

MAPO INDEX: HELP FOR USE OF DATA COLLECTION SHEET (UNIT)

The data collection sheet for MAPO index is designed to achieve a two-fold goal:

- identification of exposure (MAPO Index)
- survey of assistive devices and other actions needed to reduce risk

1. INTERVIEW with head nurse or nurse with appropriate knowledge of ward/unit

The following characteristics are considered:

- Number of beds
- Total Nursing staff: indicate the number of workers assigned to manual patient handling, divided into Nurses and Nurse Assistants.
- **VALUE OF "Op"** – Number of workers assigned to manual patient handling divided into three shifts. In (**Op**) indicate the sum of operators over the three shifts. If the number varies on Saturday and Sunday please consider only the period Monday-Friday. Should unfitted operators be present, do not sum them up in Op calculation unless they carry out patient manual handling.
- **TYPE OF PATIENT:** Disabled patients (**D**) are classified, on the basis of residual motorial capacity and current illness, into "Non-cooperative (**NC**)" and "partially cooperative (**PC**)". By non-cooperative (NC) we intend a patient that has to be fully lifted by nurses. By partially cooperative (PC) we intend a patient who has residual motorial capacity and is therefore only partially lifted. When describing disabled patients, please proceed indicating clinical condition and then disability extent (NC or PC).
NB If there are difficulties to quantify patients average number NC e PC, use "OBJECTIVE COLLECTION SHEET FOR DISABLED PATIENTS.pdf". In "NAP" please report the maximum number of possible disabled patients. Then please indicate the average hospitalization stay of disabled patients. NB For intensive care please consider all NC patients as PC patients.
- The description of transfer operations (bed-wheelchair// bed-trolley// to pillow// wheelchair – wc/) will be useful to assess adequacy of assistive devices.
- The question: "are disabled patients unable to hold any particular position during transfer?" are useful to choice aids.

TRAINING FACTOR

One determining factor for definition of exposure index is the specific training of operators. Checking of training effectiveness enabled defining **minimum requirements for specific training adequacy** based on the following feature:

- 1) Training course lasting 6 hours divided into a theoretical section and practical exercises on:
 - a. techniques for partial lifting of patients producing the least overload;
 - b. practical exercises on the correct use of equipment.
- 2) Training course involving at least 90% of nursing staff
- 3) Training course delivered not over 2 years before risk assessment

2. ON SITE INSPECTION

WHEELCHAIRS :

- check the total number of available wheelchairs (**n. of wheelchairs**)
- aggregation by kind of wheelchair
- Ergonomic requirements (malfunctioning brakes, not extractable armrest, cumbersome backrest, width exceeding 70 cm) are assessed by assigning a value of **1** to each type of wheelchair identified during on-site inspection. Scores are assigned to lack of ergonomic requirements.
- scoring the Ergonomic requirements by kind of wheelchair
- calculate every column score (number of kind of wheelchair x sum of scores)
- Calculate the total wheelchair score (sum of column scores)
- Then calculate the mean score (**MSWh**) dividing the total wheelchair score by total number of wheelchairs.
- By **CUMBERSOME BACK REST** we intend: Height (back rest end to floor) exceeding 90 cm **Or** Thickness exceeding 6 cm + presence of foldaway handles **Or** Inclined back rest .

ASSISTIVE DEVICES

Please describe all the equipment usable for patient total lifting (that is ergonomic beds/lifting hoists/ ergonomic stretchers + sliding sheets).

1. LIFTING HOISTS

Check the total number of hoist

Essential requirements and corresponding characteristics of lifting hoists

Essential requirement	Characteristics of lifting hoist
SAFETY (operator/patient)	<ul style="list-style-type: none"> • Blocking device in case of overload • Well functioning brake system • Adjustment controls (need to be clearly marked and not cause brusque movements) • Sling fastening system
COMFORT (patient)	<ul style="list-style-type: none"> • Kind of body support • Position of patient when raised • Attachment system preventing the patient from swinging
SIMPLICITY	<ul style="list-style-type: none"> • Adjustment controls (clearly marked; mode of operation) • Kind of body support • Adequacy of maintenance
LOW PHYSICAL EFFORT	<ul style="list-style-type: none"> • Type of wheels • Weight of equipment (including support system) • Absence of lifting manoeuvres

2. ERGONOMIC STRETCHER

Check the total number of ergonomic stretcher

By ergonomic stretcher we intend an aid (useful in wards--operating rooms and emergency rooms where totally non cooperative patients have to be line-to-line lifted) with this ergonomic requirements:

- Variable height (electric and hydraulic mechanism) to at least 90/92 cm
- Tuck-away side rails under stretcher
- "Equipped with" sliding aids
- Wheels: 2 steering wheels and 2 castors; "low friction" wheels and lightweight frame (low physical effort applied during pulling/pushing operations)
- Stretcher size compatible also with environment smaller areas
- Adequacy of maintenance

3. ERGONOMIC BED

Check the total number of ergonomic stretcher



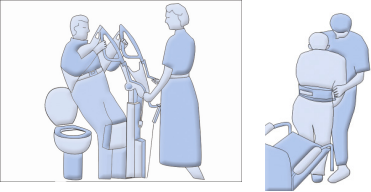

By ergonomic bed we intend an aid with this ergonomic requirements:

- Variable height (electric and hydraulic mechanism)
- With at least 3 sections
- No section to be manually raised
- Tuck-away side rails under bed
- Wheels: 2 steering wheels and 2 castors; "low friction" wheels (low physical effort applied during pulling/pushing operations)
- Adequacy of maintenance

Please define and (qualitatively) assess the percentage of total liftings of disabled patients aided by such equipment.

4. OTHER AVAILABLE AIDS (MINOR AIDS)

We consider as minor aids the equipment that reduces the number or the overload produced by certain operations to partially move the weight of the patient (sliding sheet, sliding board, turning disk, roller, ergonomic belt).

	<p>"FRICTION REDUCING SLIDING AIDS" Such aids can be used for line-to-line transfers without difference in level and gap. They allow to transfer patients without lifting them. Sliding sheets are also used to assist in certain movements within the bed (especially in case of heavy patients): moving the patient up in bed towards the pillow or repositioning the patient from supine position to side position.</p>
	<p>ROLLER (aid reducing friction during passages of PC patient who remains seated)</p>
	<p>ERGONOMIC BELT (that is a belt with hands to better help patient during chair-upright standing) This aid is advisable for hospital ward or home care with patients who can use at least one lower limb (e.g. hemiplegic patients, very sick elderly patients, with broken femur or hip prosthesis). <u>N.B.: the powered standing assist lift is similar to the ergonomic belt since when in use the nurse has still to carry out manual operations</u></p>
	<p>ERGONOMIC BED could be usefull for PC patients</p>

Please define and (qualitatively) assess the percentage of partial liftings of disabled patients aided by such equipment.

5. AIDS FOR PATIENT HYGIENIC ASSISTANCE

For patient hygiene: please note presence and number of HEIGHT ADJUSTABLE SHOWER -- ERGONOMIC SHOWER CHAIR-- HEIGHT ADJUSTABLE BATHTUB -- FIXED BATH LIFT

STRUCTURAL FEATURES OF ENVIRONMENT

BATHROOMS (hygiene)

- describe all the environments with shower and/or bath and report them in respective columns (A,B,C, etc.) whenever different
- indicate free spaces inadequate for hygiene aids
- NON REMOVABLE OBSTACLES: indicate possible obstacles to use of aids
- Calculate (see example) the bathroom inadequacy mean score (**MSB**)

TOILETS (wc)

- Describe all the environments with wc and report them in respective columns (A,B,C, etc.) whenever different
- wc height is to be measured from floor to table surface
- wc free side space should be at least 80 cm. on one side
- calculate (see example) the inadequacy mean score of bathrooms (**MSWC**) for use of wc.

PATIENT ROOMS

Help for data collection mapoindex

- CHECK whether the rooms are all alike (in number of beds); and report them in respective columns (A,B,C, etc.) whenever different.
- SPACES: measure bed distance (at least 90 cm), between bed foot and wall (at least 120 cm).
- BEDS: if not adjustable, measure height from ground to mattress upper surface, and indicate if height is less than 70 cm.
- By unsuitable bed indicate the need for manual lifting of mattress and/or bedhead and/or bed foot for bed adjustment.
- By SPACE BETWEEN BED AND FLOOR, indicate the absence of bed structures not allowing use of aids (anyhow the space shall be at least 15 cm).
- BY INADEQUATE SIDE FLAPS indicate presence of light and easily removable side flaps

Calculate (see example) the inadequacy mean score of PATIENT ROOMS (**MSR**).

Environment: calculate the mean environment score (**MSE**) obtained from the sum MSB. + MSWc.+ MSW.

ADDITIONAL HANDLING OPERATIONS (PULLING-PUSHING and/or LOAD MANUAL HANDLING

These operations contribute to the broader characterization of exposure.

The preliminary questions reported here below are proposed once again to the ward head nurses.

Do the operators carry out at least once a day (per operator) pulling/pushing of stretchers, beds, devices on wheels uncomfortable for operators ?

YES NO

Do the operators carry out at least once a day (per operator) lifting of loads ≥ 10 kg?

YES NO

If these activities are reported as being present with the evidenced daily frequency, please proceed with assessment using the appropriate methodologies

TABLE FOR MAPO INDEX CALCULATION IN WARDS

<u>NC/OP</u>		RATIO BETWEEN MEAN NUMBER OF NC PATENTS AND OPERATORS PRESENT ALONG THE 24 HOURS.
	X	
LIFTING DEVICE FACTOR (LF)		ERGONOMIC AND NUMERICAL ADEQUACY OF AIDS (LIFTING HOISTS) FOR NC PATIENT HANDLING
	+	
<u>PC/OP</u>		RATIO BETWEEN MEAN NUMBER OF PC PATENTS AND OPERATORS PRESENT ALONG THE 24 HOURS.
	X	
MINOR AIDS FACTOR (AF)		ERGONOMIC AND NUMERICAL ADEQUACY OF AIDS FOR PC PATIENT HANDLING
	X	
WHEELCHAIR FACTOR (WF)		ERGONOMIC AND NUMERICAL ADEQUACY OF WHEELCHAIRS
	X	
ENVIRONMENT FACTOR (EF)		ERGONOMIC ADEQUACY OF ENVIRONMENTS USED BY DISABLED PATIENTS
	X	
TRAINING FACTOR (TF)		ADEQUACY OF TRAINING PROVIDED ON SPECIFIC RISK
	=	
		MAPO EXPOSURE INDEX

HOW TO ASSIGN THE VALUE FACTORS

VALUE OF TRAINING FACTOR (TF)

Condition	VALUE OF TF
TRAINING delivered via an ad hoc course, not over two years before risk detection and at least 90% of ward operators	0,75
If carried out over two years before, please carry out effectiveness check (with DINO and REBA methods): if the result is positive for at least 90% of ward operators	0,75
TRAINING delivered via an ad hoc course, not over two years before risk detection and for 50 % to 89% of ward operators	1
If carried out over two years before, please carry out effectiveness check (with DINO and REBA methods): if the result is positive for 50% to 90% of ward operators	1
CARRIED OUT only with information provided on use of equipment (for at least 90% of ward operators)	1
CARRIED OUT only with distribution of information material (for at least 90% of ward operators)	1
CARRIED OUT only with information provided on use of equipment (for less than 90% of ward operators)	2
CARRIED OUT only with distribution of information material (for less than 90% of ward operators)	2
NOT CARRIED OUT or without previous condition respected	2

VALUE OF WHEELCHAIR FACTOR (WF)

To define the **Wheelchair Factor – WF** it is necessary to assess (see example) the inadequacy mean score (**MSWh**) and correlate it to sufficient number of wheelchairs (SEE next table) .

Numerical sufficiency of wheelchairs. By sufficient number we intend the presence of a number of wheelchairs equal to at least half of the disabled patients in the unit. N.B.: For residential homes a number equal to 80% of disabled patients is considered as numerical sufficiency.

N.B.: for intensive care, wheelchair factor=1

Mean wheelchair score (MSWh)	0.5 – 1.33		1.34 – 2.66		2.67 – 4	
Numerically sufficient	YES	NO	YES	NO	YES	NO
VALUE OF WF	0.75	1	1.12	1.5	1.5	2

VALUE OF LIFTING FACTOR (LF)

Absent or inadequate + insufficient lifting devices = **4**

Inadequate or insufficient lifting devices = **2**

Adequate and sufficient lifting devices = **0,5**.

By "**sufficient number**" we intend the presence of:

- 1 lifting device every 8 totally non-cooperative patients (**NC**).
- 1 ergonomic stretcher plus friction reducing sliding aids every 8 totally non-cooperative patients (**NC**).
- A number of ergonomic beds equal to 100% of ward beds

N.B. Considers only assistive devices with ESSENTIAL REQUIREMENTS

We considers "**adequate** lifting device" when AT LEAST 90 OF NC PATIENT LIFTING OPERATIONS ARE AIDED

The presence of ergonomic stretcher or beds plus sliding sheet or sliding board has to be considered equivalent to the presence of a patient lifting device where transfer operations are mainly "line to line" (i.e. bed-stretcher)

VALUE OF MINOR AIDS FACTOR (AF)

When minor aids are not present or are insufficient/inadequate, the value assigned is **1**.

Minor aids adequate and sufficient= **0,5**

We consider “minor aids as adequate sufficient ” when at least 90% of lifting operations of PC patients are aided and the unit is equipped with:

- one sliding sheet or sliding boards plus at least two of the other aids mentioned (remember that the powered standing assist lift is similar to the ergonomic belt)
- one sliding sheet or sliding boards plus all ergonomic beds

VALUE OF ENVIRONMENT FACTOR (EF)

To define the **Environment Factor (EF)** it is necessary to assess (see example) the inadequacy mean score (**MSE**) obtained from the sum $MSB + MSWc.+ MSW$ (SEE next table) .

Mean environment score (MSE)	0 – 5.8	5.9 – 11.6	11.7 – 17.5
VALUE OF EF	0.75	1.25	1.5

N.B.: FOR INTENSIVE CARE **Environment Factor =1**

DATA COLLECTION SHEET FOR MAPO INDEX: EXAMPLE

HOSPITAL :Example
UNIT : MEDICINE

date **15 may 2008**
No BEDS: **30**

1. INTERVIEW

TOTAL Nursing Staff: Nurses **12** Nurse Assistants (N.A.) **6** No operators unfitted for patient MH (**0**)

NURSING STAFF ENGAGED IN PATIENT TRANSFERRING OVER 3 SHIFTS:

Morning **5** Afternoon **4** Night **2** Total No Operators | **11** | **Op**

TYPE OF PATIENT:

DISABLED (D.) **22** (indicate daily average Number of D patients)
 Maximum number of present disabled patients: **25** (N.A.P.) Average hospitalization stay of disabled patient **5** (days)
 Non-cooperative patients (NC) No **16** Partially cooperative patients (PC) No **6**

DISABLED PATIENTS	No N.C.	No P.C.
elderly	6	2
hemiparesis	3	2
surgical		
severe ictus/stroke	5	
other neurologic movement disorders	2	2
fracture lower limbs		
bariatric patients		
other		

Which manual (D) patient transfer operations are usually performed?:	NC	PC
pulling up to the head of bed	X	
repositioning patients (SIDE TO SIDE)	X	
bed/wheelchair and back	X	X
wheelchair (or chair)/ upright		X
bed-trolley/stretchers and back		
wheelchair /toilet and back		
other		
other		

Are disabled patients unable to hold some particular position during transfer ? Yes No Describe in NOTE

ARE LIFTING DEVICES USUALLY USED? YES NO if YES, for which (D) patient transfer operations :
 pulling up to the head of bed repositioning patients bed/wheelchair and back wheelchair (or chair)/ upright
 bed-trolley/stretchers wheelchair/toilet other
 if not USED, why? not up to the unit requirements lack of training often broken
 too time consuming not enough space for use

STAFF TRAINING IN MANUAL PATIENT HANDLING

not given included in training course
 given only via training course on use of aids only via information brochures

If CARRIED OUT, to how many operators ? **12** and how many hours per operator **8**

If carried out, how many months ago? **20** Was training course effectiveness checked? YES NO

STRUCTURAL FEATURES OF ENVIRONMENT BATHROOMS (centralized or individual in rooms):

TYPE OF BATHROOMS WITH SHOWER/BATH

FEATURES AND INADEQUACY SCORE OF BATHROOMS WITH SHOWER/BATH centr = centralized in ward indiv. = in room	Score	A	B	C	D	E	Total No bathrooms _3_
		<input checked="" type="checkbox"/> centr <input type="checkbox"/> indiv.	<input checked="" type="checkbox"/> centr <input type="checkbox"/> indiv.	<input type="checkbox"/> centr <input type="checkbox"/> indiv.	<input type="checkbox"/> centr <input type="checkbox"/> indiv.	<input type="checkbox"/> centr <input type="checkbox"/> indiv.	
		No 1	No 2	No	No	No	
Free space inadequate for use of aids	2	X	X				Total score For bathrooms:
Door opening inwards (not outwards)							
No shower							
No fixed bath							
Door width less than 85 cm	1	X					
Non-removable obstacles	1						
Column score (No Bathrooms x sum of scores)		3	4				7

Mean score bathrooms (M.S.B.) = total score bathrooms/total N. bathrooms : $7/3 = 2,33$ MSB

TOILETS (WC) (centralized or individual in rooms):

TYPE OF TOILETS (WC)

FEATURES AND INADEQUACY SCORE OF TOILETS centr = centralized in ward indiv. = in room	Score	A	B	C	D	E	Total No Toilets (WC) _8_
		<input checked="" type="checkbox"/> centr <input type="checkbox"/> indiv.	<input type="checkbox"/> centr <input checked="" type="checkbox"/> indiv.	<input type="checkbox"/> centr <input type="checkbox"/> indiv.	<input type="checkbox"/> centr <input type="checkbox"/> indiv.	<input type="checkbox"/> centr <input type="checkbox"/> indiv.	
		No 1	No 7	No	No	No	
Free space insufficient to turn wheelchair round	2	X	X				Total WC score
Door opening inwards (not outwards)							
Insufficient Height of WC (below 50 cm)	1	X					
WC without grabe bars	1		X				
Door width less than 85 cm	1						
Space at side of WC less than 80 cm	1		X				
Column score (No Toilets x sum of scores)		3	28				31

Mean score (M.S.WC.) = total WC score/No WC: $31/8 = 3,87$ MSWC

PATIENT ROOMS CONFIGURATION

FEATURES AND INADEQUACY SCORE OF WARDS	Score	PATIENT ROOMS					Total No Rooms _12_
		No _2_ Rooms	No _8_ Rooms	No _2_ Rooms	No ___ Rooms	No ___ Rooms	
Space between beds or between bed and wall less than 90 cm	2	X	X				Total Rooms Score
Space between foot bed and wall less than 120 cm	2	X					
Presence of non-removable obstacles							
Fixed beds with height less than 70 cm							
unsuitable bed : needs to be partially lifted	1						
Inadequate side flaps							
Space between bed and floor less than 15 cm	2						
Beds with 2 wheels or without wheels							
Height of armchair seat less than 50 cm	0,5	X					
Column score (No Wards x sum of scores)		9	16	0			

Mean score Rooms (M.S.R.) = total score wards/total No Rooms $25/12 = 2,08$ MSR

ENVIRONMENT: MEAN ENVIRONMENT SCORE = M.S.B. + M.S.WC.+ M.S.R. = 2,33+3,87+2,08= 8,28 MSE

MAPO INDEX							
HOSPITAL : _____			UNIT : _____				
NUMBER OF DISABLED PATIENTS/OPERATORS RATIO							
No Non-cooperative patients (NC) <u>16</u> mean			No operators <u>11</u> =		<u>1,45</u> NC/OP		
No Partially cooperative patients (PC) <u>6</u> mean			No operators <u>11</u> =		<u>0,54</u> PC/OP		
LIFTING DEVICE FACTOR (LF)				VALUE OF LF		<u>4</u> LF	
Absent OR Inadequate+Insufficient Lifting Devices ■				4			
Insufficient OR Inadequate Lifting Devices				2			
Adequate AND Sufficient Lifting Devices				0.5			
MINOR AIDS FACTOR (AF)				VALUE OF AF		<u>0,5</u> AF	
Minor Aids Absent OR Insufficient				1			
Minor Aids Sufficient AND Adequate■				0.5			
WHEELCHAIR FACTOR (WF)							
Mean wheelchair score (MSWh)		0.5 – 1.33		1.34 – 2.66		2.67 - 4	
Numerically sufficient		YES	NO	YES	NO	YES	NO
VALUE OF WF		0.75	1	1.12	1.5	1.5	2
ENVIRONMENT FACTOR (EF)							
Mean environment score (MSE)		0 – 5.8		5.9 – 11.6		11.7 – 17.5	
VALUE OF EF		0.75		1.25		1.5	
TRAINING FACTOR (TF)				VALUE OF TF FACTOR			<u>1</u> TF
Adequate training				0.75			
Only information				1			
No training				2			

$$\text{MAPO INDEX} = \left(\frac{1,45}{\text{NC/OP}} \times \frac{4}{\text{LF}} + \frac{0,54}{\text{PC/OP}} \times \frac{0,5}{\text{AF}} \right) \times \frac{1,5}{\text{WF}} \times \frac{1,25}{\text{EF}} \times \frac{1}{\text{TF}} = \mathbf{11,38}$$

MAPO INDEX	EXPOSURE LEVEL
0	ABSENT
0,1 – 1.5	NEGLIGIBLE
1.51 – 5	MEDIUM
> 5	HIGH