



MARITIME TELEMEDICINE

OPTIMIZE YOUR HUMAN RESOURCES AND REDUCE RE-ROUTING

Francesco Amenta, MD
Fondazione Centro Internazionale Radio
Medico (CIRM)
Italian Telemedical Maritime Assistance
Service (TMAS)

Ship Owner Seminar Hong Kong

When: December 6, 2016, 14.00 – 17.00 hrs

Where: United Conference Centre, 10/F United Centre, 95 Queensway, HK

Why: Understand how technology generates cost savings and efficiency

Please register by email to hksoa@hksoa.org

The seminar is free of charge
Drinks will be served after the seminar

Supported by:

The Business Case For Digital Shipping

Driving cost reduction and performance improvement through the application of digital technologies



MEDICAL ASSISTANCE AT SEA: THE PROBLEM

In general, sailing ships do not carry medical doctors or adequately trained paramedical staff.

The time necessary to reach a port for medical reasons may be quite long.

This may result in a disadvantage for seafarers compared to workers living on land, that can receive medical/hospital care hospital within hours.



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MEDICAL ASSISTANCE AT SEA THE 20TH CENTURY SOLUTION

Since the first Radio Medical service started in New York City (1920) and in Sweden (1922) 12 countries have developed Radio Medico

All countries ratifying ILO 164 are required to have a Radio Medical Service free of charge

No distinction made between nationality of patients using Radio Medical services



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MEDICAL ASSISTANCE AT SEA: THE PROBLEM



Injuries and illnesses at sea: Who is in charge?

- A medical officer is in charge of the patient
- On land, dedicated medical centres are available to give advise
- The doctors will need the best possible information about the state of the patient
- The medical responsibility remains with the captain
- The doctor has never seen the patient, and probably never will
- The doctor will talk to the first mate, not the patient
- No global system for personal IDs
- The doctor has no previous medical history of the patient

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MEDICAL ASSISTANCE AT SEA: THE PROBLEM



The medical assistance via radio although still largely in use should be considered quite obsolete and a rudimentary way of providing medical assistance in case of diseases or injuries on board ships



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MEDICAL ASSISTANCE AT SEA REGULATIONS (1)



ILO CONVENTION 164 (1958)

Article 7:

The competent authority shall ensure by a prearranged system that medical advice by radio or satellite communication to ships at sea, including specialist advice, is available at any hour of the day or night.

Such medical advice, including the onward transmission of medical messages by radio or satellite communication between a ship and those ashore giving the advice, shall be available free of charge to all ships irrespective of the territory in which they are registered

IMO MSC/circ 960 (2000) " Medical assistance at sea"

The circular emphasizes the relevance of telemedical services for providing high quality medical assistance to seafarers

The circular introduces the Telemedical Maritime Assistance Service (TMAS) and defines standards and roles for TMAS



MEDICAL ASSISTANCE AT SEA REGULATIONS (2)

MARITIME LABOUR CONVENTION (MLC) 2006

Standard A4.1 – Medical care on board ship and ashore

(a) ensure the application to seafarers of any general provisions on occupational health protection and medical care relevant to their duties, as well as of special provisions specific to work on board ship

(b) ensure that seafarers are given health protection and medical care as comparable as possible to that which is generally available to workers ashore, including prompt access to the necessary medicines, medical equipment and facilities for diagnosis and treatment and to medical information and expertise

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MEDICAL ASSISTANCE AT SEA REGULATIONS (3)

MARITIME LABOUR CONVENTION (MLC) 2006 (2)

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Standard A4.1 – Medical care on board ship and ashore

- (c) give seafarers the right to visit a qualified medical doctor or dentist without delay in ports of call, where practicable;
- (d) ensure that, to the extent consistent with the Member's national law and practice, medical care and health protection services while a seafarer is on board ship or landed in a foreign port are provided free of charge to seafarers;
- (e) are not limited to treatment of sick or injured seafarers but include measures of a preventive character such as health promotion and health education programmes.





MEDICAL ASSISTANCE AT SEA: THE PROBLEM



Ensure that seafarers are given health protection and medical care as comparable as possible to that which is generally available to workers ashore, including prompt access to the necessary medicines, medical equipment and facilities for diagnosis and treatment and to medical information and expertise

This recommendation is far from being applied considering the current advances in telecommunications and medicine

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CURRENT PRACTICE

1 NO REGULAR CONSULTATIONS, CONTACT IN EMERGENCY ONLY

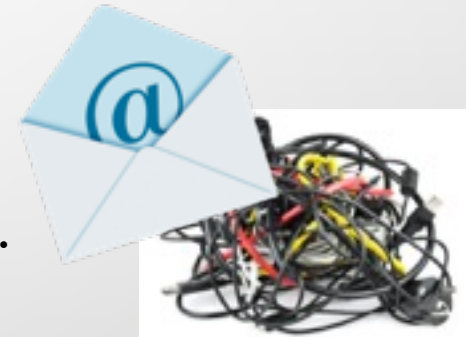
• **FIRST CONTACT:** PHONE CALL TO MEDICAL CENTER

- VERBAL DESCRIPTION OF MEDICAL CONDITION IMPRECISE
- MISUNDERSTANDINGS DUE TO ENGLISH ACCENTS (15 VS 50 ?)
- DIFFERENCES IN TAKING MEDICAL MEASURES (KG VS LBS, °C VS °F)
- STRESS / "FEELING ALONE IN THE OCEAN"



2 **Follow-up Contact:** Email (attach photos, measures)

- On vessel: Find cables / connection in a stressful situation
- At Medical Center: Linking received data to patient case
- Legal: not really allowed to send medical data per email ...



3 The Medical Center may recommend:

- SEVERITY ↓
- Treatment onboard (vessels hold a pharmacy)
 - Disembark at next port
 - Rerouting to closest port (major financial impact)
 - Medical Evacuation (MEDEVAC) by helicopter or speed boat





CIRM (International Radiomedical Centre, Italian TMAS)

Established: 1935

Headquarters: Roma

Service: 24 h a day, every day

Organization: Telemedicine Dept, Telecommunication Dept, Occupational Medicine Dept and Research Dept

Doctors : 9 + medical director

T.C. operators: 7 + supervisor

Patients assisted at the 31 December 2015: 81,016

Medical messages at the 31 December 2015: 560,742





7 April 1935: C.I.R.M. starts its activity

Mission : Delivery of medical advice to ships of any nationality sailing in all the seas of the world

 *Copia del primo messaggio di assistenza pervenuta al C.I.R.M.*

7 APRILE 1935 ORE 20.15
DA PIROSCAFO PERLA
A C.I.R.M. ROMA
BT
FUOCHISTA DIAGNOSTICATO GIORNO 2 MEDICO
DAKAR MORBO DI POTT PRESCRITTOGLI
ADRENOCALCINA STOP OGGI ACCUSA FEBBRE
39 CON ECLAMPSIA POLSO 77 PREGOVI
CONSIGLIARMI
COMANDANTE DE SIMONI



18

 *Copia del primo consiglio radio medico del C.I.R.M.*

7 APRILE 1935 ORE 20.35
DA C.I.R.M. ROMA
A PIROSCAFO PERLA
VIA COLTANO RADIO
BT
RICEVUTO VOSTRO MARCONIGRAMMA STOP
CONSIGLIAMO SOMMINISTRARE AL PAZIENTE
ANTIPIRETICI COME ASPIRINA UN GRAMMO E
MEZZO AL GIORNO IN TRE VOLTE STOP SE IL
PAZIENTE ACCUSA ANCORA CONVULSIONI
SOMMINISTRATE CALMANTI COME BROMURI UN
PAIO DI GRAMMI AL GIORNO OPPURE
INIEZIONI DI MORFINA STOP IN MANCANZA
DI DETTE MEDICINE SOMMINISTRATE QUALCHE
CALMANTE OPPIACEO COME TINTURA DI OPIO
10 GOCCE OGNI 5 ORE SOSPENDETE
ADRENOCALCINA STOP INFORMATECI DOMANI
MATTINA CONDIZIONI PAZIENTE C.I.R.M.

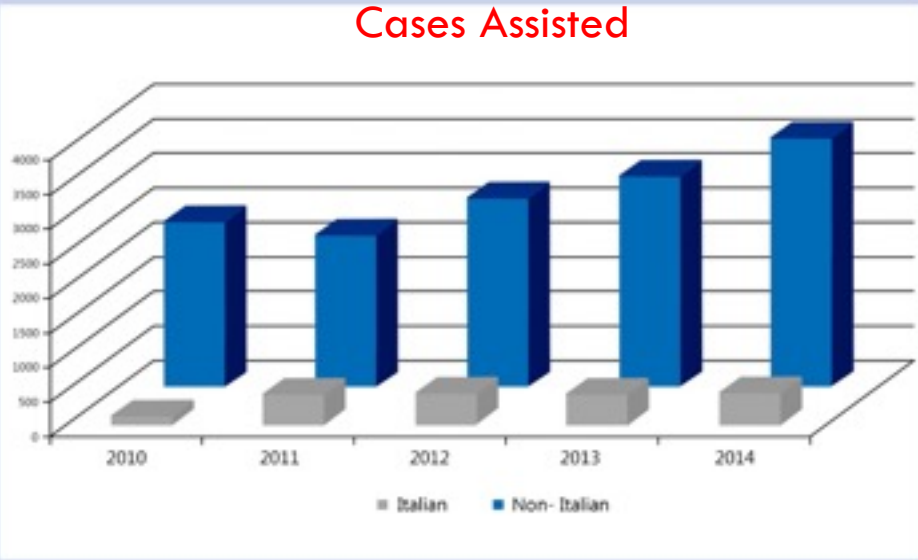


7/3 20



OUR ACTIVITIES (STATISTICS)

Cases Assisted



Nervous System



RE-ROUTINGS DUE TO SERIOUS MEDICAL PROBLEMS (2005-2015)

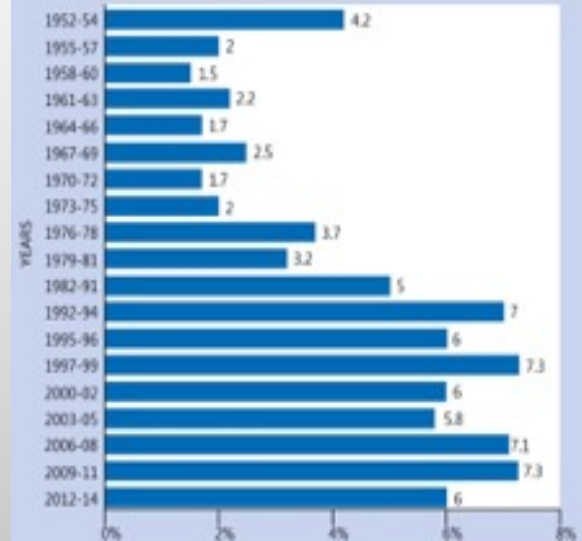
TOTAL CASES	27,473
TOTAL RE-ROUTINGS	1,635
CVD	1,020
%	5.95
OTHERS	857
%	3.12

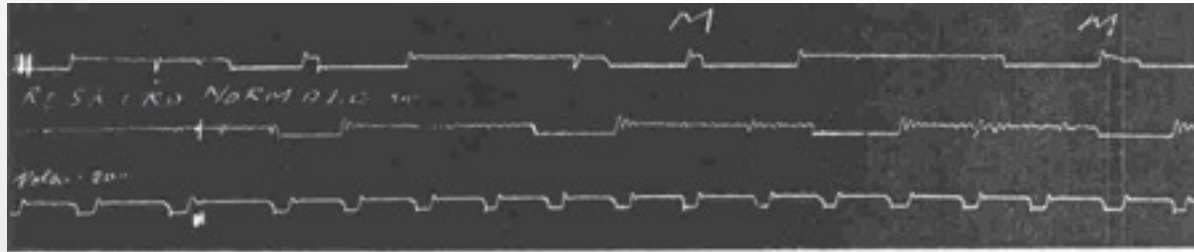
Life threatening conditions for which CIRM received more often requests of medical advice (2005-2015)

YEAR	TOTAL CASES	1	2	3	4	5	6
TOTAL	27,473	214	1,303	1,141	1,018	21	16
		%	%	%	%	%	%
		0.78	4.74	4.15	3.70	0.08	0.06

1: Loss of consciousness/convulsions; 2: Serious accidents; 3: Cardiovascular emergencies; 4: High fever; 5: Serious respiratory problems; 6: Serious diabetes complications

Cardiovascular System





1938. Transmission of breathing and pulse by radiotelegraph



2002: Store-and-forward picture of an ankle injury used for guiding medication



2000: Dermatological lesion

Advantages offered by telemedicine

MODERN SYSTEMS: ADVANTAGES & COST

Advantages

- ✓ Automatic synchronisation
 - More reliable data
 - Time-saving
- ✓ Video Conference
 - Visual Validation of diagnosis
 - Guide remote user in performing the examination
- ✓ Secure Patient Data Hosting & Web Access



Communication Costs

- **VSAT** (e.g. Sealink, Fleet Xpress): \$0 “All you can eat” plans
- **MSS** (Inmarsat Fleet BroadBand): \$2 - \$20
(1 consultation of 5MB medical data, HD Photo, 10 sec video)





Call to CIRM, Edit record (0/21)

Ship Name	Radio Code	Ship Type	Master of ship	Nationality	Pharmacy	Yacht	File	Phone
AJ23-439E	xxxx	ATP	Captain	xxx	xxxxxx	xxxxxx	xxxxxxxx	xxxxxxxx

Details found: 2 Page 1 of 1 Records Per Page: 10

Ship Name	Radio Code	Ship Type	Master of ship	Nationality	Pharmacy	Yacht	File	Phone
AJ23-439E	xxxx	ATP	Captain	xxx	xxxxxx	xxxxxx	xxxxxxxx	xxxxxxxx
AJ23-439E	xxxx	ATP	Captain	xxx	xxxxxx	xxxxxx	xxxxxxxx	xxxxxxxx

Details found: 2 Page 1 of 1 Records Per Page: 10



Call to CIRM, Edit record (0/21)

Save Reset Back to list

Ship Name: AJ23-439E Radio Code: xxxx Ship Type: ATP Master of ship: Captain Nationality: xxx Pharmacy: xxxxxx Yacht: xxxxxx File: xxxxxxxx Phone: xxxxxxxx

SYSTEM FOR GENERATING APPROPRIATE REQUESTS OF MEDICAL ADVICE TO CIRM ACCORDING TO THE APPARENT MAIN SYMPTOMATOLOGY

Review:

Actions:

Vital parameters	
Temperature	See flow - 35.0 to 40.0
Heart rate - See value	See set - bpm
Breathing rate - See value	
Blood pressure	See set - max and min
Breathing rate not regular	No <input type="checkbox"/> Yes <input type="checkbox"/>
Breathing rate regular	No <input type="checkbox"/> Yes <input type="checkbox"/>
Heart rate not regular	No <input type="checkbox"/> Yes <input type="checkbox"/>
Heart rate regular	No <input type="checkbox"/> Yes <input type="checkbox"/>

Prescribe rx
 Open if symptoms
 Attached file

Fw: CIRM EasyCirm Email
1 messaggio

data operativa CIRM - teleco.co.spa@cirmservi.it -
A: famerita@gmail.com
Cc: Sorveglianza Sanitaria - occupational.medicon@cirmservi.it

24 giugno 2015 07:21

From: CIRM@ANDROMEDA
Sent: Wednesday, June 24, 2015 3:44 AM
To: teleco.co.spa@cirmservi.it
Subject: CIRM EasyCirm Email

Submitted values

Field	Value
Call C.I.R.M. Number	39
ship_name	ANDROMEDA
owner_name	CIMA.COM
master	Milica Mitrovic
departeur_port	Jeddah
target_port	Port Kelang
eta_date	2015-06-28
latitude	
longitude	
fax_area	
patient_name	JOSIP GUVO
nationality	CROATIAN
city	SPLIT
born_date	1960-03-15
sex	M
allergies	0
duties_on_board	DECK CADET
priority_of_call	10 Apparently not urgent
Attachments/Images	0
Sign data	
sign_set	A24
sign_code	A24
AJ415405128498	
A0042	morning test nr Josip Guvo 2 week test 1/14

allegati.zip
 415K

1

3

4



Call to CIRM, Edit record (0/21)

Save Reset Back to list

Ship Name: AJ23-439E Radio Code: xxxx Ship Type: ATP Master of ship: Captain Nationality: xxx Pharmacy: xxxxxx Yacht: xxxxxx File: xxxxxxxx Phone: xxxxxxxx

allegati.zip - WinRAR (copia di valutazione)

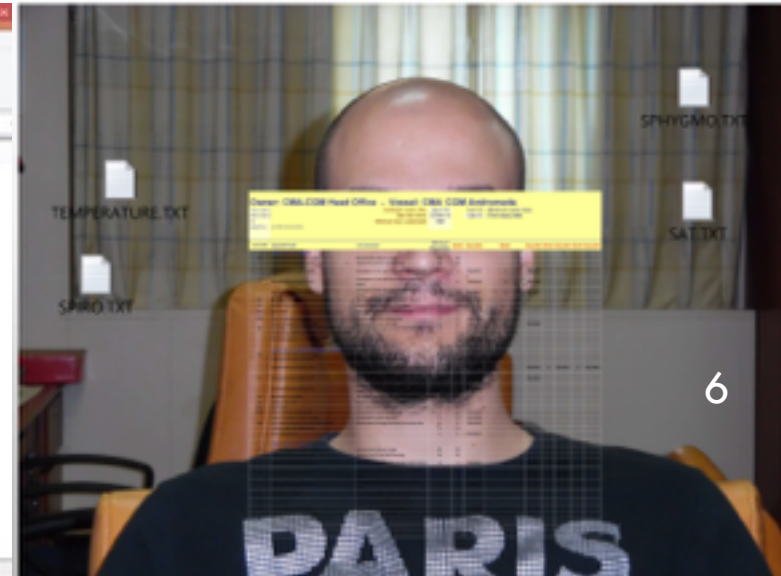
File Comandi Usare Predef. Opzioni ?

Archivio Estrai in Verifica Volume Elabora Trova Assistenti Info Archi Virus Comandi Autoestrazione

allegati.zip\allegati - archivio ZIP, dimensione non compressa di 871.013 bytes

Nome oggetto	Dimensione	Compresso	Tipo	Modificato	CRC32
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FCM000.JPG	130.229	148.978	Immagine JPG	24/06/2015 02:23	873E16A
Medicine Invent...	125.108	40.031	Foglio di lavoro di...	24/06/2015 02:48	8C79CC8
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SPHYSGAR0.TXT	10	21	Documento di testo	24/06/2015 02:27	F4B8203
SPRO.PNG	48.184	2.108	Immagine PNG	24/06/2015 02:25	3807957
SPRO.TXT	245	138	Documento di testo	24/06/2015 02:25	8CC71801
TEMPERATURE...	20	20	Documento di testo	24/06/2015 02:25	7917098

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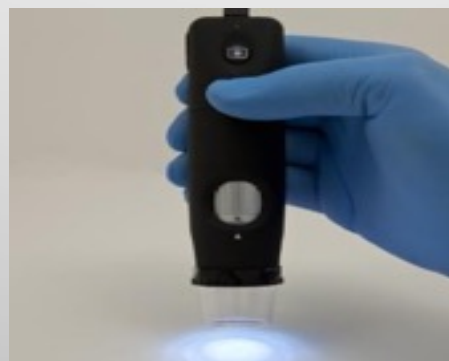
ADVANCED TELEMEDICAL SYSTEMS ON SHIPS

2

5

ADVANCED TELEMEDICAL SYSTEMS ON SHIPS

TELEMEDICAL EQUIPMENT AND SOFTWARE
EXAMPLE OF TELEMEDICINE CORNER



October 2016

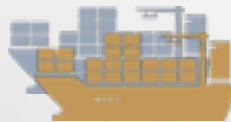
BUSINESS CASE FOR TELEMEDICINE AT SEA



Medical provision contributes to crew welfare and retention



10% of vessels have a medical emergency per year



1 in 2 diversions could be avoided with Telemedicine



\$ 180,000 estimated average cost per evacuation ¹

Bottom Line

- **Equipment Cost:** \$1 crew per day
- **Communications Cost:** between \$0 - \$20 per consultation

October 2016

¹ **Source:** Article "The business case for telemedicine" published in *International Maritime Health*, 2013; 64, 3



PRACTICAL ADVANTAGES OFFERED BY ADVANCED TELEMEDICAL SYSTEMS ON SHIPS

From: [CMA CGM PEGASUS](#)

Sent: Sunday, November 13, 2016 7:39 AM

To: [sala operativa](#)

Subject: CC PEGASUS / Request for medical advise

Dear Sirs,

Good day,

Patient complains having chest pain, difficult breathing, followed with lightheadedness, perspiration and shudder in left arm.

Pain is not constant, occur overnight.

European, male, 42 years old, sign on Nov/7.

Vessel is on the way form Nansha (China) to Xingang (China) - ETA Nov/16.

Please find in attachment medicine available on board.

Best regards,

[CMA CGM Pegasus Medical Inventory 30.10.16.xls \(131K\)](#)

Fr: CC PEGASUS / Request for medical advise - famenta@gmail.com - Gmail

SAT.TXT

Apri con Documenti Google

SpO2 99 %
Pulse 85 bpm



The abovementioned patient is presented with a month long history of central chest pain. An ECG sent to a cardiologist, prior to his visit with us, showed features of either left ventricular hypertrophy or pericarditis.

He is currently in the cardiac ward at Entabeni and is being seen by the cardiologist. His repeat ECG shows features of possible pericarditis. He is still complaining of mild, intermittent chest pain. His blood work, including cardiac enzymes, were unremarkable.





PRACTICAL ADVANTAGES OFFERED BY ADVANCED TELEMEDICAL SYSTEMS ON SHIPS

From: CMA CGM AQUILA
Sent: Sunday, October 23, 2016 1:16 PM
To: 'Ion Pand' ; sala operativa
Cc: 'slj oss-crewing' ; 05. MAR - IT Fleet Support ; 06. ISM 1 - HO - MAR ; 03. CREWING - CMA SHIPS Croatia
Subject: CC AQUILA /URG / CREW - crewmemberEO JAKOVAC DRAZEN - ILLNES- SEEKING MEDICO ROMA ADVICE

Dear All,

Kindly be informed that this morning at 0920LT(0720UTC),Electrician

feel very weak ,almost losing his consciousness, felling jerk in his left hand and on the cheek.

We give him 4 glass of water with sugar and Master call CIRM ROMA.

Kindly find attached his medical report after visit doctor on 19/10/2016 and he was using prescribed medicines:INDOMETACINE 75mg,OMEPRAZOLE 20mg.

History of illness:

During morning AT 0915LT Electrician feels weakness during climbing by stairs to maintain job.

He couldn't breathe normally so he sits down on chair on navigational bridge.

Duty Officer calls Master and Chief Officer so they start prevent actions

Master takes measurements of blood pressure and pulse. At first blood pressure was 162/88 mm/Hg and pulse 82.

0920 LT Master called CIRM ROMA for medical advice.

Electrician was given Diazepam 5 mg according to advice.

He was given oxygen from Portable Oxygen Kit.



4/10/2016

Gmail - Medical assistance of patient on CMA CGM



Medical assistance of patient on CMA CGM AQUILA. Update

1 messaggio

Francesco Amenta <famenta@gmail.com>
A: SAMAD Marc Abdul <HO.MSAMAD@cma-cgm.com>
Cc: Sala operativa - CIRM <telesoccorso@cirm.it>, Sorveglianza Sanitaria <occupational.medicine@cirmservizi.it>

24 ottobre 2016 09:01

Dear Dr Samad,

I am writing to you further to our telephone conversation of yesterday night concerning medical assistance to the electrician Mr Jakovac on board of the CMA CGM AQUILA.

Yesterday night we both agreed that in view of the suspect of a cerebrovascular accident (probably TIA) it would have been necessary to hospitalize the patient in the next few hours when the ship was passing through the Strait of Gibraltar.

In the meantime I had 2 telephone conversations with the Captain Mr Curkovic, who is an excellent and attentive collaborator. A long review between us of symptomatology and the fact that problems started after patient took omeprazole, suggested me that the problems could be caused by an adverse reaction to omeprazole. This medicinal compound was prescribed by a physician in Rotterdam as gastroprotectant treatment in association with indomethacin given for sciatic complications of a low back inflammatory condition.

On entering in the MICROMEDEX adverse drug reactions bank I had the confirmation that symptoms referred by Jakovac can be due to problems caused by omeprazol (rare adverse events).

In this situation and in agreement with Captain Curkovic we have decided to avoid the MEDEVAC in Gibraltar and to continue a careful observation of the patient. Patient at the present feels normal, without any problem/symptom and of course not longer assuming omeprazole. If need arises when the ship will be close to Sardinia or Malta we can arrange patient's transfer ashore.

This note for your information and explaining why at the moment I did not longer recommend patient hospitalization in Gibraltar.

With best regards,

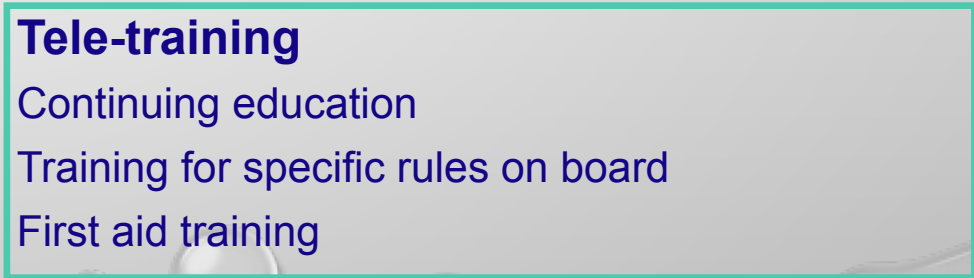
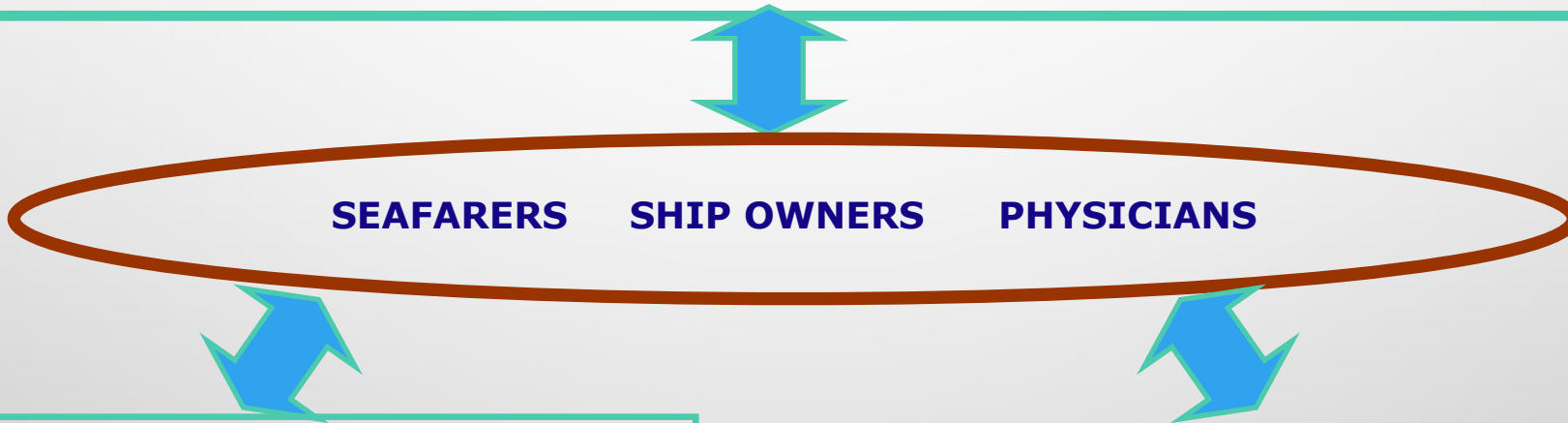
Sincerely,

Prof Francesco Amenta

CIRM President



ORGANISATIONAL ISSUES/POTENTIALITIES



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CONCLUSIONS

We are living in exciting times as the speed and ease of communications and progress of telemedicine continues to get better with time.

Traditional radiomedical services, certainly useful in the past, today should be considered obsolete.

We should work for an increased diffusion of advanced telemedical services for treating diseases and injuries on board ships.

Based on our direct experience the future looks bright to advance our goal to provide effective health services to people on board ships.

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