



# **Cutting the stay-time at the ER of a major medical centre acc. to TOC**

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**Alex Klarman** - As the CEO of the **Goldratt Institute (Israel)**, Dr. Klarman is leading the effort to introduce TOC to, and establish it as the standard management approach in Israel, as well as worldwide.

His background - Ph.D. in biophysics, as well as his industrial and educational background, including long years of hands-on experience in industry, makes him exceptionally fitting to this demanding undertaking.

As the commanding officer of Dr. Eli Goldratt during decades' long service the Israeli army, Dr. Klarman became familiar with the early concepts of **OPT** and **TOC** almost three decades ago. Since 1985 he took a major part in the drive to develop, disseminate and apply **TOC**.

Dr. Klarman's work included developing the educational materials and simulators used in various areas of **TOC** education, as well as the implementation work with some of the leading world-class corporations including the likes of **Ford, Phillips, Intel, Teva** and **Microsoft**, as well as many, many others.

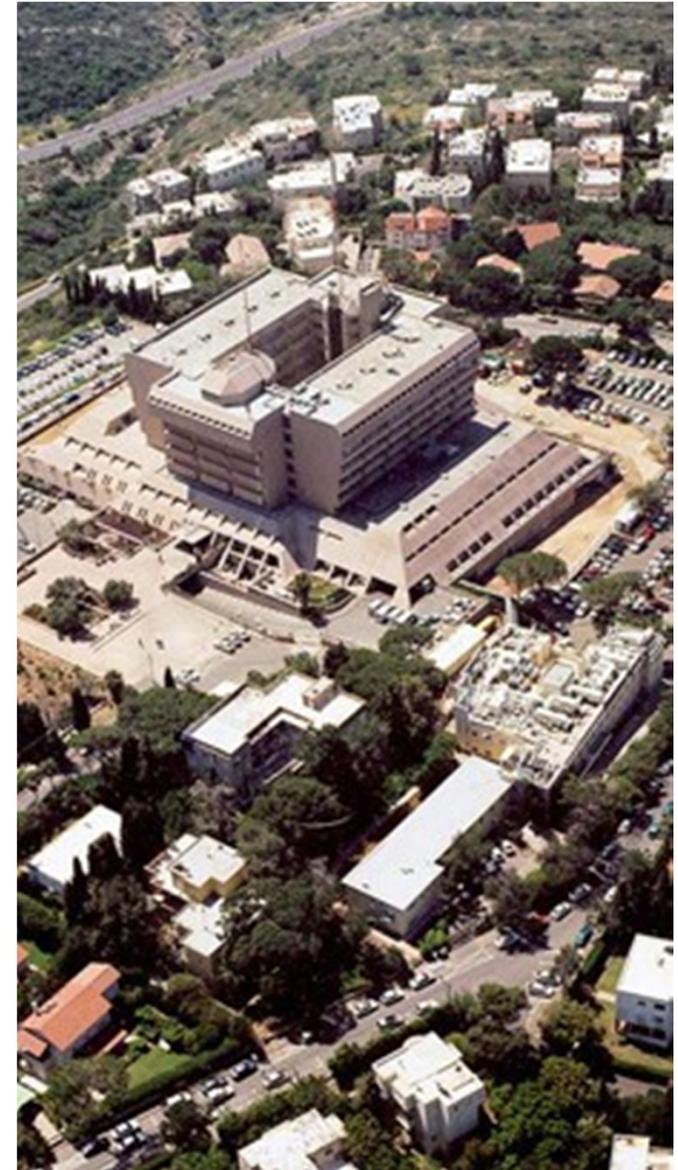
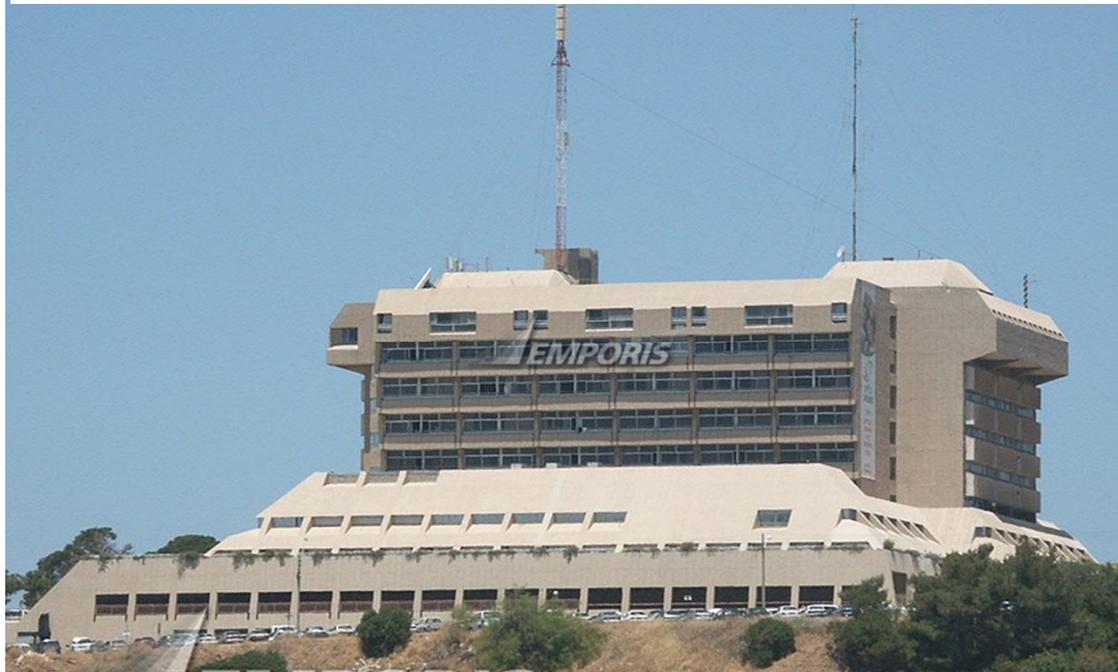


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## The starting Point:

A survey was commissioned by the CMC, regarding the *Patient Experience* (or, as they have called it, *Customer Experience Survey*). It has confirmed what's already well known: there isn't any factor having more profound impact on the feelings and emotions (mainly negative ones) of all the people coming to the hospital - be it patients or the people accompanying them – than the waiting times have.

This phenomenon is having its most vivid impact in the assessment of the ER department's patient's performance:

*The **waiting times** are the main factor in assessing the experience in the ER. The level of satisfaction in ER was **very low**, mainly because most of the people surveyed answered “**they are very dissatisfied with waiting times in the ER**”.*

*The only positive responses regarding the waiting times were the identification with the staff (**lack of personnel**) or an a-priori low expectation. The long waiting times were associated with feelings of **insecurity, frustration and negligence**.*

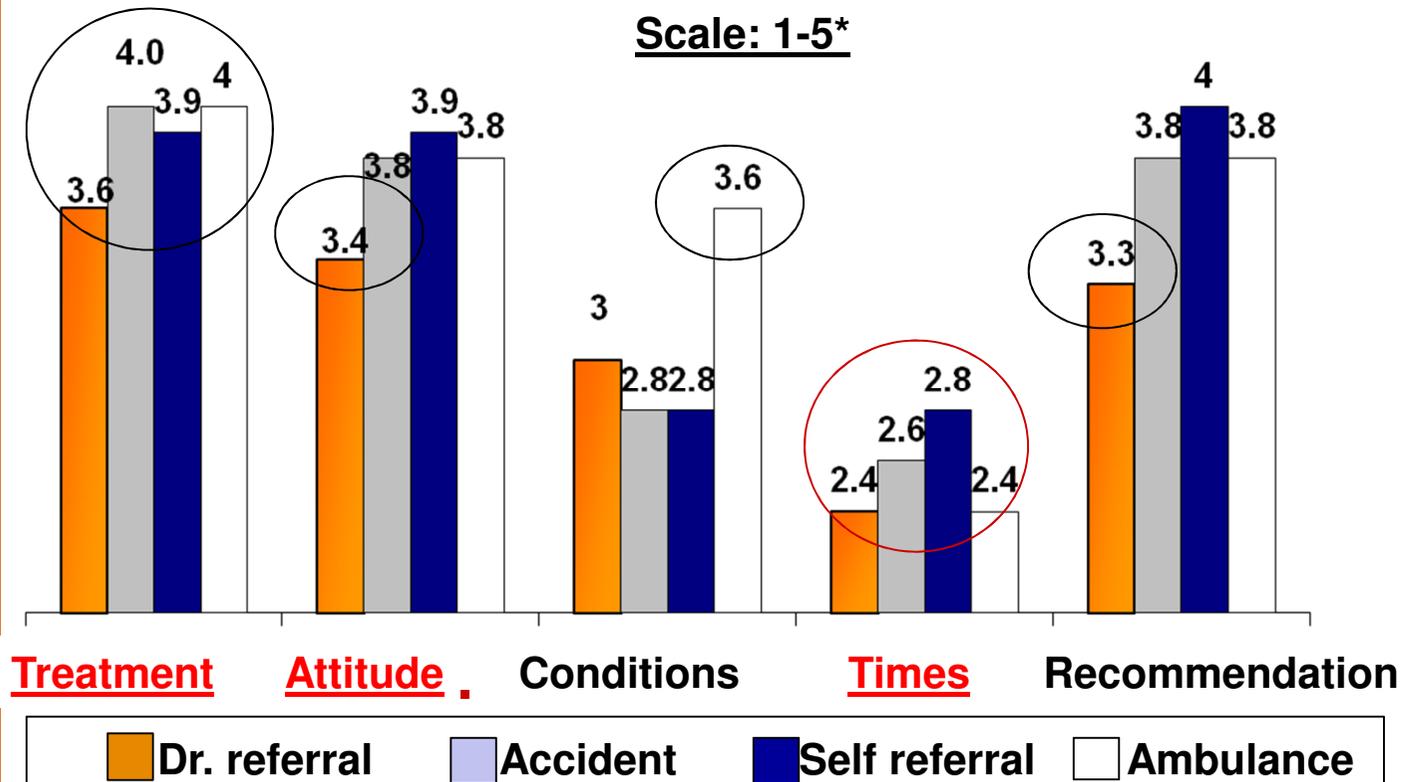


Starting Point (cntd):

As you can see, although the **medical treatment** and the **attitude of the personnel** consistently got high marks, it was the **waiting times** that has most significantly lowered the overall satisfaction:

Satisfaction

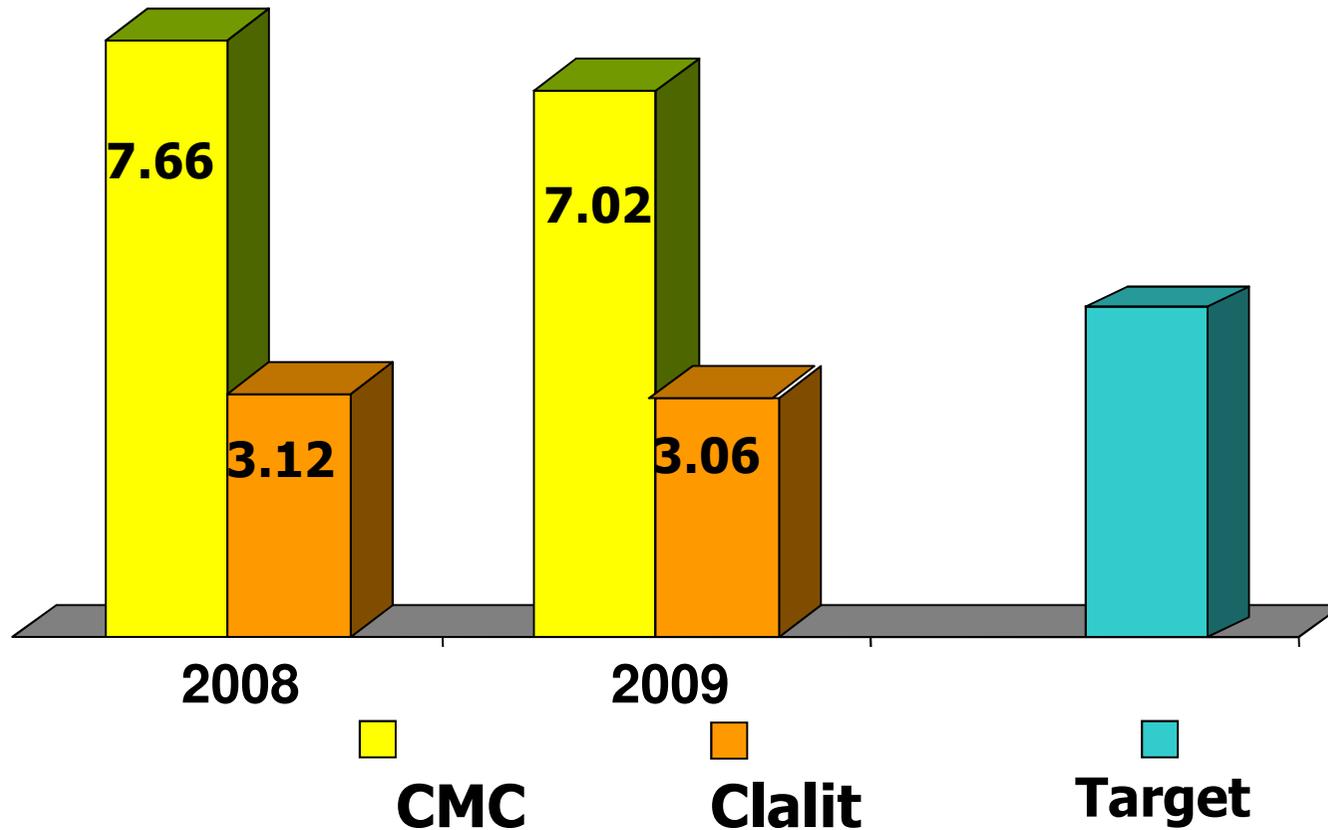
Scale: 1-5\*





# Characteristics of CMC's ER:

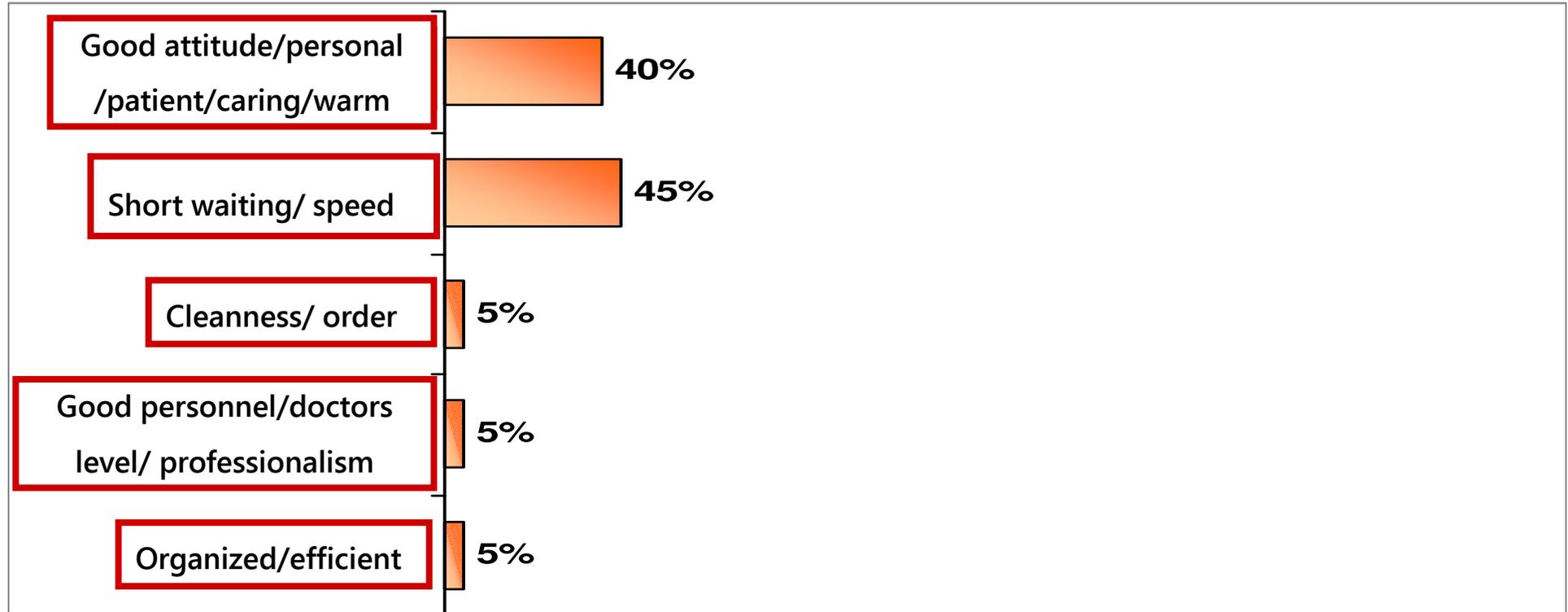
## Average stay in the ER (hours)





## *Experience in the ER of CMC*

**Experience vs. expectation - positive factors (*surprises*)**



***What have positively surprised you today?***

*“They really took a good care of me; I just gave them my doctor’s referral and got a bed in the ward”.*

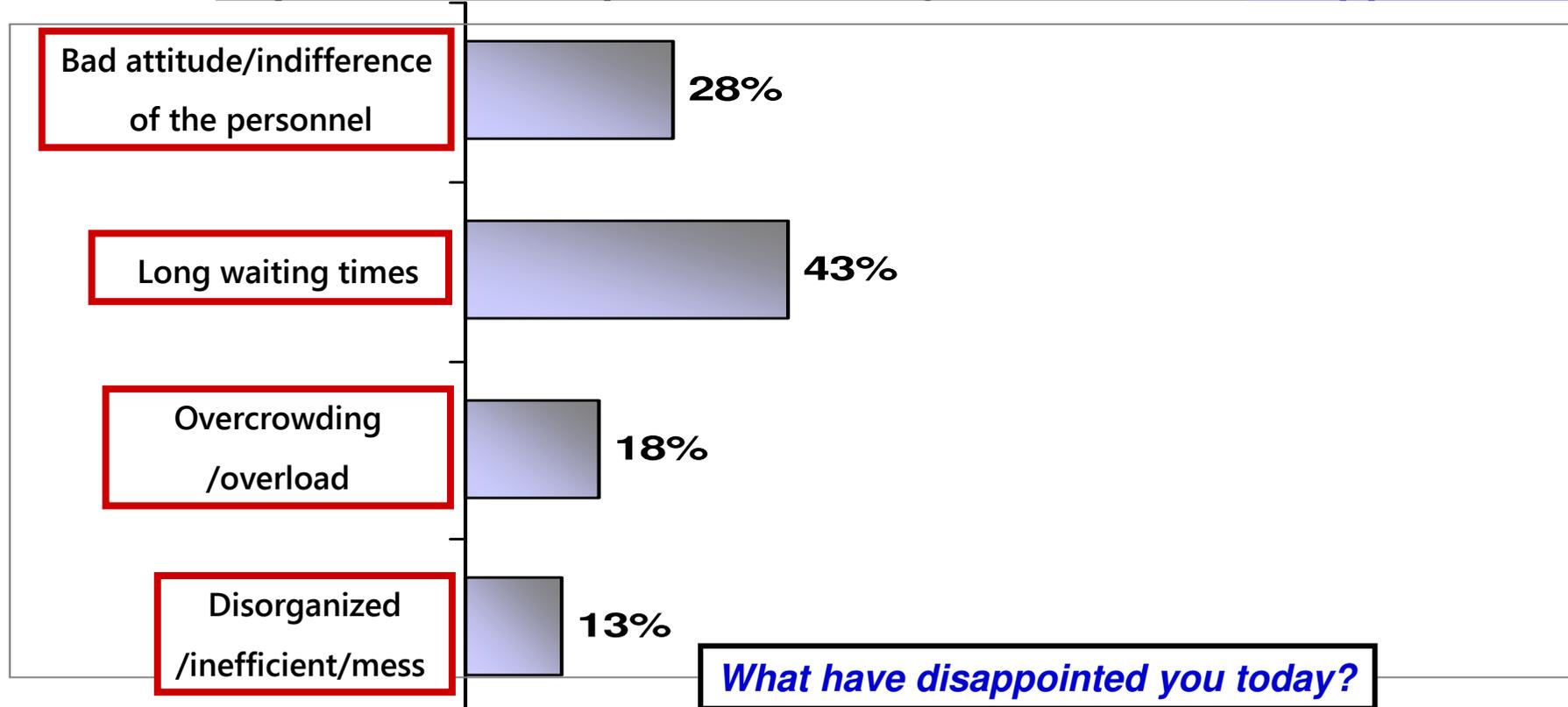
*“... a very nice attitude, they welcome you o nicely”.*

*“They relate to you very nicely, excellent doctors, much better than in the **Rambam** and **Bney Zion** hospitals”.*



# Experience in the ER of CMC

## Experience vs. expectation – negative factors (*disappointment*)



*"The overcrowding is simply terrible; a wait of 3 hours before somebody just looks at you".*

*"... the amount of people here... crowded, hardly enough air to breathe".*

*"We've arrived with my son writhing with pain; we waited two hours for a bed and sedative. The doctor arrived after hours of wait".*



## The goal of the process:

**To contribute to better satisfaction of the patients and their companions through significant reduction of their stay in the ER.  
To better answer the continuous increase of patients' visits, without significant increase of resources.**

## The challenge:

**Significant reduction of the time spent in the general (internal) ER, and improvement of the experience of all the affected (patients and their families/companions), keeping the high medical standards and performing all necessary procedures (which was identified in the survey as a major positive factor).**

**We've assumed that we can rely on the deep trust people have in regard to the professionalism of the personnel and to their dedication to the patients.**



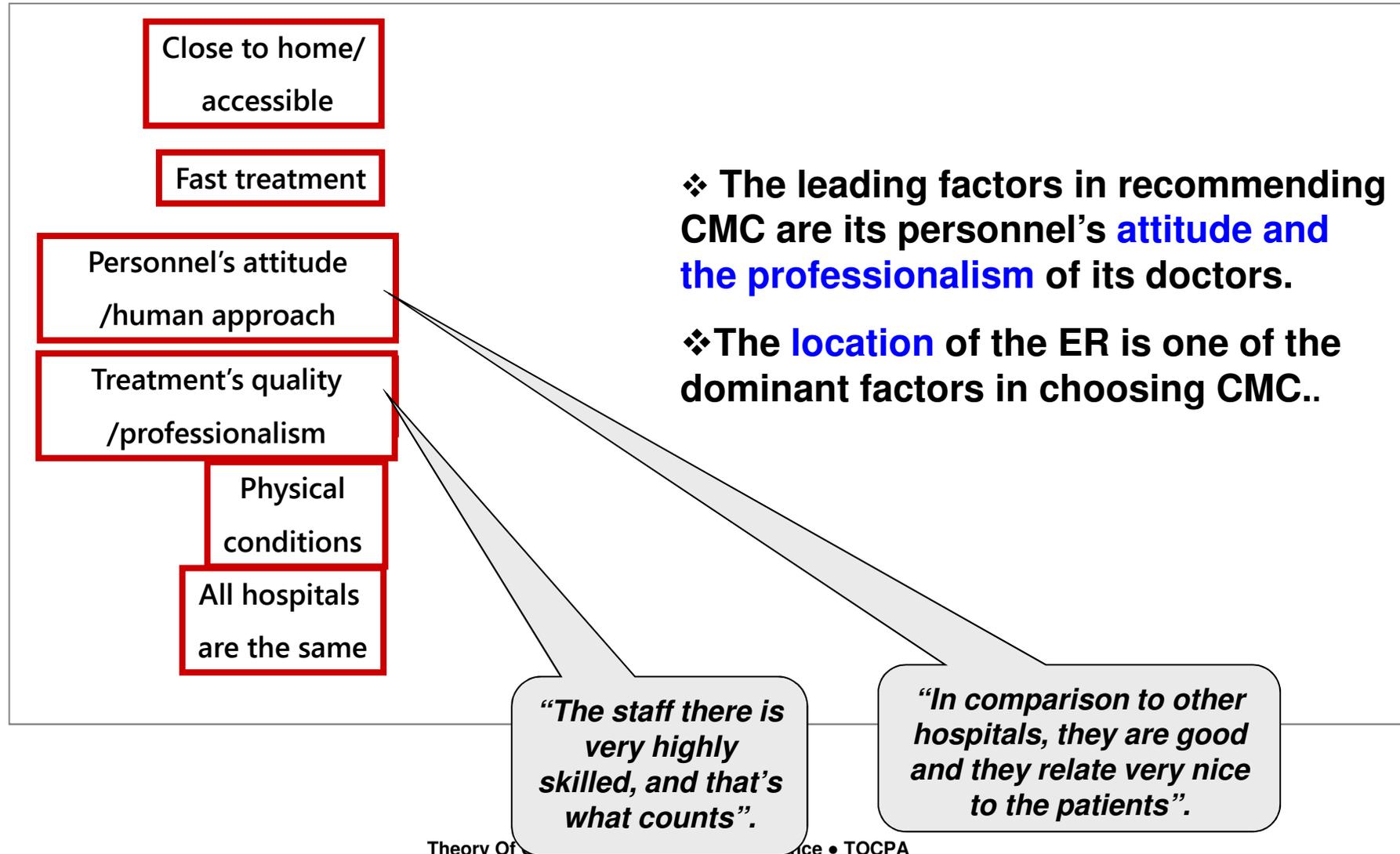
## The physical conditions:

**Additional factor, having a marked negative impact , as seen in the survey, are the **lamentable physical conditions** in the ER.**



# *Experience in the ER of CMC*

Experience vs. expectation – positive factors (*surprise*)





## The process

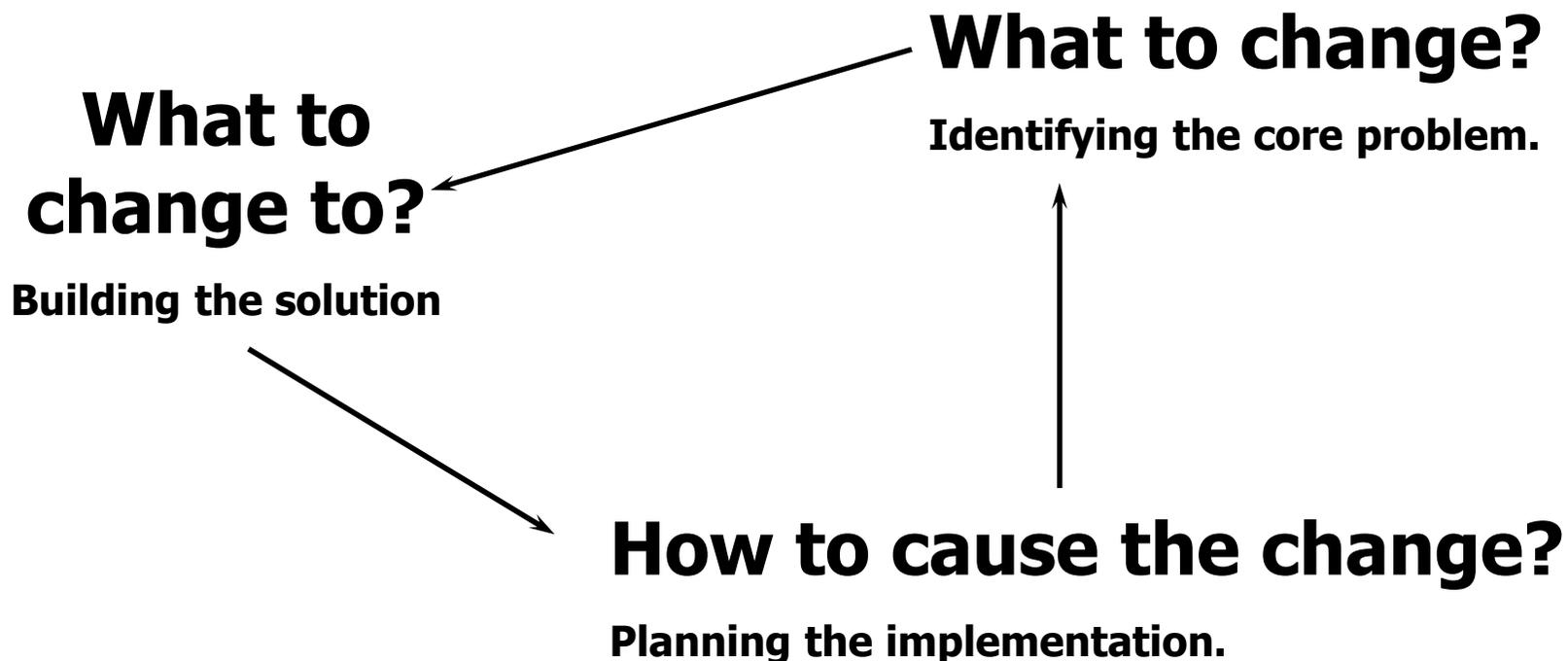
**In order to deal with challenge ER presented, we must first **identify** and understand the **main causes** which most markedly contribute for the existing situation, be it internal problems of the ER or systemic problems of the hospital (or even the problems of the entire health system).**

**This information will serve as the base for any suggested solution aiming in a drastic reduction of the length-of-stay stay in the ER, basing upon the existing resources (or, at least, with only minimal investment in them).**



# The process of on-going improvement

This process is based upon the answers to three key questions:





## The 5 Steps of Process of Ongoing Improvement

1. **Identify** the system's **constraint(s)**.
2. Decide how to **exploit** the system's constraint(s).
3. **Subordinate** everything else to the above decision.
4. **Elevate** the system's constraint(s).
5. If, in a previous step, a constraint has been broken, **go back to step 1**. *Do not allow **inertia** to become the system's constraint.*



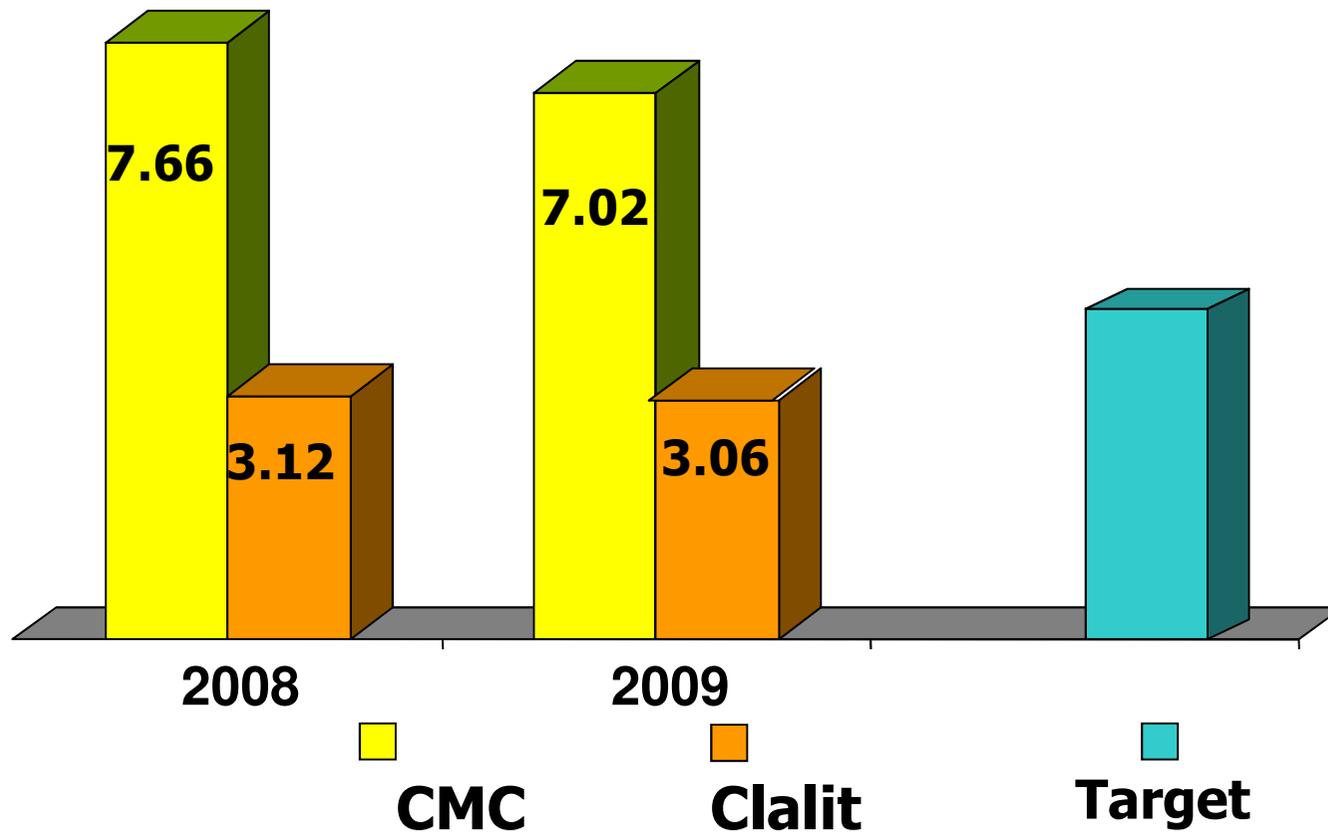
# *The 6 Layers of Resistance to Change*

- Layer 1:** Has the right problem been identified?
- Layer 2:** Are we looking in the right direction for a solution?
- Layer 3:** Will the solution *really* solve all the problems?
- Layer 4:** What could go wrong with the solution? Are there any negative side-effects?
- Layer 5:** Is this solution implementable?
- Layer 6:** Are we all really up to this?



# Characteristics of CMC's ER

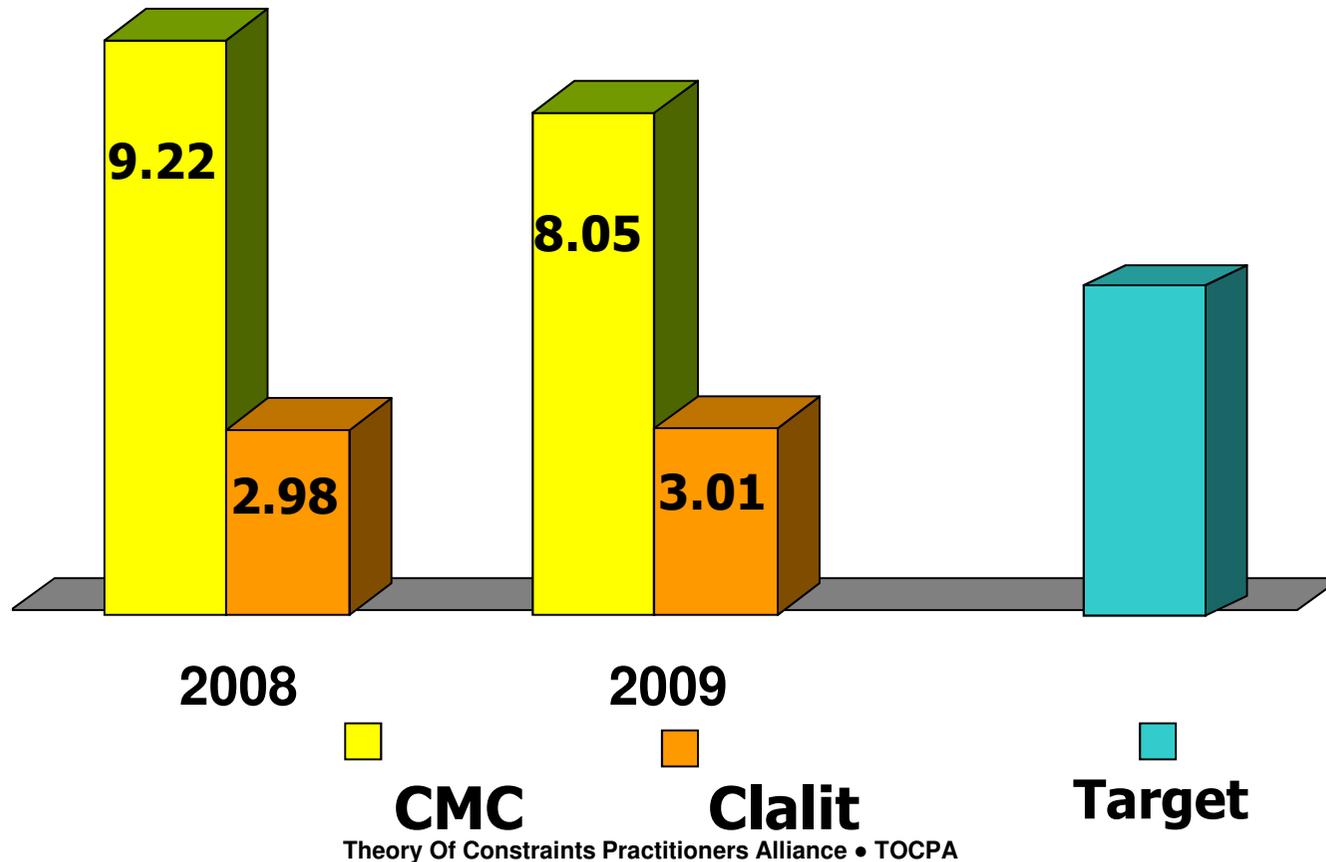
## Average stay in the ER (hours)





## Characteristics of CMC's ER:

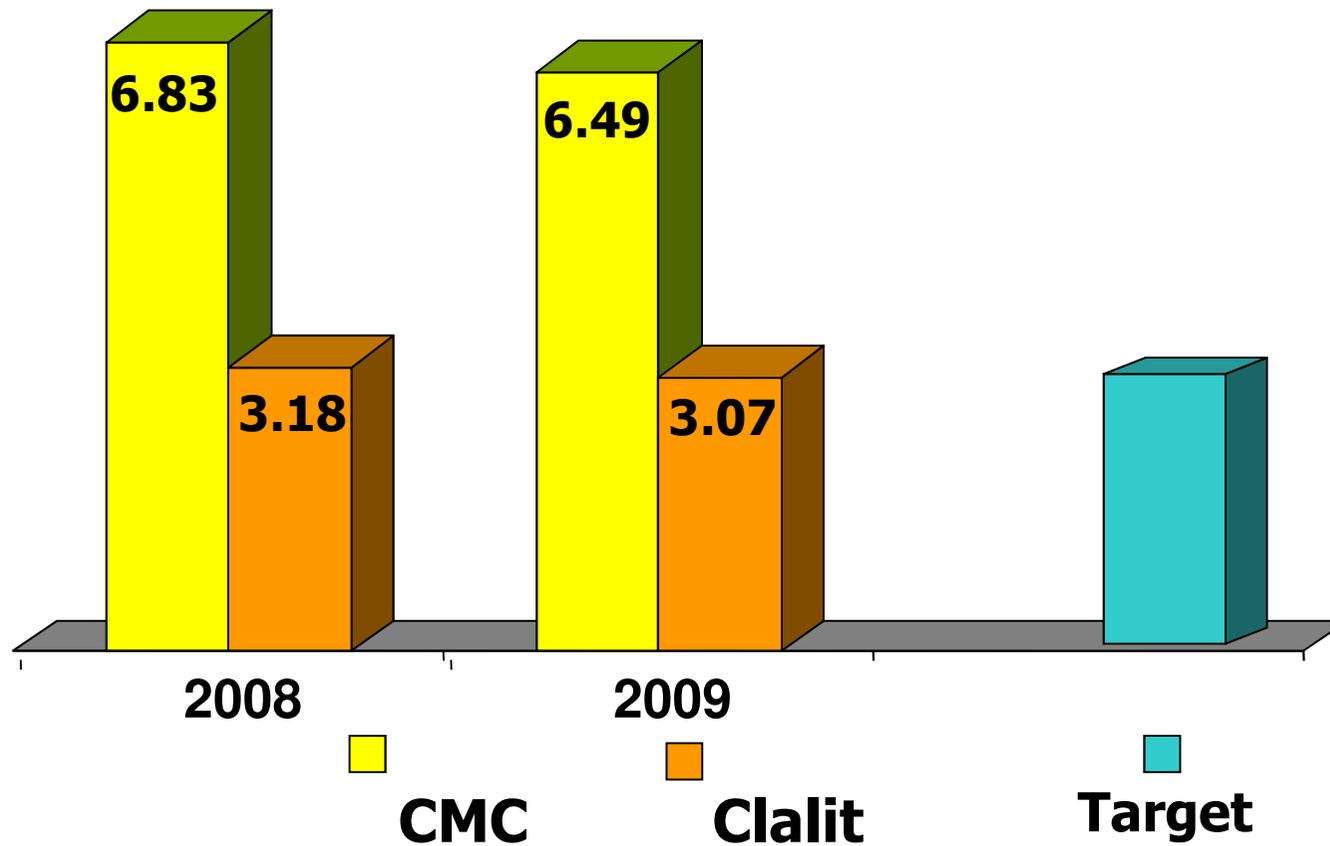
### Average stay in the ER (hours) of hospitalized patients



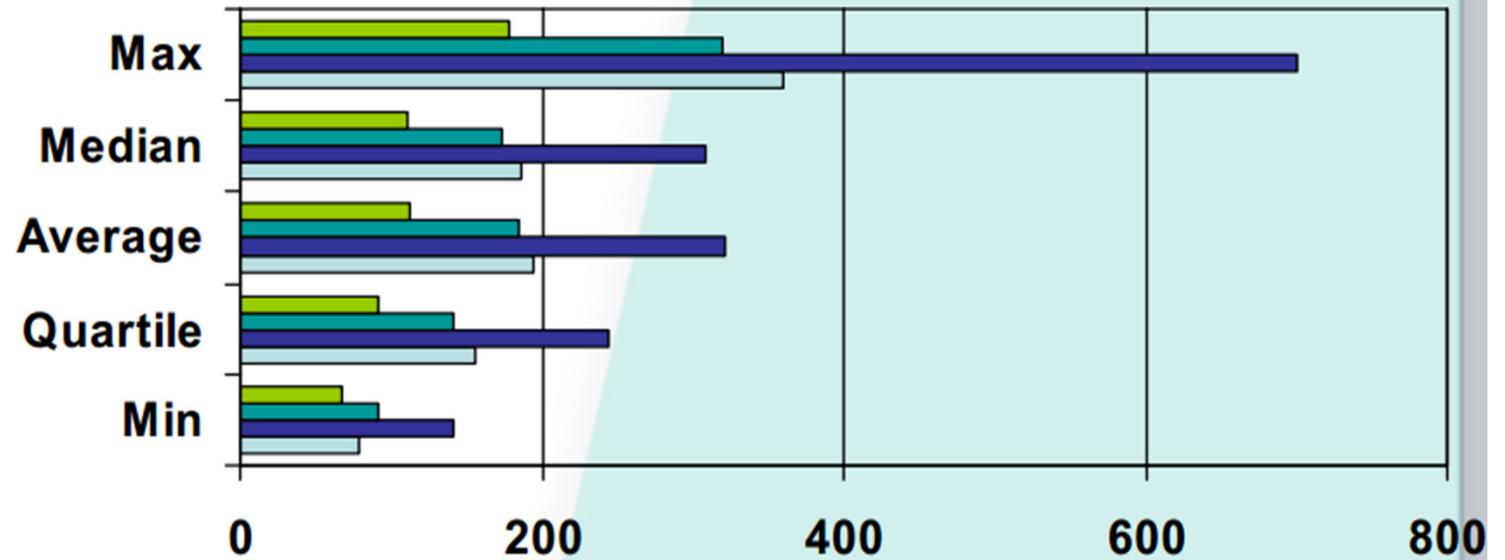


## Characteristics of CMC's ER:

### Average stay in the ER (hours) of un-hospitalized patients



# ED Length of Stay



	Min	Quartile	Average	Median	Max
Fast Track	67	91	113	110	178
Discharged	92	142	185	174	319
Admitted	141	244	321	309	700
Overall average length of stay - arrival to release	78	156	195	187	360

Minutes



**The huge difference between the length of stay in the ER of CMC and in the other hospitals caused us to look for some basic differences (or problems) in the composition of its patients, in its processes or/and procedures between this hospital and others.**

**We've examined both the composition of this hospital's patients body and the processes in the ER, looking for some differentiating factor.**

**That also has caused us to probe the very nature of the processes in the ER, not just measuring their duration.**

**Following you'll see the process we've employed:**



The question was: *Why it takes so long?*

What dictates the slow pace of patients' flow in the ER?

What is this ER's *constraint*?

**At least three different reasons come to mind:**

- 1. This ER deals with people which are much more sick than the average.**
- 2. This ER simply is much more serious in its medical approach than ER's in other hospitals.**
- 3. Its standard processes are more time-consuming than in other ER's.**

**So let's have a look at its patients, procedures and processes:**

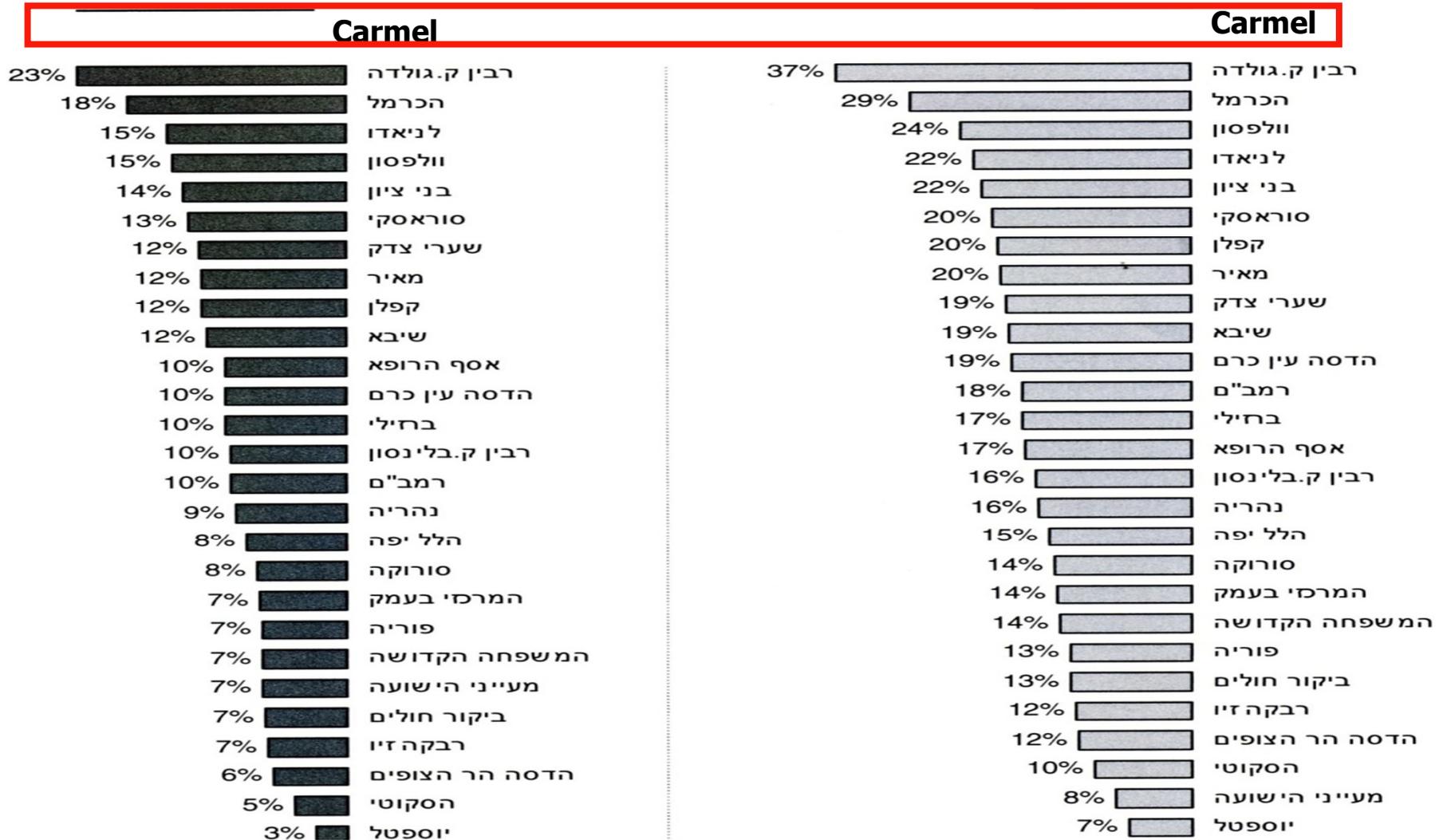
Macabee	United	National	Clalit	Total	Age group
			<u>% of total</u>		<u>Age</u>
24.2	12.5	9.7	53.6	100.0	סך הכול
24.4	15.9	10.1	49.6	100.0	עד 1
25.4	16.1	10.3	48.2	100.0	5-1
25.2	14.6	11.1	49.1	100.0	15-5
20.2	12.5	10.7	56.6	100.0	25-15
25.3	13.6	8.9	52.2	100.0	35-25
31.3	13.3	9.8	45.6	100.0	45-35
24.9	11.1	9.6	54.4	100.0	55-45
22.7	9.8	8.1	59.4	100.0	65-55
19.4	7.7	8.0	64.9	100.0	75-65
14.7	5.9	7.4	71.9	100.0	85-75



% of elderly patients – above 65 and 75, in 2009

Above 75

Above 65





**OK, they take much more time, but does it work?  
Does this lengthy process bears fruits?  
Are Carmel Med Center's patients well served?**

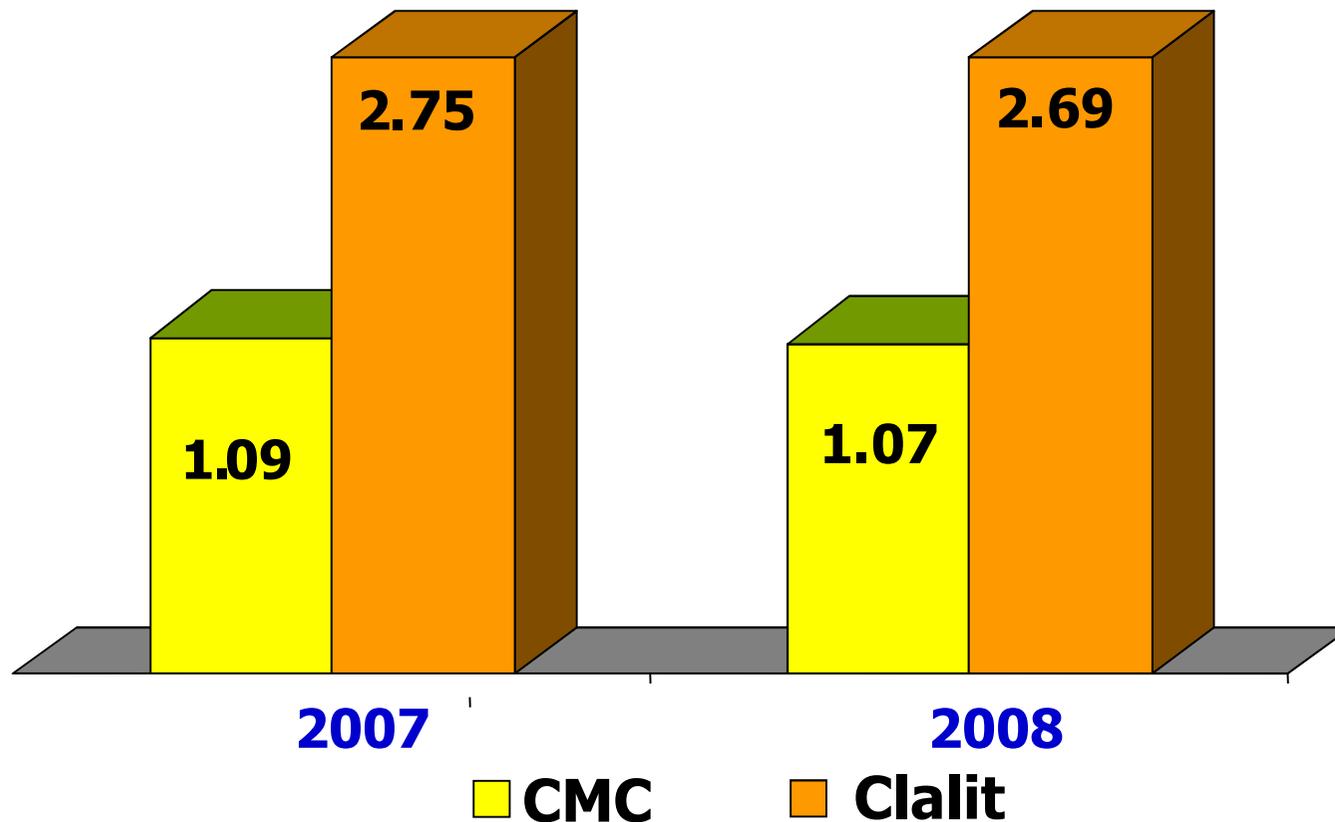
**The standard mode of assessing the thoroughness of medical procedures are the so called *return visits* in the ER within a very short period of time.**



## Characteristics of CMC's ER:

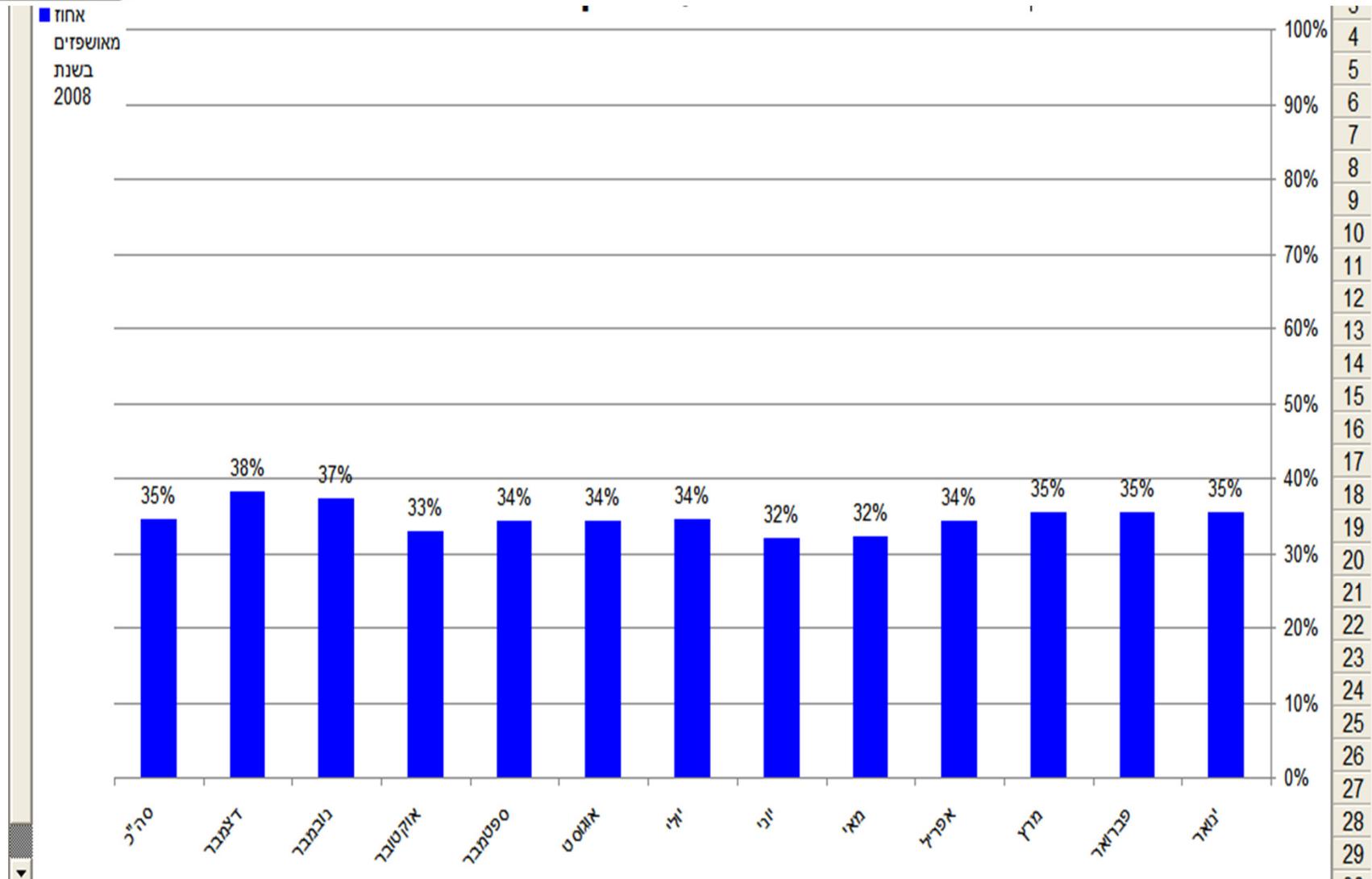
Thorough tests significantly decrease return visits

Return patient visits in ER within 24 hours:





## % of hospitalized patients coming from the Internal Medicine (general) ER





**No doubt, the characteristics of this hospital and its patients are truly very challenging.**

**But let us have a scrutinizing look at some of its processes and procedures.**



## **How does the ER (Internal Med.) functions?**

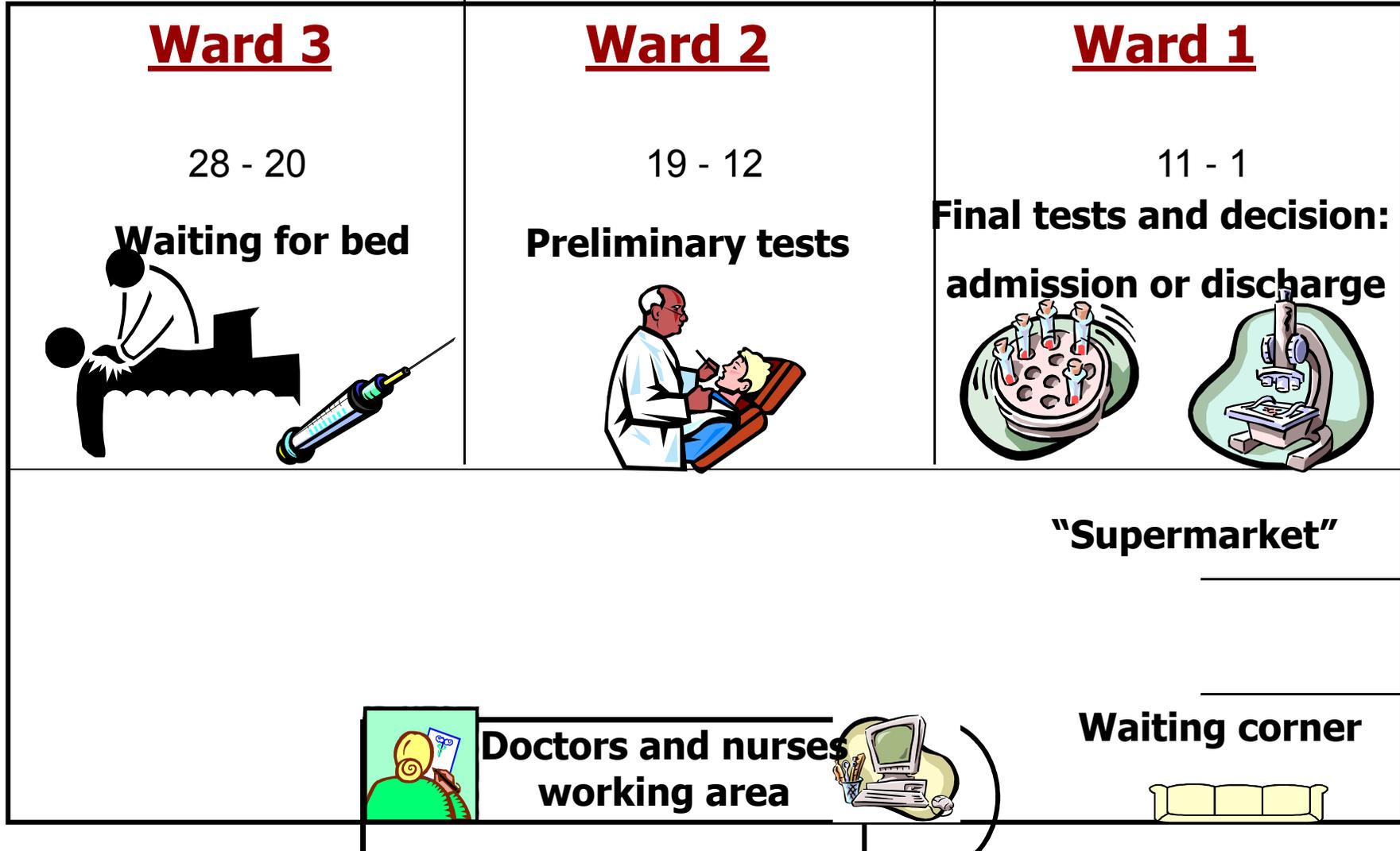
**What is the path each person has to traverse, after registration in the admissions office?**

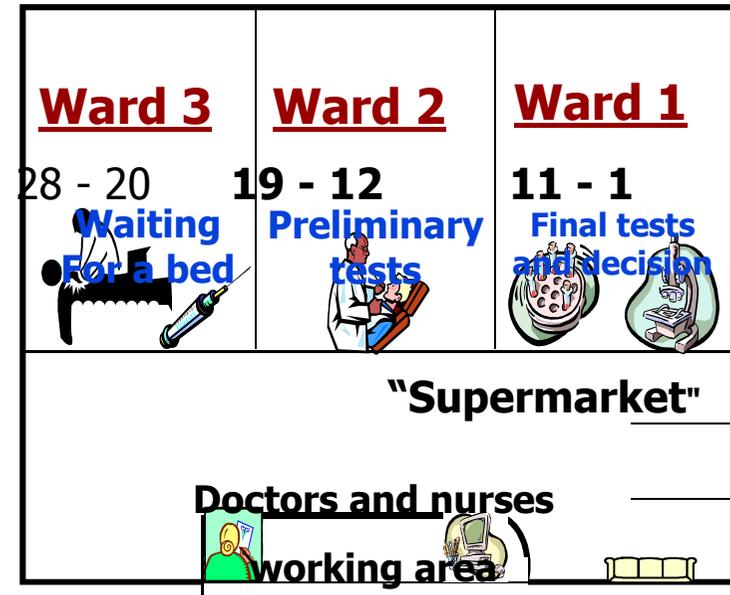
**To be clear, we'll present the "standard" path of a "regular" patient, either referred by a doctor or of his own will, be it alone or accompanied by somebody. It's a little different for person arriving by ambulance or emergency services.**

**But first let us familiarize ourselves with the Emergency Medicine department structure:**



# Internal Medicine ER







**The waiting ward**

**If and when the load of patients waiting for hospitalization in one of the CMC wards is overflowing the capacity, the *Waiting Ward* is opened. If it happens during the day shift, the regular staff of the ER will take care of it.**

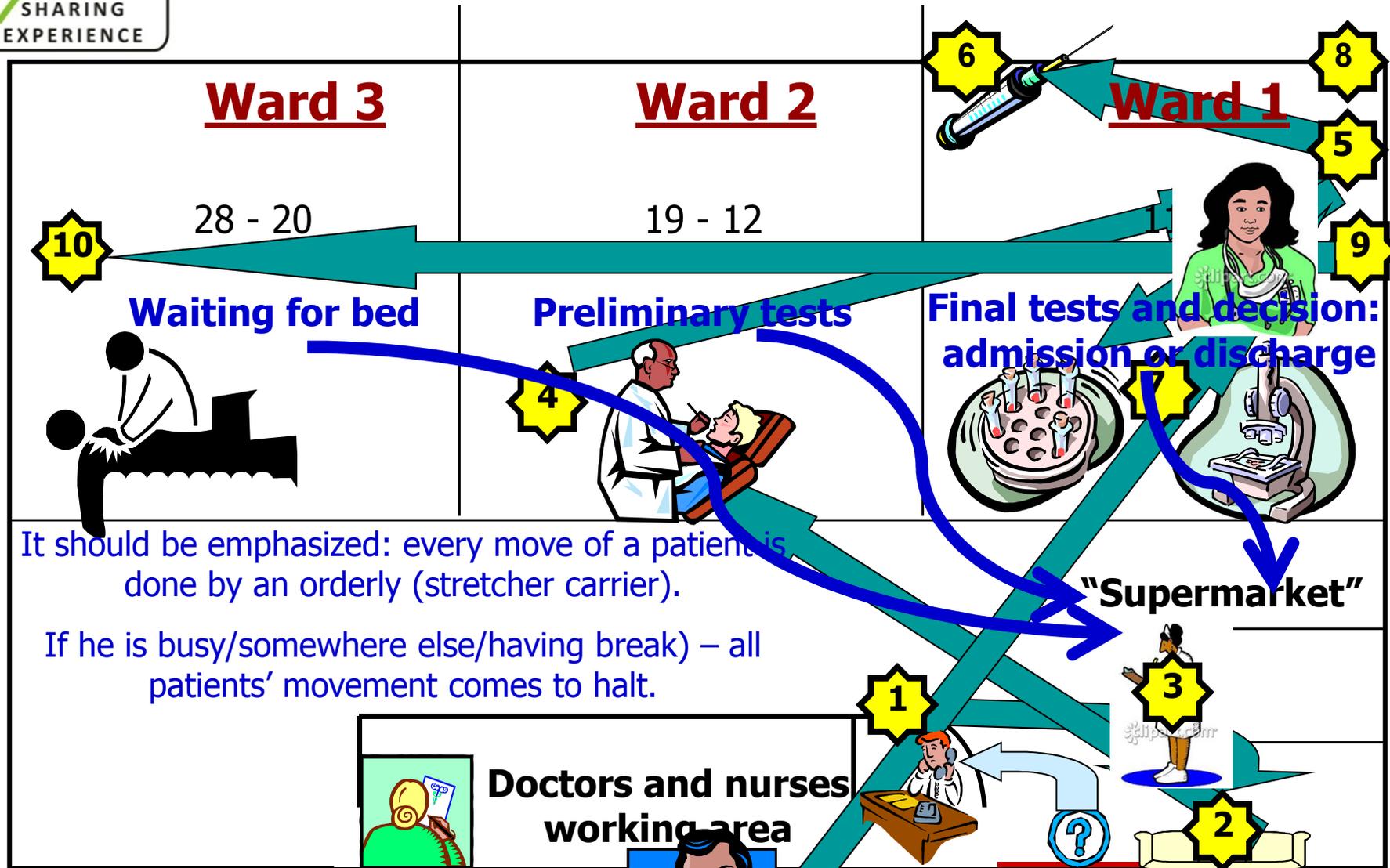
**If it happens at night, the on-call nursing staff has to arrive.**

In reality, on top of the large, internal medicine ER, there are two additional units – *Surgery and Orthopedic ER-s*, and they include diagnostics, casting and treatment rooms.

Then, there is special *waiting ward (Hilton)*, at which the overflow of Ward 3 – patients which are waiting for the hospital bed – are held for some time.



# Internal Med. ER – flowchart



It should be emphasized: every move of a patient is done by an orderly (stretcher carrier).

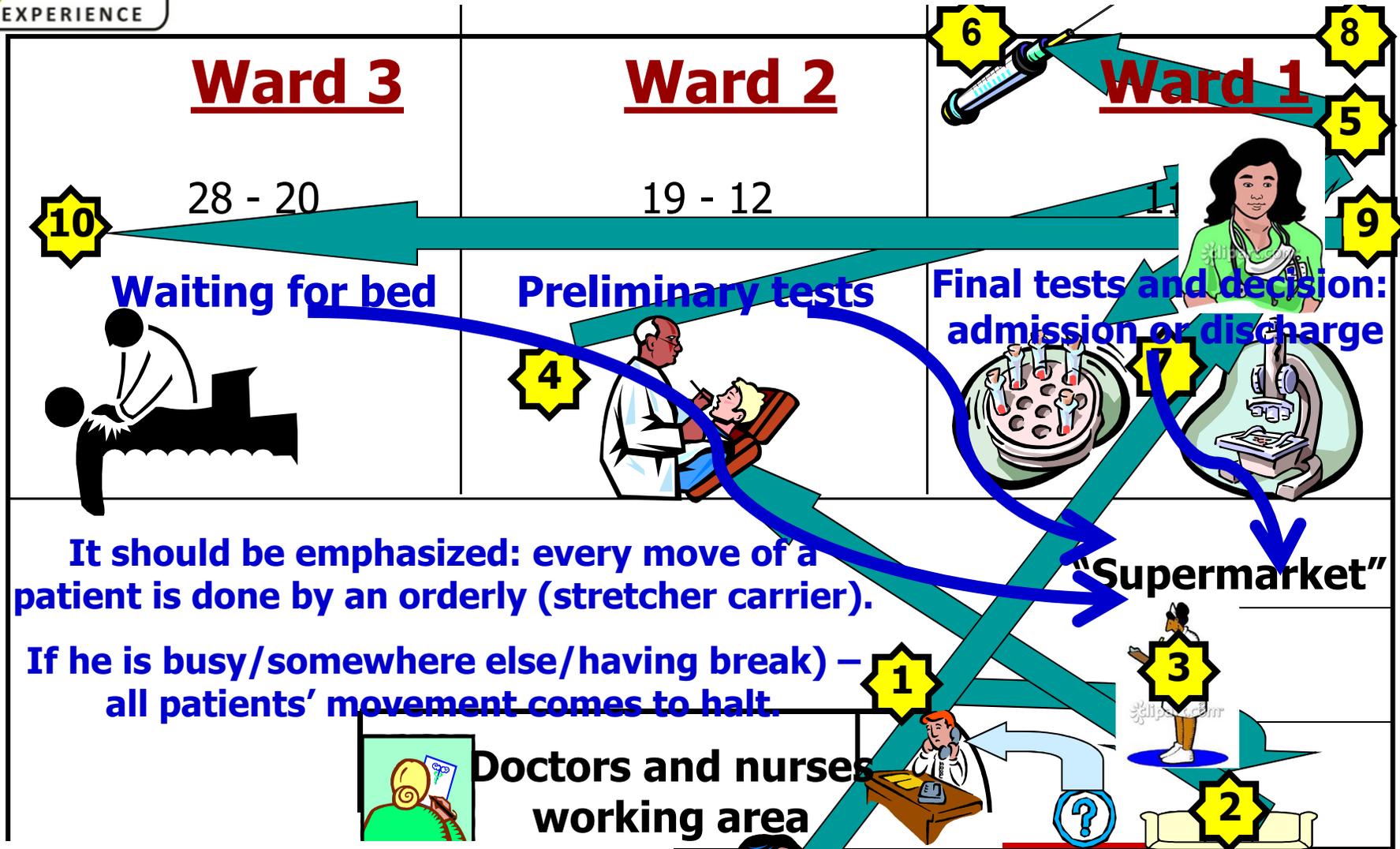
If he is busy/somewhere else/having break) – all patients' movement comes to halt.

What happens to patient in ER?





# Internal ER – flowchart (*Spaghetti diagram*)



What happens to patient in ER?





0-48 hours

0.5-2 hours

1-4 hours

Ward 3

Ward 2

Ward 1

28 - 20

19 - 12

11



Waiting for bed



Preliminary tests



Final tests and decision:  
admission or discharge



It should be emphasized: every move of a patient is done by an orderly (stretcher carrier).

If he is busy/somewhere else/having break) – all patients' movement comes to halt.

"Supermarket"



0-1 hours



Doctors and nurses working area

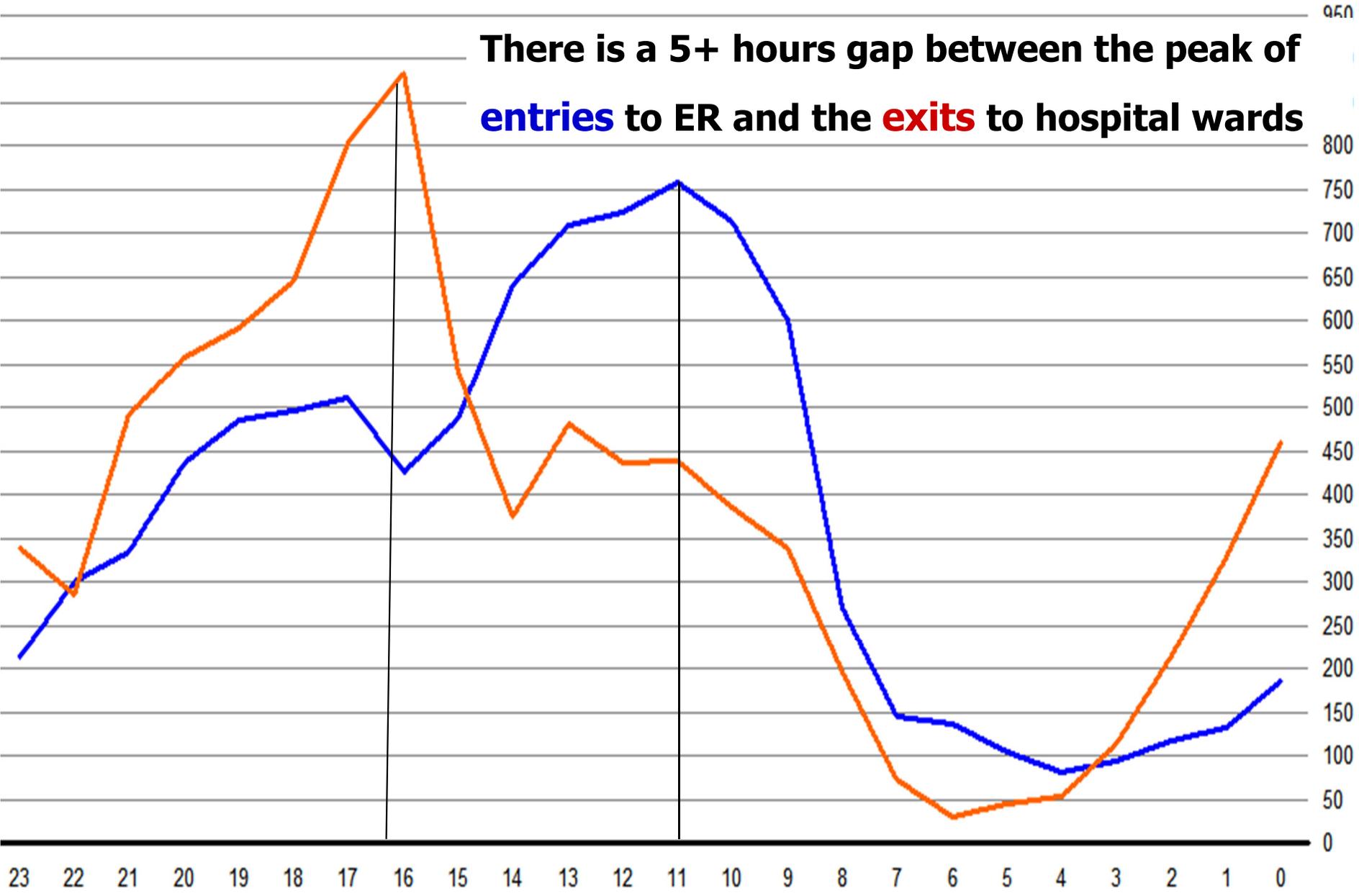


How long it takes?



The time distribution of the **entry into** and the **exit from** the internal medicine ER, of patients that were admitted

There is a 5+ hours gap between the peak of **entries** to ER and the **exits** to hospital wards





Let us start with the **ER's intra-departmental** issues,  
which significantly prolong the stay:

1. Unlike in most modern ER, there isn't any established *triage* screening process.
2. There is a large degree of **double-handling** in the transition between wards 2 and 1. The need to transfer the patients as well as all the relevant information between the medical staff (doctors and nurses) which has attended him in ward 2 to the staff in ward 1 is quite time-consuming, and often done in a discontinuous manner.
3. Additional factor contributing to the long times is the restriction limiting the performance of **intrusive procedures to doctors only**.
4. There isn't any **systematic routine for follow-up** after the advancement of treatment of patients. Patients which came alone, without a companion to take care, their treatment (or at least the passage of an updated information to them) may be delayed.



## Systemic (hospital-wide) issues

1. **Over the years the number of visits in the ER has steadily grew – it's now about 55,000 a year. The infrastructure was planned assuming **half of this load**. It hardly can deal with the present numbers.**
2. **The **work-load on the nursing** staff is enormous: out of 6 attending nurses 2 man the orthopedic and surgery units. The remaining 4 have to deal with the 3 wards, to admit the patients entering the ER, to manage their traffic to tests and other departments (and to bring them back), to manage the ER and to try to get beds for awaiting patients.**



## **Systemic (hospital-wide) issues**

- 3. There isn't a single point-of-contact (POC) function dealing with bed management. It seems that the entire ER's staff – from the ER head to doctors and the nursing staff and administrative staff deal with this issue. Time, effort and nerves are wasted.**
- 4. Sometimes, the wait for the consultant is long, adding to patient's anxiety.**
- 5. The space is so severely limited, that not even an entry point information (if not triage) position is available.**

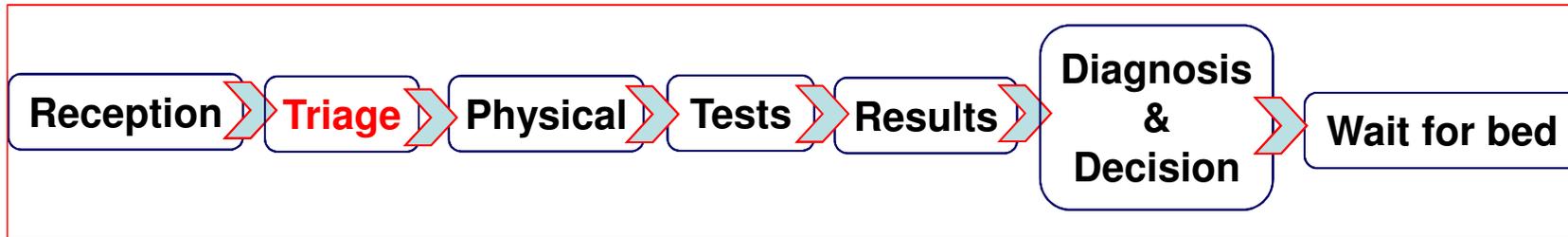


## So – what's the constraint?

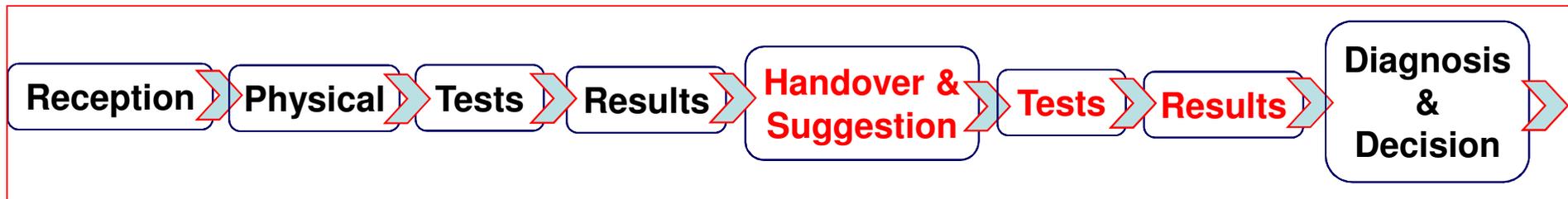
**After careful considerations, together with the staff of the ER, our conclusion was that it is the flow in the ER, which necessitates double handling of the patients, which mostly impedes their fast discharge.**



**Is it any different than a similar process in any other hospital?**



4 h.



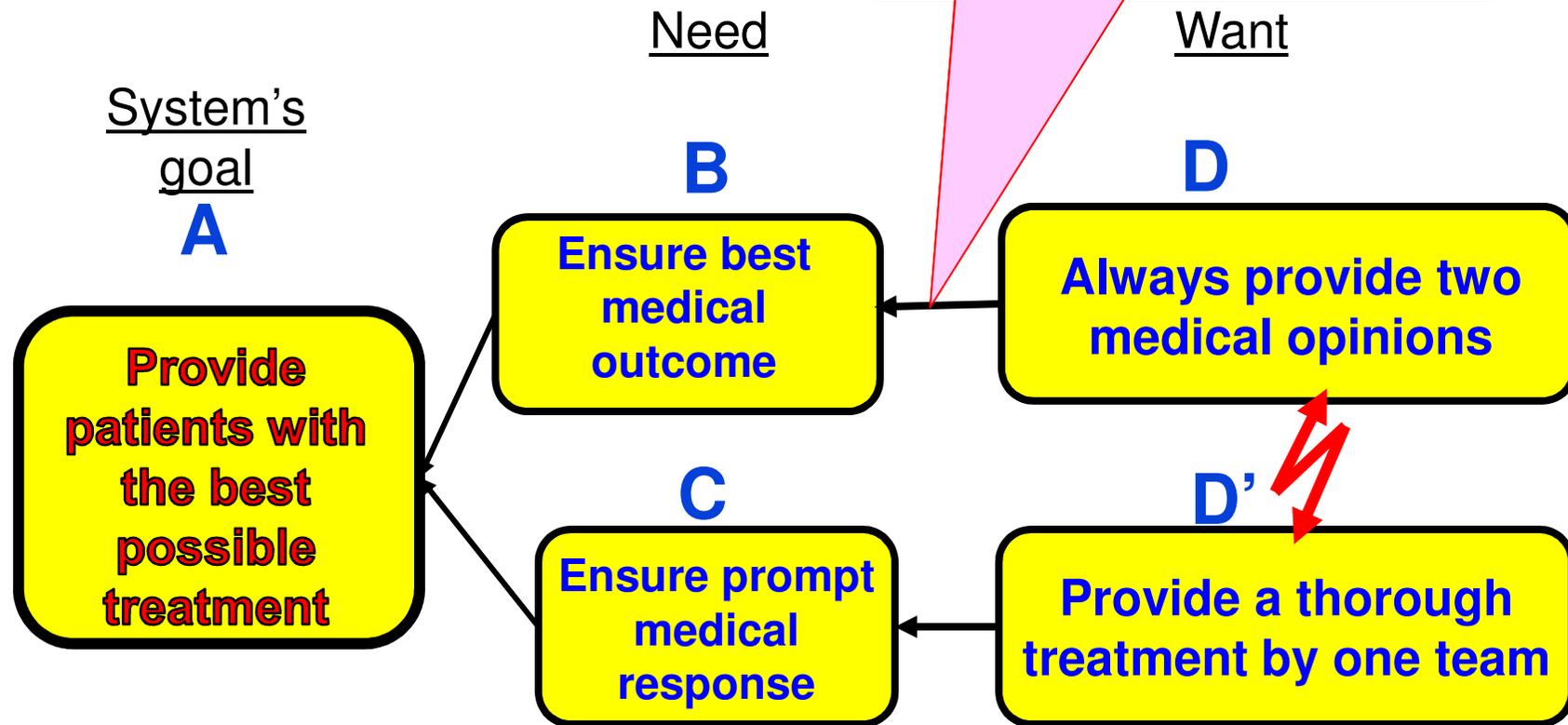
7 h.



## What's the dilemma ER's managers face?

Why?

**B-D** Only by having two independent opinions a proper diagnosis is reached





## Now we come to the second question: What's the solution?

1. First, we suggest that **double-handling will cease; each patient will be dealt with by the same doctor and nurse team**, from the arrival to ER until her/his discharge.
2. To enable this we'll change the functions of wards 1 and 2, **instead of acting in sequence - they will operate in parallel**. They will be staffed by **two fully qualified teams**, each consisting of a senior physician, an additional doctor (or resident) and a nurse.
3. ***Let doctors be doctors*** – we wanted to enable doctors in the ER to focus on activities specific only to them. To enable it, some of their assignments will be transferred to the nursing staff – blood taking for tests, administration of injections, infusions and some additional invasive procedures.

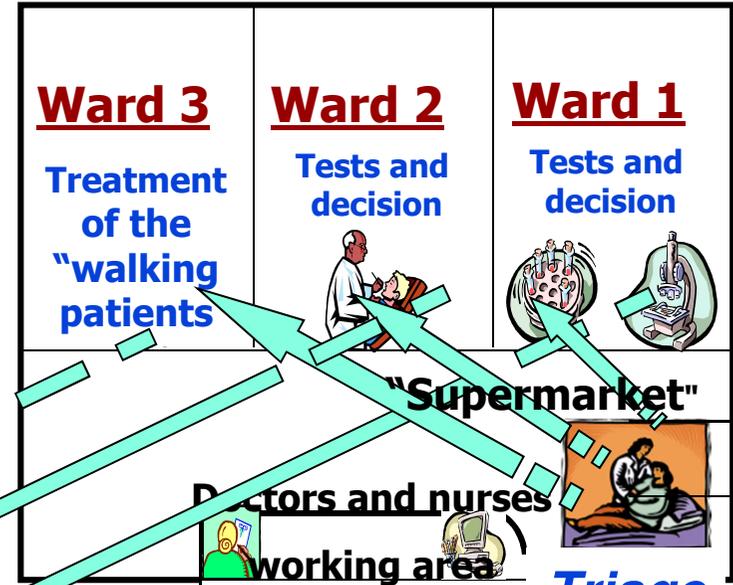


**Now we come to the second question:**  
**What's the solution?**

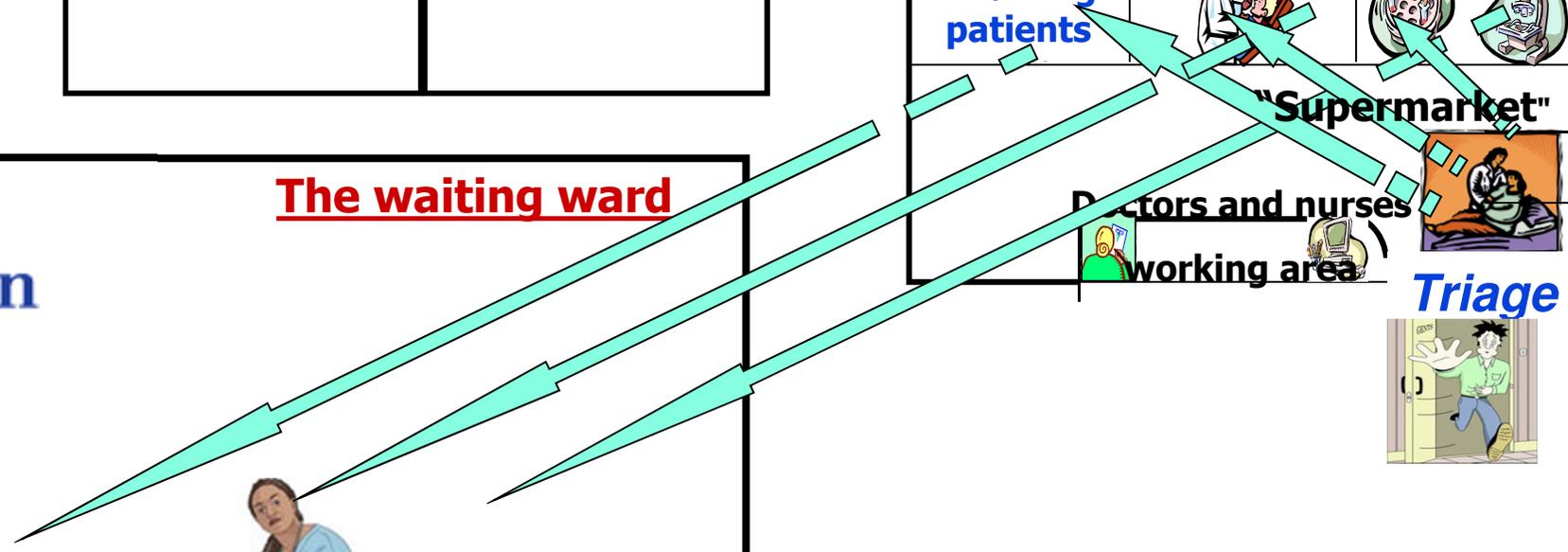
- 1. A permanent nurse station** will be placed in the "supermarket" area, serving as a **preliminary triage station**, as well as to balance the patients' load between wards 1 and 2. This station will also manage all the queues in the ER, and inform about it all interested parties, be it medical staff, patients and their families.
- 2. The *Hilton* will be open at all times** (and not only when the ER is bursting at seams). It will serve as a waiting area for all patients it was decided they should be admitted, but currently no hospital bed is available for them. In this manner **Ward 3** will be vacated, enabling it to become **a treatment area for the "walking patients"**.



# Internal ER



**Triage**





## Implementing the solution:

1. Presenting the ideas to the staff, getting their remarks, corrections and changes, until a wide consensus is achieved.
2. Building the implementation plan and schedule, including roles, responsibilities and authorities.
3. Creating a control system for a periodic follow-up of the entire new process (*KISS*).
4. Creating an **RFID system of queue management**.
5. *Let nurse be a nurse* – creating a new function of the **ER manager**.
6. *Let medical staff do the medicine* – creating the new function of the **bed manager**.



## The results:



**Questions, remarks?**

**Thanks**