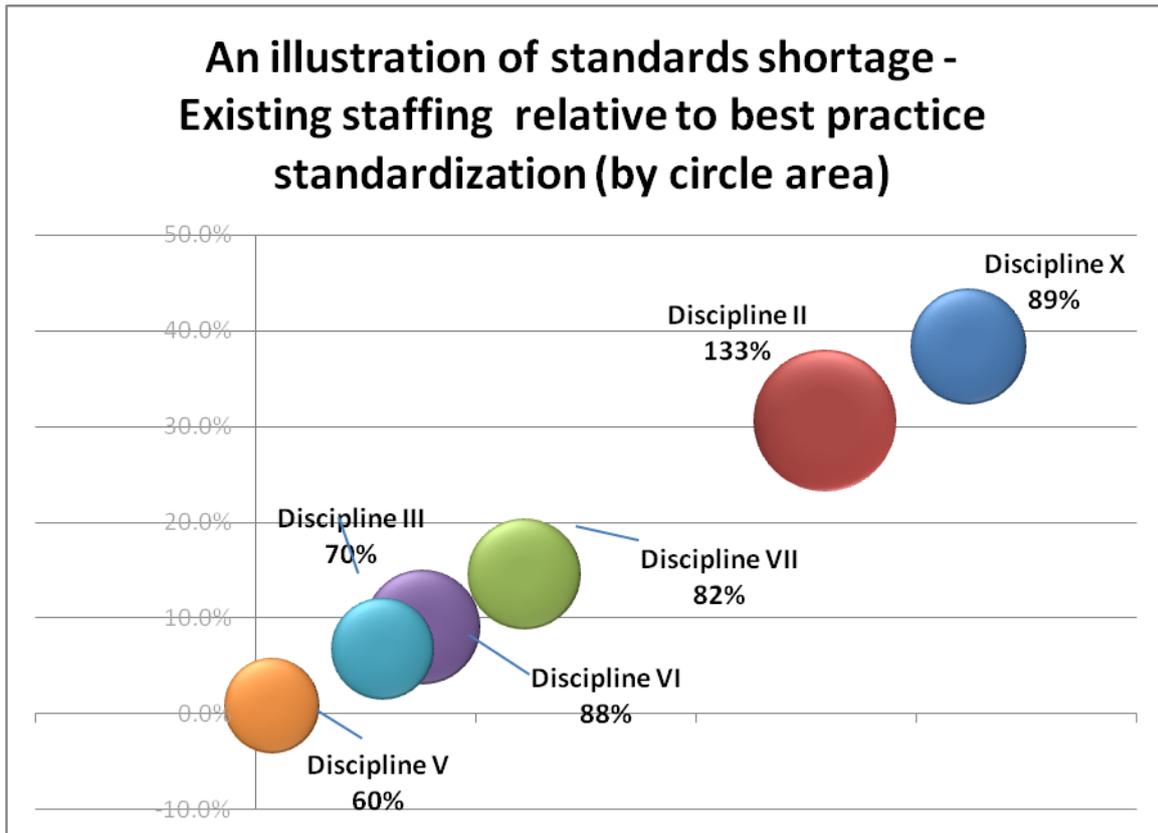
Fig. 6: An illustration of standard shortage – Existing staffing relative to best practice standardization

3.3 physicians per capita

The study presents the rate between present, recommended and best practice staffing related to a population of 100,000 in different countries. It is clear from the table under that the present situation in Israel related to western countries is bad. This study recommends new staffing norms that will definitely better the situation. Even if the best practice option is implied, the number of doctors per capita will not elevate to the highest rates as in leading countries. It will definitely raise service levels and the quality of hospital medicine.

Table 2: A mapping of the number of physicians per capita in existing staffing, versus the recommended and best practice standards.

	Discipline	Number of physicians (FTE) per 100,000 people in Israel [1]		Number of physicians (FTE) per 100,000 people in the world relatively to Israel (2010)		
		Recommended relatively to Existing (2010)	BP standard relatively to Existing (2010)	Country	Number of positions relatively to Israel	Year
1	Discipline VII	144%	168%	Sweden	353%	2004
				France	282%	2004
				UK	156%	2004
				Romania	91%	2004
				Turkey	47%	2004
2	Discipline I	116%	-	Japan	227%	2006
				USA	156%	2006
3	Discipline IV	136%	-	USA	224%	2006
				Japan	77%	2006
				Korea	61%	2006
4	Discipline II	129%	179%	Japan	347%	2006
				USA	216%	2006
5	Discipline III	131%	135%	Japan	136%	2006
				USA	125%	2006
6	Discipline V	116%	148%	Canada	85%	2004
				USA	54%	2004
7	Discipline VI	200%	245%	USA	274%	2006
				Japan	85%	2006
8	Discipline X	-	164%	-		

[1] According the central bureau of statistics at the end of 2010 Israel population was 7,695,100 people (excluding foreign workers).

4. <u>**CONCLUSIONS**</u>

The results indicate clearly that the physician staffing related to treated patients for 2010 is very poor based on treatment processes that are practiced today in Israel. The first indicator to strengthen our findings are measured rest times, 3% to 7%, that are extremely low, in fact the lowest rest times researchers in this study have ever encountered. Our recommendations for physicians suggest that rest times for a standard shift of 8.6 hours should be for these disciplines 12%-17%. Interns do not work one shift; they work 3 consecutive shifts, 25 hours with no significant break. It would be logical to assume that nighttime fatigue would cause mistakes and higher mortality, but statistics show that Israel boasts of low hospital mortality and high life expectancy, 81.6 years according to OECD 2009 data. Shortages of physicians are more significant in peripheral areas as in greater Tel-Aviv. The rate of interns in peripheral areas, related to experts is low; therefore it is more difficult to bridge the gap in the future. Peripheral interns do more night shifts than in Tel-Aviv.

Correlating our recommendations to the standardization norms from 1975 revised 1983 and 1997, relevant only for half of the disciplines, that existed in 1975, reveals an alarming shortage of 3513 FTE's. The standardized old norms for four major disciplines allow 1,788 FTE's while there are existing 2,561 FTE's in hospitals today and we recommend 3,820 FTE's. The answer is simple, the number of beds dictate the staffing in the old norms, while we correlated our norms to 2012 demand- patients arriving for treatment.

Israel is lacking many beds and additional wards, in most of our medical disciplines. According to OECD 2009 data, Israel had 3.35 beds per population of 100,000. The acceptable average use of beds occupied by patients in different countries is around 70%. Thereby in stressed periods they reach 100% utilization and patients are not clammed into corridors.

Israel needs a new physician staffing standard for public health. The work we have done should be based on up to date best practices and in addition to what we did, the standard should be built to cope with service levels e.g. reasonable waiting time for operations, tests and outpatient clinics.

Physician staffing in Israel is a strategic issue. It takes on average 7 years to get a medical license and 6 more years to specialize. Opening more academic tutoring and building wards will take years.

5. <u>REFERENCES</u>

1. I. Ben-Gal, M. Wangenheim and A. Shtub. A new Standardization Model for Physician Staffing at Hospitals, *International Journal of Productivity and Performance Management*, Vol. 59 No. 8, 2010.
2. J. Bratt, W. Foreit, P. Chen, C. West, B. Janowitzi and T.A. Varagas. Comparison of four approaches for measuring clinician time use, *Health Policy and Planning*, Vol. 14 No. 4, pp. 374-81, 1999.

6. <u>ACKNOWLEDGMENT</u>