“Protezione dei pazienti fragili ricoverati e quella degli operatori sanitari”

Vincenzo Puro
INMI L. Spallanzani

Webinar 16 marzo 2020

Coronavirus disease 2019 (COVID-19)

World Health Organization

Situation Report – 55

Data as reported by national authorities by 10 AM CET 15 March 2020

HIGHLIGHTS

- Nine new countries/territories/areas (African Region [7], European Region [1] and Region of Americas [1]) in have reported cases of COVID-19 in the past 24 hours.

- A WHO high-level technical mission concluded a visit to Iraq to support the Iraqi Ministry of Health in their COVID-19 prevention and containment measures. WHO is working around the clock to establish 3 negative-pressure [contagious respiratory disease isolation] rooms in Baghdad, Erbil and Basra to accommodate patients who might require more sophisticated medical treatment. For detailed information, please see here.

SITUATION IN NUMBERS

total and new cases in last 24 hours

Globally

153 517 confirmed
(10 982 new)
5735 deaths (343 new)

China

81 048 confirmed (27 new)
3204 deaths (10 new)

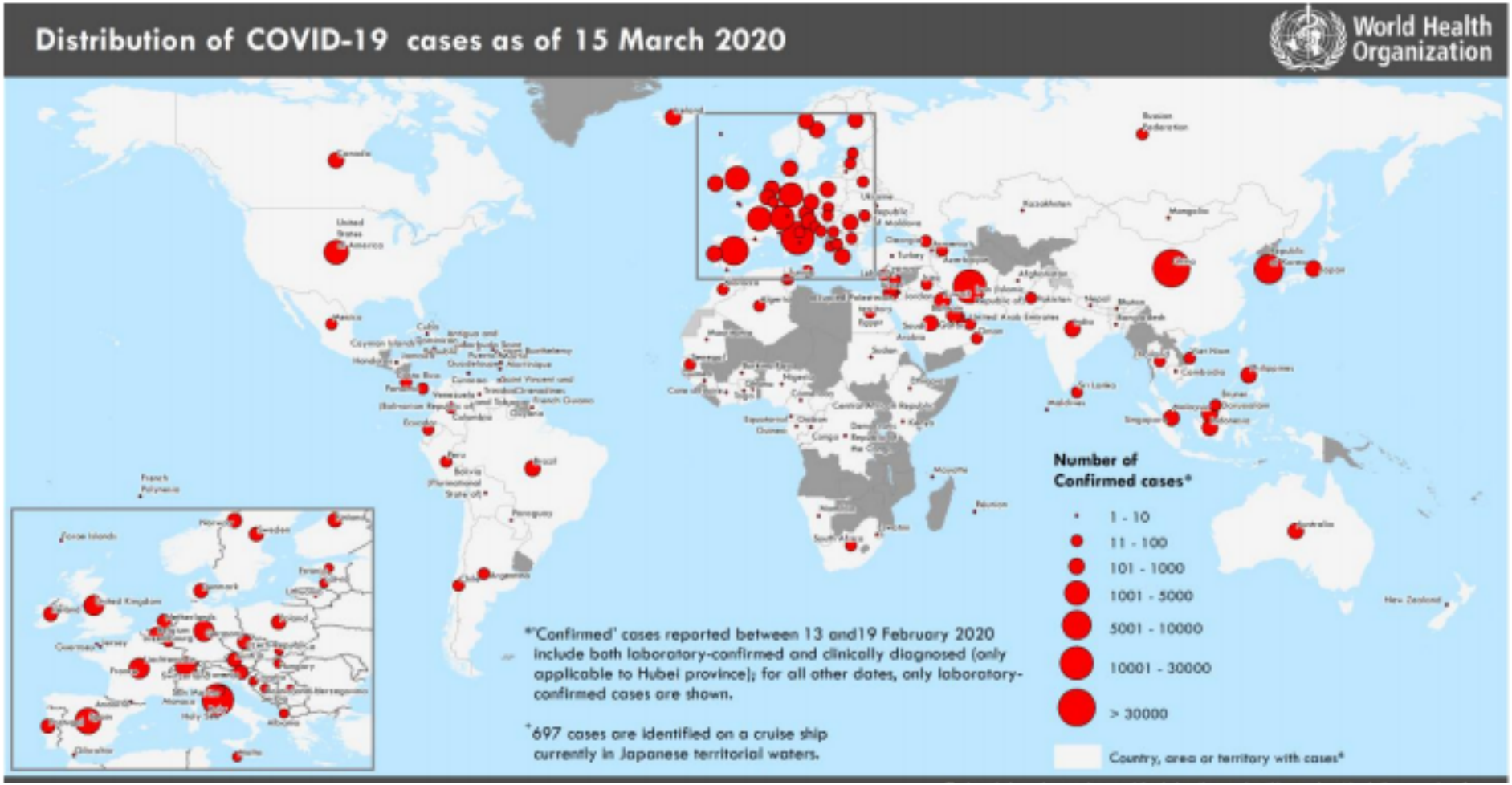
Outside of China

72 469 confirmed (10 955)
2531 deaths (333 new)
143 countries/territories/areas (09 new)

WHO RISK ASSESSMENT

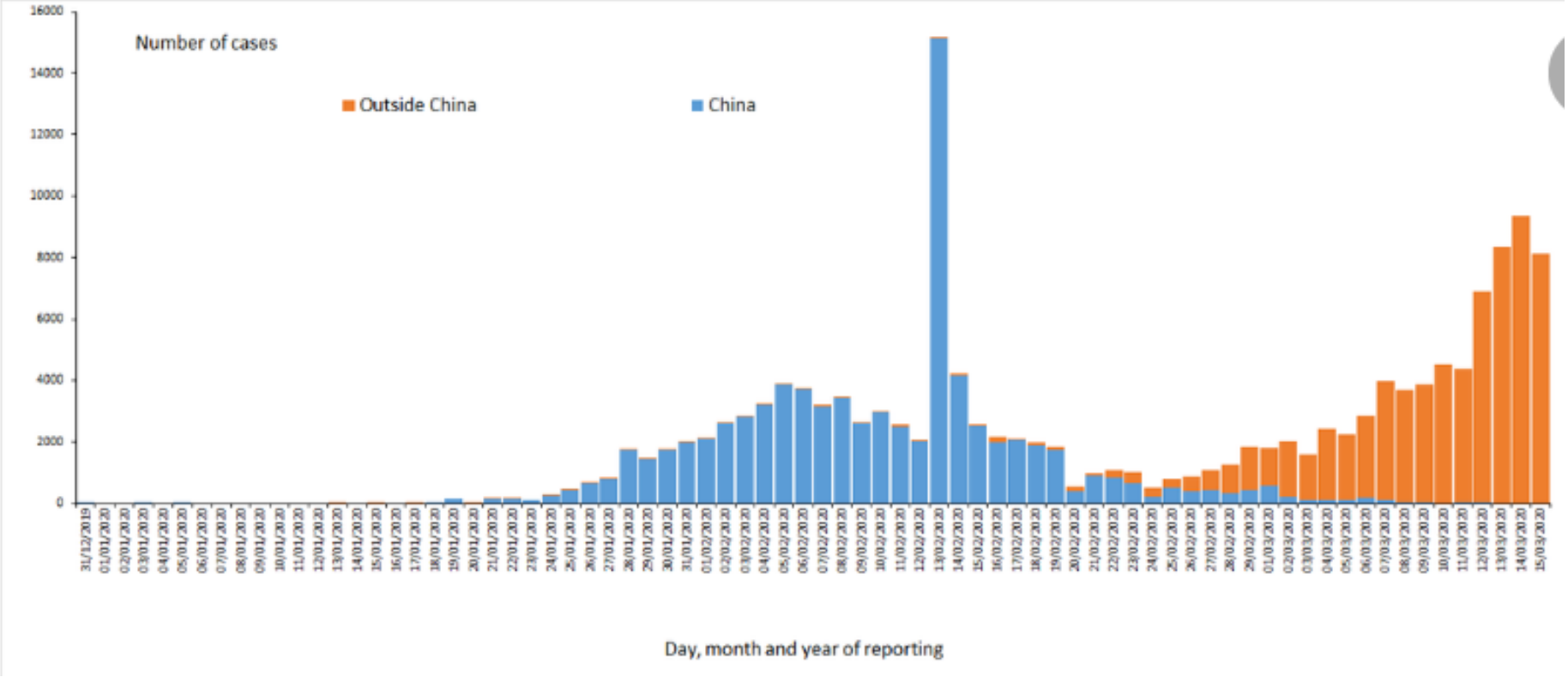
China	Very High
Regional Level	Very High
Global Level	Very High

Figure 1. Countries, territories or areas with reported confirmed cases of COVID-19, 15 March 2020



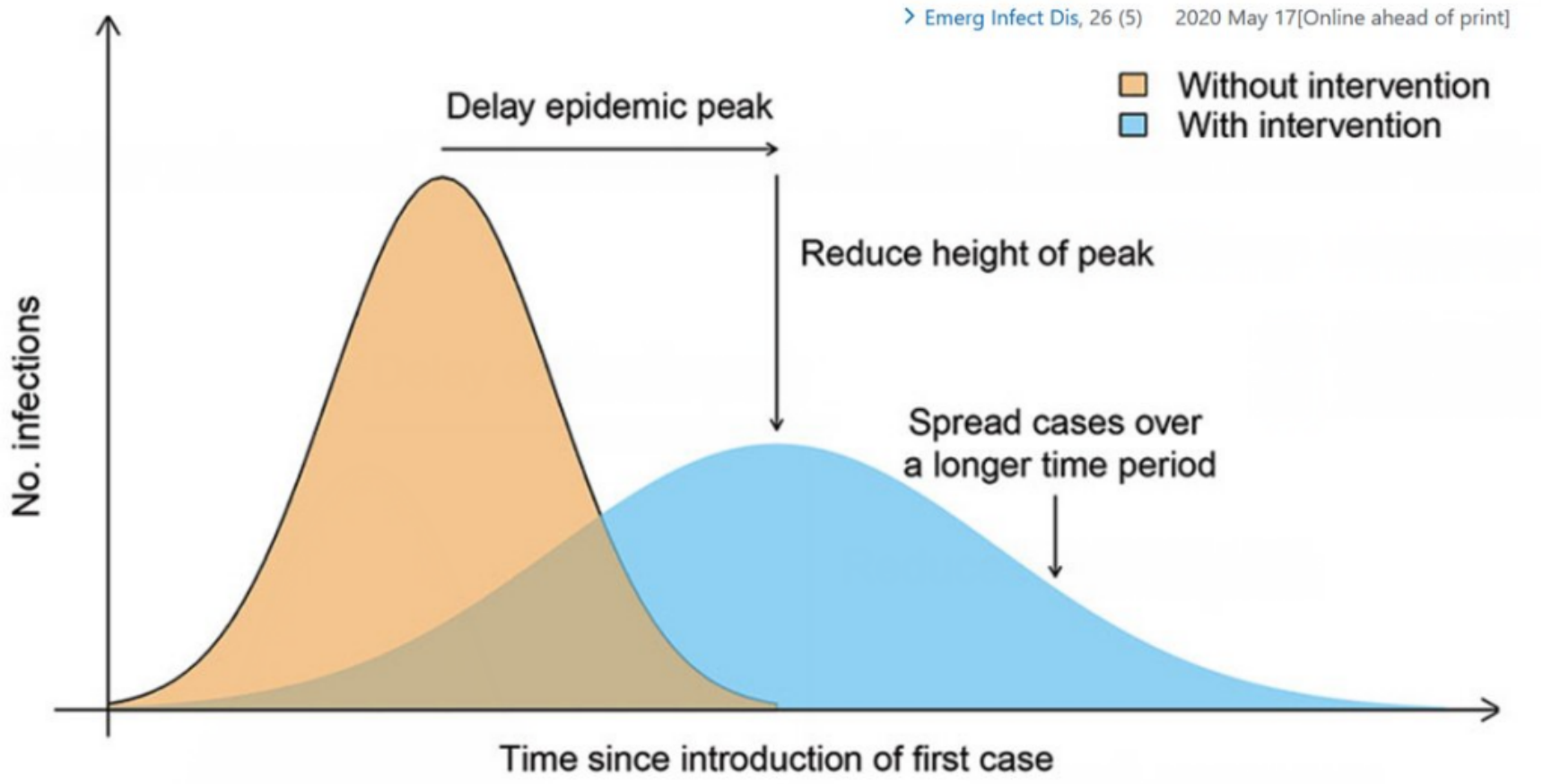
https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200313-sitrep-53-covid-19.pdf?sfvrsn=adb3f72_2

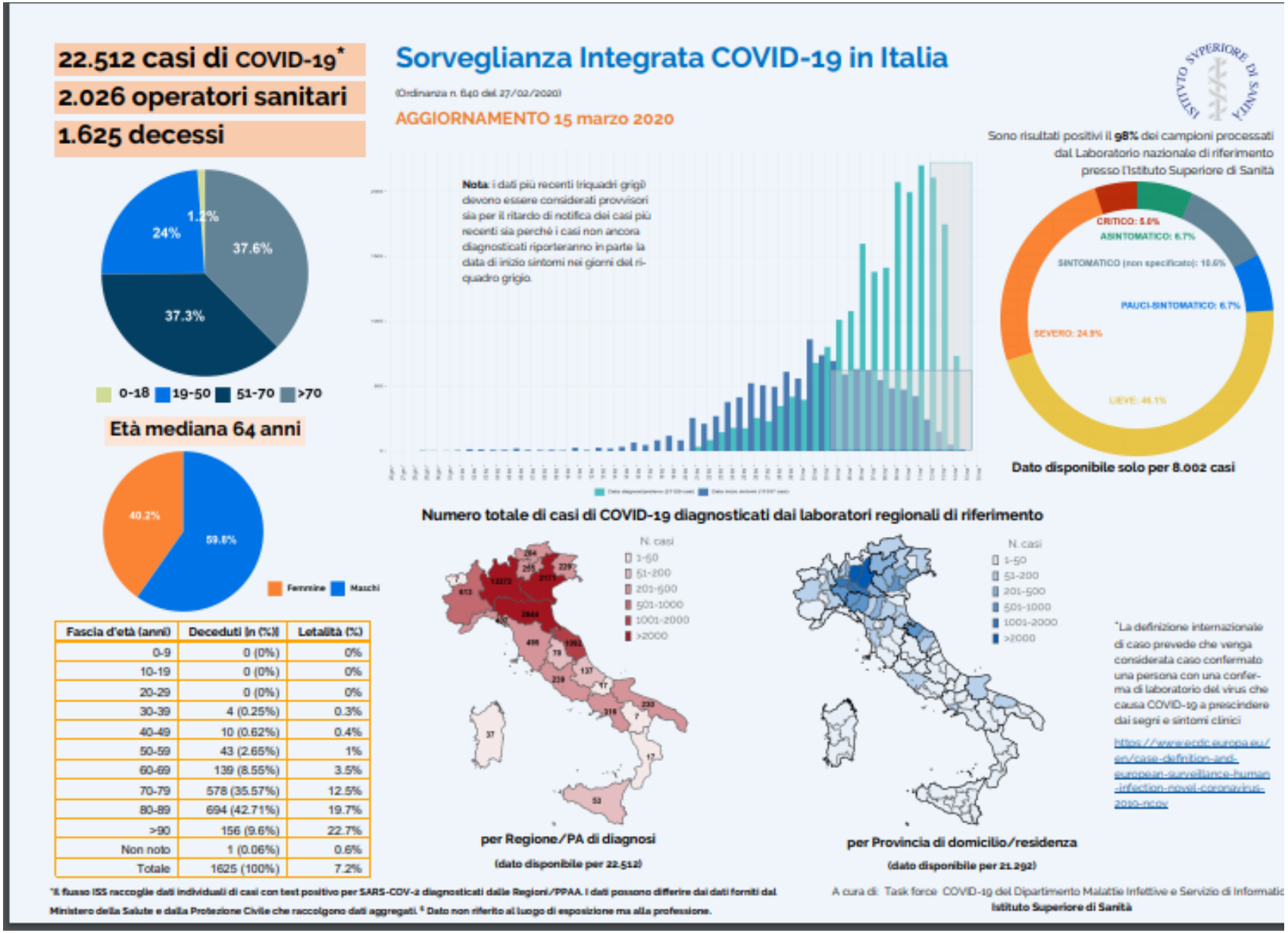
Distribution of COVID-19 cases worldwide, as of 15 March 202



https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases

Efficacia delle misure di isolamento sociale sul contenimento delle epidemie

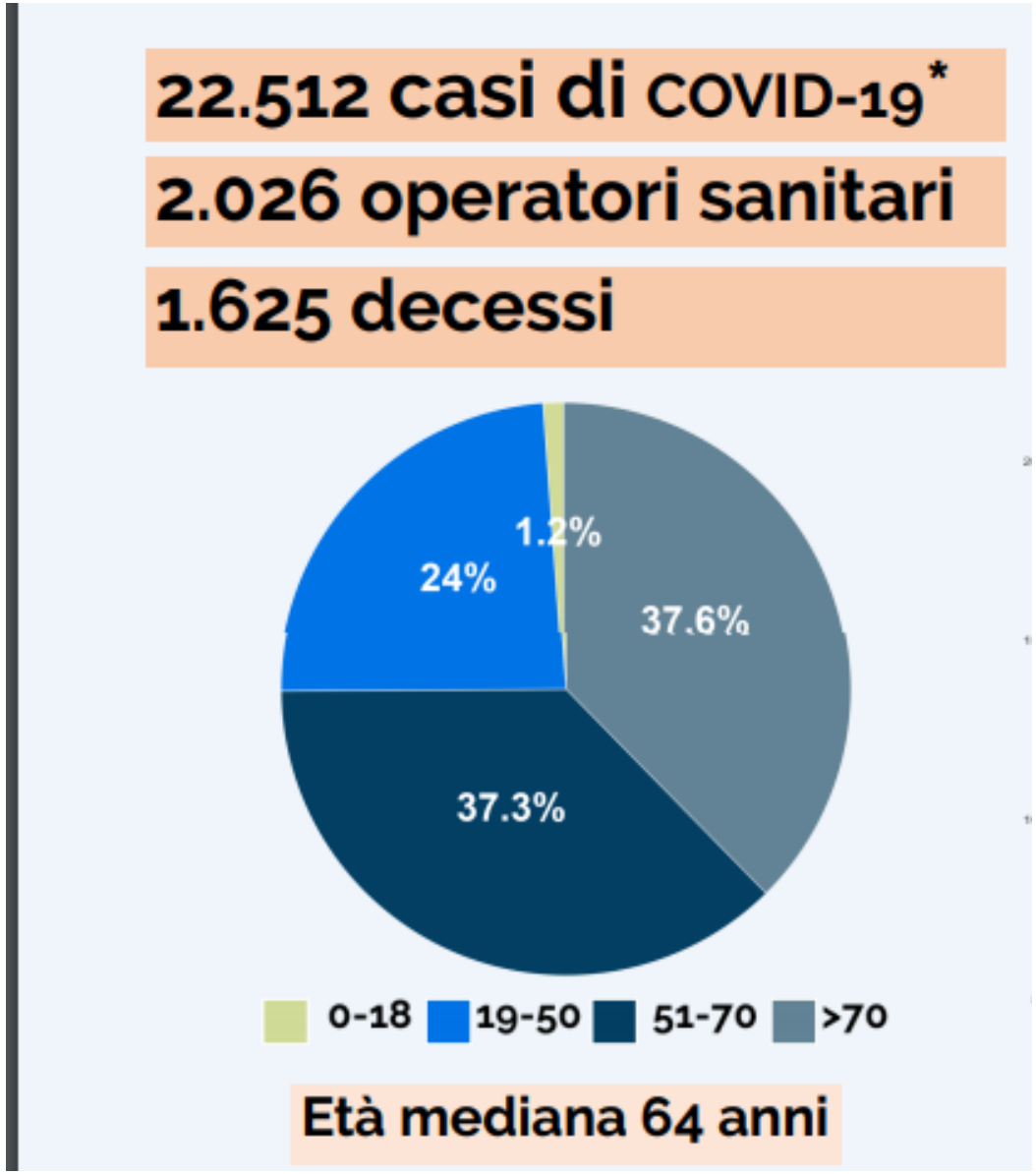




Fascia d'età (anni)	Deceduti [n (%)]	Letalità (%)
0-9	0 (0%)	0%
10-19	0 (0%)	0%
20-29	0 (0%)	0%
30-39	4 (0.25%)	0.3%
40-49	10 (0.62%)	0.4%
50-59	43 (2.65%)	1%
60-69	139 (8.55%)	3.5%
70-79	578 (35.57%)	12.5%
80-89	694 (42.71%)	19.7%
>90	156 (9.6%)	22.7%
Non noto	1 (0.06%)	0.6%
Totale	1625 (100%)	7.2%

*Il flusso ISS raccoglie dati individuali di casi con test positivo per SARS-COV-2 diagnosticati dalle Regioni/PPAA. I dati possono differire dai dati forniti dal Ministero della Salute e dalla Protezione Civile che raccolgono dati aggregati. § Dato non riferito al luogo di esposizione ma alla professione.

https://www.epicentro.iss.it/coronavirus/bollettino/covid-19-infografica_ita.pdf



9%

15% nella fascia d'età

https://www.epicentro.iss.it/coronavirus/bollettino/covid-19-infografica_ita.pdf

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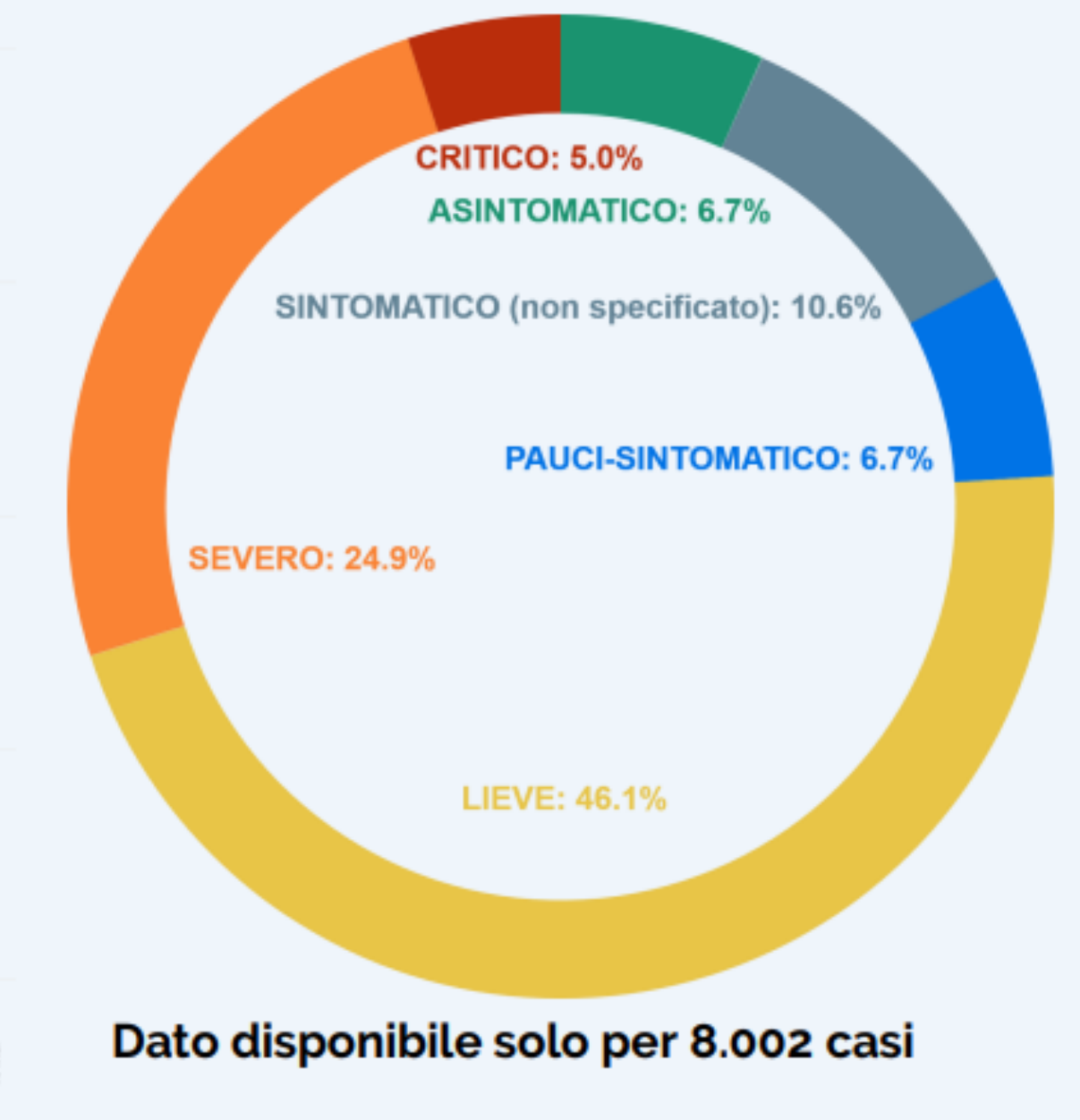


https://www.epicentro.iss.it/coronavirus/bollettino/covid-19-infografica_ita.pdf

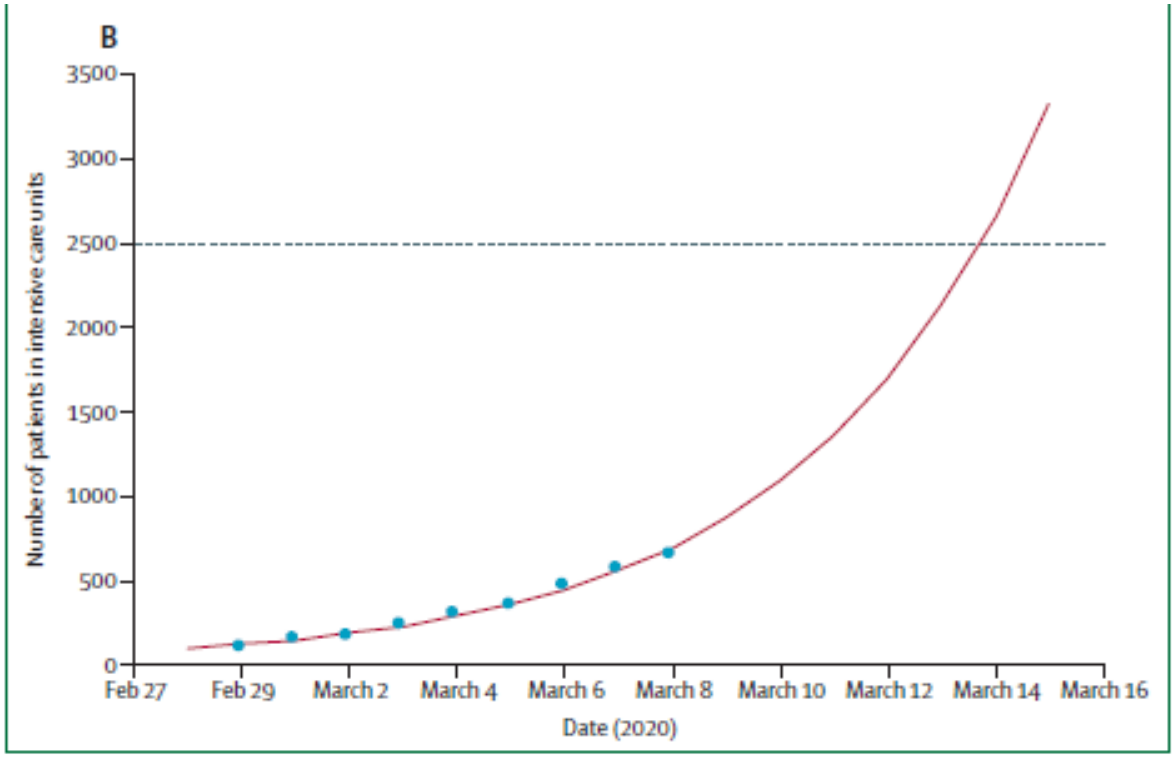
COVID-19 and Italy: what next?

Andrea Remuzzi, Giuseppe Remuzzi

The spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has already taken on pandemic proportions, affecting over 100 countries in a matter of weeks. A global response to prepare health systems worldwide is imperative. Although containment measures in China have reduced new cases by more than 90%, this reduction is not the case elsewhere, and Italy has been particularly affected. There is now grave concern regarding the Italian national health system's capacity to effectively respond to the needs of patients who are infected and require intensive care for SARS-CoV-2 pneumonia. The percentage of patients in intensive care reported daily in Italy between March 1 and March 11, 2020, has consistently been between 9% and 11% of patients who are actively infected. The number of patients infected since Feb 21 in Italy closely follows an exponential trend. If this trend continues for 1 more week, there will be 30 000 infected patients. Intensive care units will then be at maximum capacity; up to 4000 hospital beds will be needed by mid-April, 2020. Our analysis might help political leaders and health authorities to allocate enough resources, including personnel, beds, and intensive care facilities, to manage the situation in the next few days and weeks. If the Italian outbreak follows a similar trend as in Hubei province, China, the number of newly infected patients could start to decrease within 3–4 days, departing from the exponential trend. However, this cannot currently be predicted because of differences between social distancing measures and the capacity to quickly build dedicated facilities in China.

www.thelancet.com Published online March 12, 2019 https://doi.org/10.1016/S0140-6736(20)30627-9

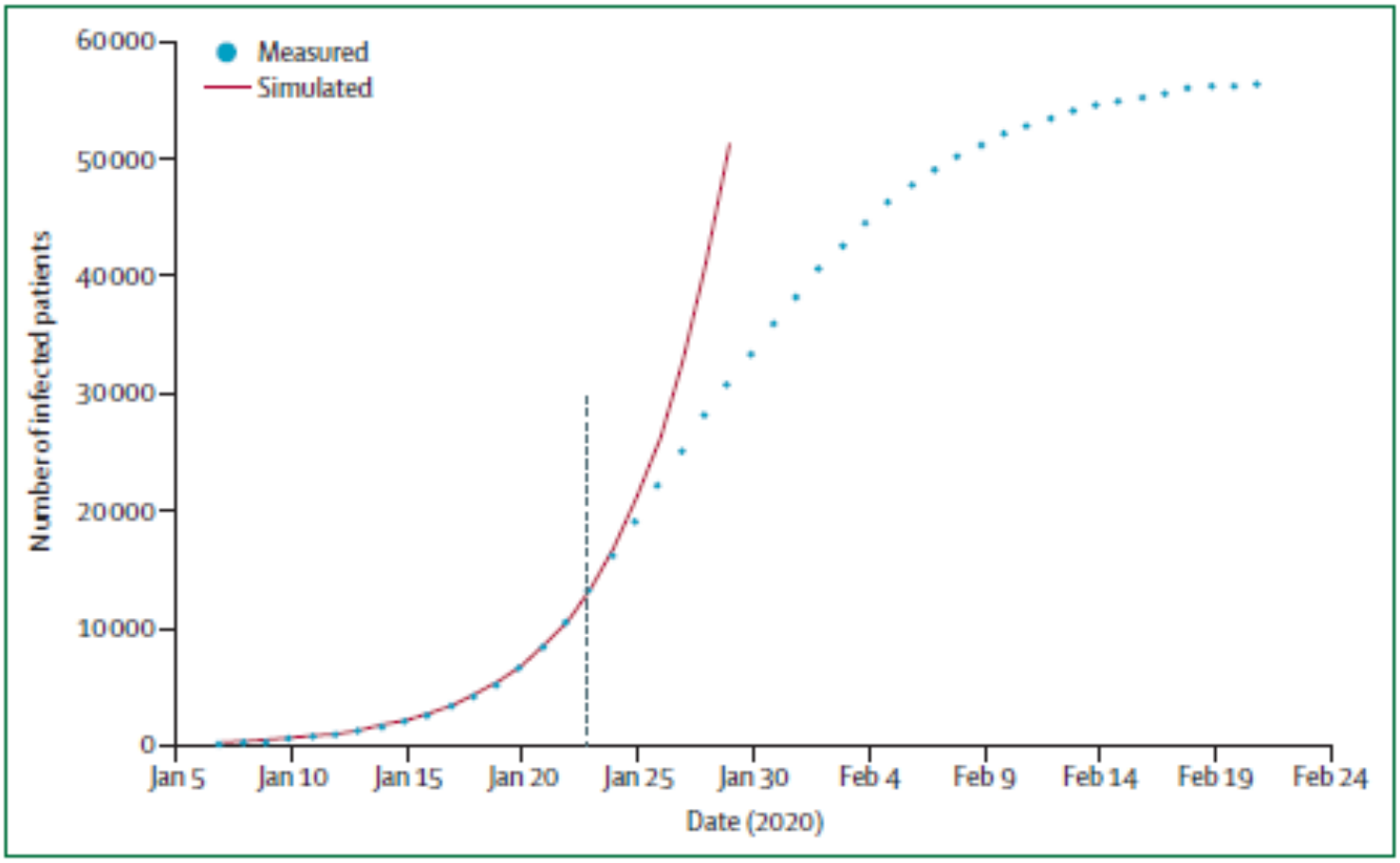
Figure 2: **Measured and predicted number of patients in intensive care units in Italy using an exponential curve**
Panel A shows number of patients in intensive care units in previous days and B shows projections for the coming days. The dotted line represents the estimated capacity of intensive care beds in Italy.



4000 beds in intensive care units during the worst period of infection,
which is expected to occur in about 4 weeks from March 11

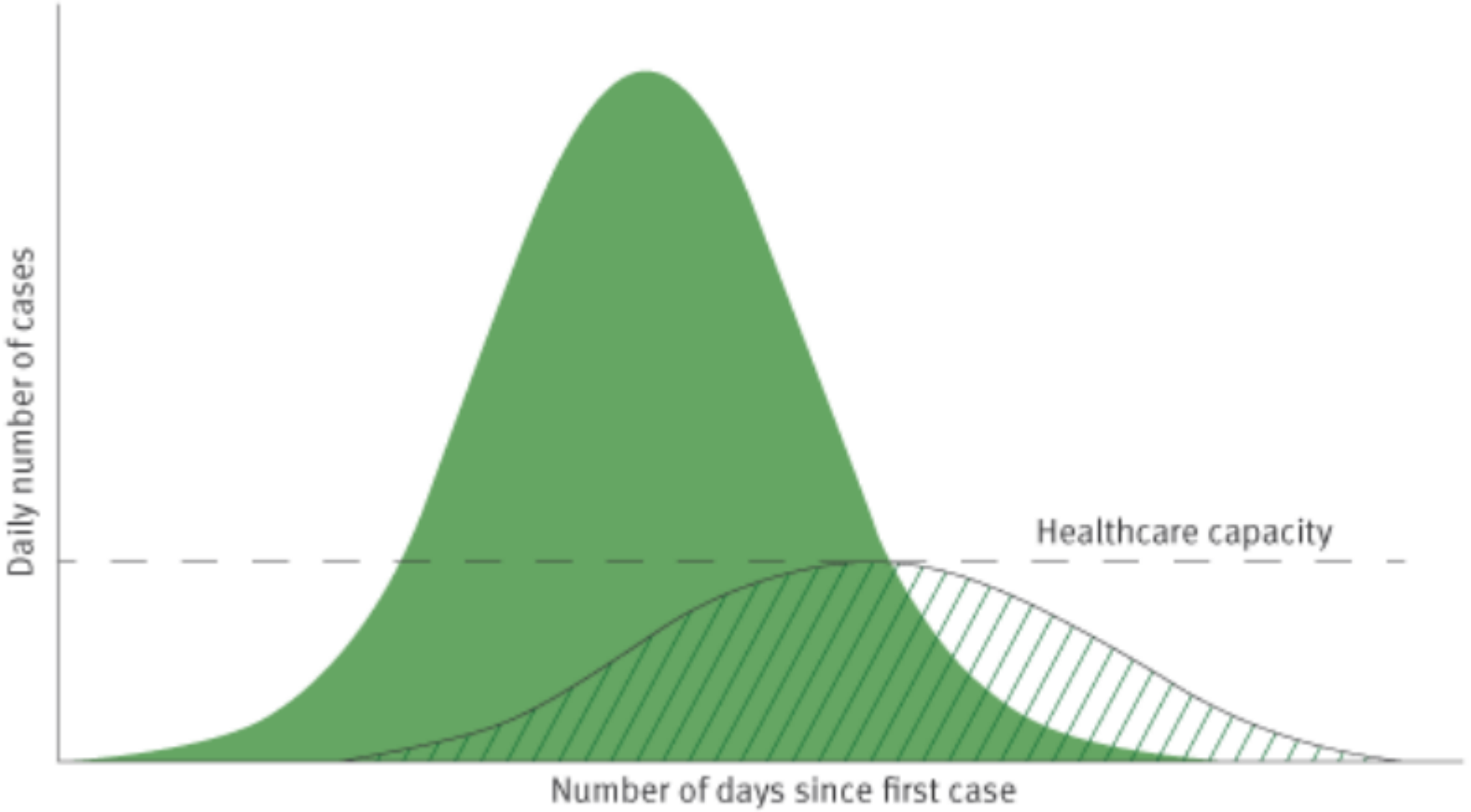
www.thelancet.com Published online March 12, 2019 https://doi.org/10.1016/S0140-6736(20)30627-9

Figure 3: **Fitting of cumulative curve of measured infected patients in Hubei, China, with an exponential curve**
The dotted line represents the timepoint of the infection outbreak in Italy. It is expected that the number of cumulative patients who are infected will start to deviate from the exponential low in 3–4 days. The plateau of the cumulative curve will be reached just over 30 days from March 11, 2020.



www.thelancet.com Published online March 12, 2019 https://doi.org/10.1016/S0140-6736(20)30627-9

Figure 1. Illustration of the objectives of community mitigation measures in a scenario of community transmission of COVD-19



https://www.ecdc.europa.eu/sites/default/files/documents/RRA-sixth-update-Outbreak-of-novel-coronavirus-disease-2019-COVID-19.pdf

Operatori sanitari

- **Rischio di infezione**
- Turni estenuanti
- Fatica – consumo
- Stress - burn out
- ……..

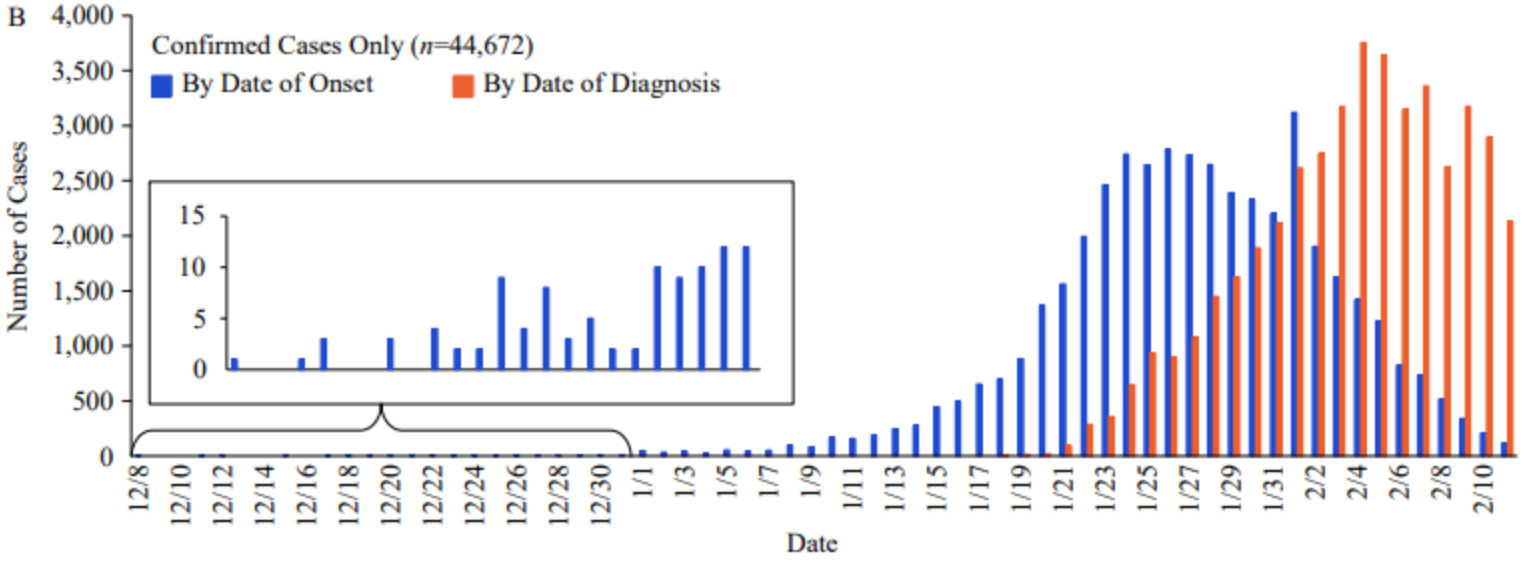
Vital Surveillances

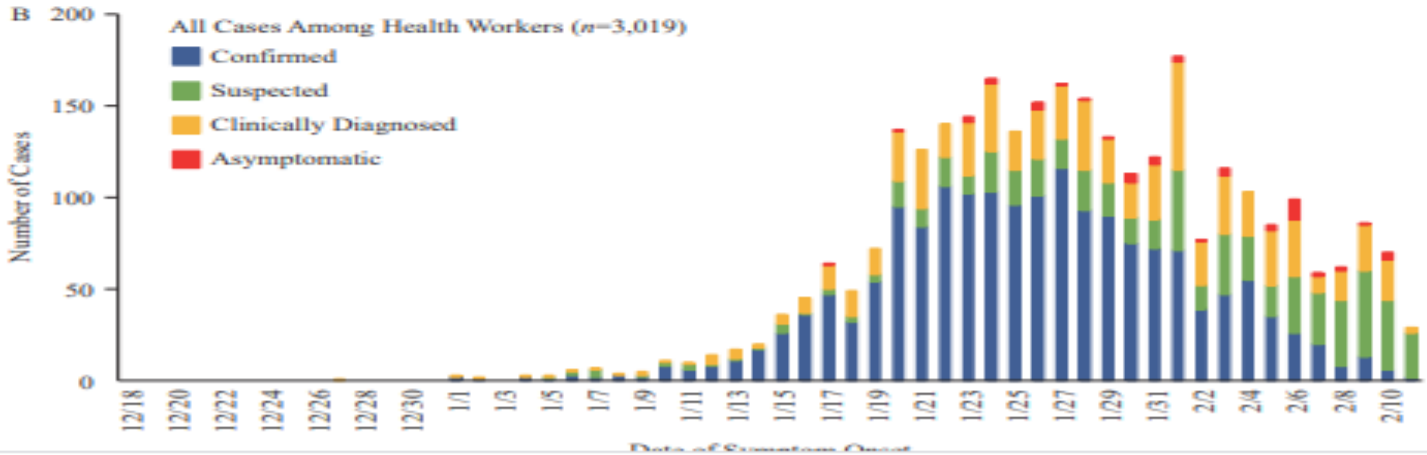
The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) — China, 2020

The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team

72,000 patient records, of which 44,672 were lab-confirmed cases, 16,186 suspected cases, 10,567 clinically diagnosed cases, and 889 asymptomatic cases. Of the confirmed cases, 80.9% cases were mild, and the vast majority (86.6%) of confirmed cases were in people ages 30 to 79 years old.

1,716 of whom confirmed in HCWs, 5 of them fatally, there is no evidence of super-spreader events in healthcare facilities caring for COVID-19 cases,


B
Confirmed Cases Only (n=44,672)
By Date of Onset
By Date of Diagnosis
Number of Cases
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
15
10
5
0
12/8
12/10
12/12
12/14
12/16
12/18
12/20
12/22
12/24
12/26
12/28
12/30
1/1
1/3
1/5
1/7
1/9
1/11
1/13
1/15
1/17
1/19
1/21
1/23
1/25
1/27
1/29
1/31
2/2
2/4
2/6
2/8
2/10
Date


B
All Cases Among Health Workers (n=3,019)
Confirmed
Suspected
Clinically Diagnosed
Asymptomatic
Number of Cases
200
150
100
50
0
12/18
12/20
12/22
12/24
12/26
12/28
12/30
1/1
1/3
1/5
1/7
1/9
1/11
1/13
1/15
1/17
1/19
1/21
1/23
1/25
1/27
1/29
1/31
2/2
2/4
2/6
2/8
2/10

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China

Dawei Wang, MD; Bo Hu, MD; Chang Hu, MD; Fangfang Zhu, MD; Xing Liu, MD; Jing Zhang, MD; Binbin Wang, MD; Hui Xiang, MD; Zhenshun Cheng, MD; Yong Xiong, MD; Yan Zhao, MD; Yirong Li, MD; Xinghuan Wang, MD; Zhiyong Peng, MD

Of 138 hospitalized, **hospital-associated transmission was suspected as the presumed mechanism of infection for affected health professionals (40 [29%]) and hospitalized patients (17 [12.3%])**

JAMA Published online February 7, 2020

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- Of the 41 infected HCWs, 31 (77.5%) worked on general wards, 7 (17.5%) in the emergency department, and 2 (5%) in the ICU.
- Of the hospitalized patients, 7 patients were from the surgical department, 5 were from internal medicine, and 5 were from the oncology department.

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One patient presented with abdominal symptoms and was admitted to the surgical department.

10 HCWs in this department were presumed to have been infected by this patient.

Patient-to-patient transmission also was presumed to have occurred, and at least 4 hospitalized patients in the same ward were infected, and all presented with atypical abdominal symptoms.

JAMA Published online February 7, 2020

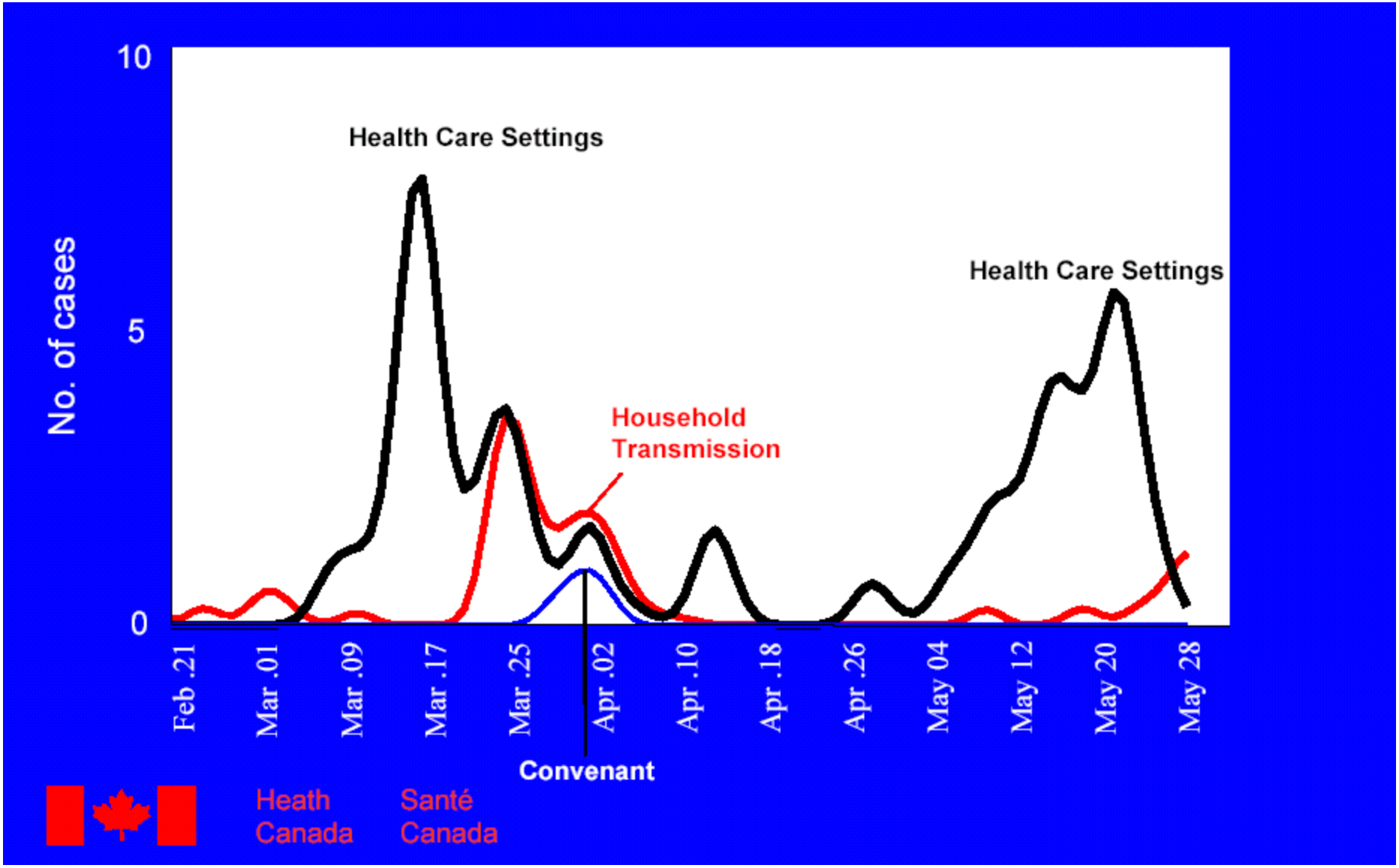
SARS E MERS: CASI IN OPERATORI SANITARI

	MERS	SARS
Operatori sanitari (% sul totale)	36	23

Interhuman transmissibility of MERS: estimation of pandemic risk. LID 2013
Infection control and MERS-CoV in health-care workers. Lancet 2014
MERS. Fact sheet. ECDC.20 August 2014

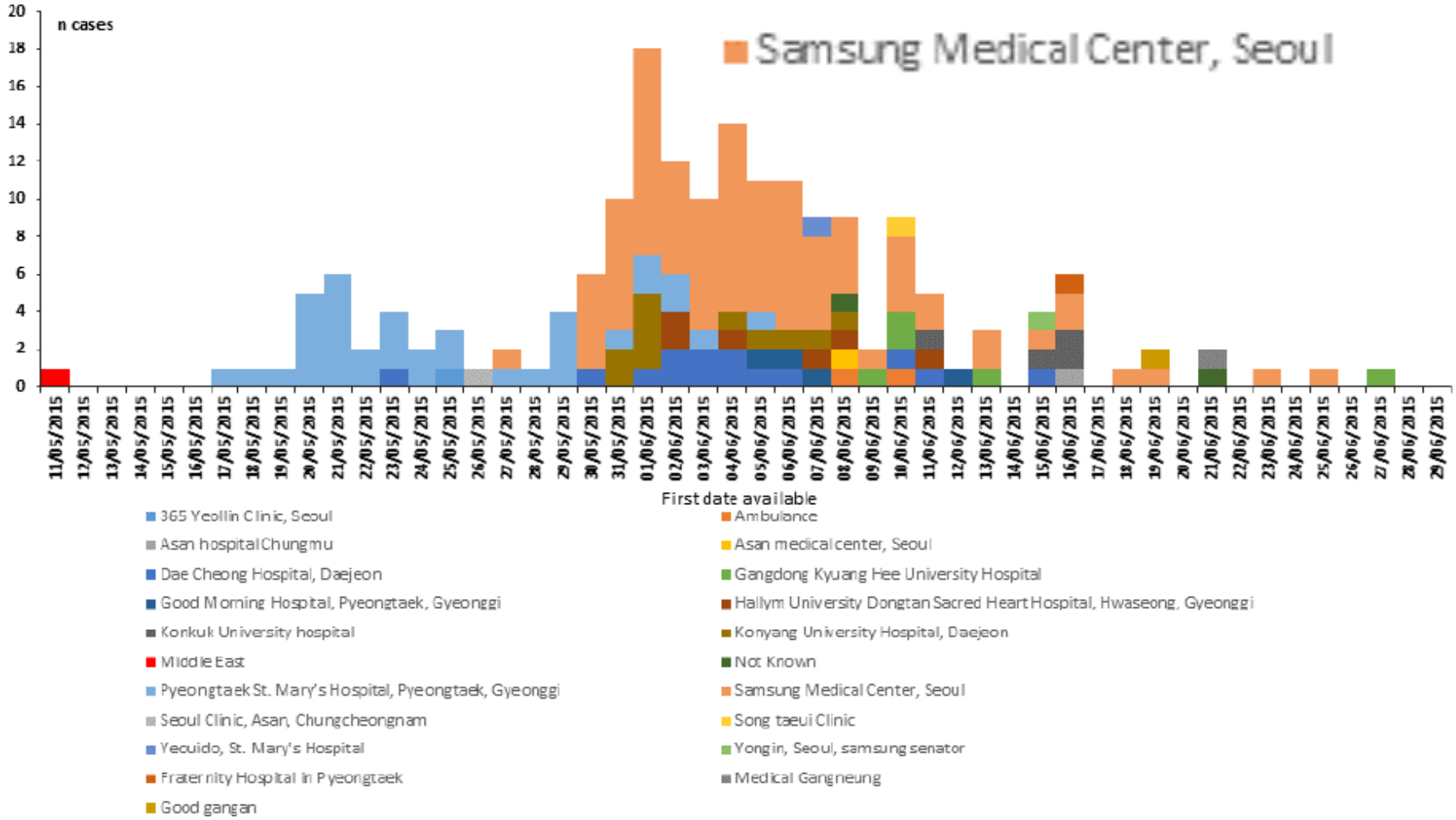
Hanoi ricorda– In un ospedale il ritratto di Carlo Urbani, il medico morto dopo aver scoperto la Sars.

SARS in Canada



MERS CoV La curva epidemica in Corea – 21 ospedali coinvolti

Figure 5. Distribution of confirmed cases of MERS infection by place of presumed exposure and date of onset or reporting*, South Korea and China, 11 May–28 June 2015 (n=182)



Emergenze infettive

2001	Antrace	
2002-2003	**SARS**	
2005	Influenza aviaria H5N1	13/12/2007 PIANO NAZIONALE DI PREPARAZIONE E RISPOSTA AD UNA PANDEMIA INFLUENZALE
2009	**Pandemia Influenza H1N1**	**Italia 5.600.000 ILI** 1.106 casi gravi 532 ricoverati in TI 260 decessi
2014	**Ebola**	Africa occidentale
2017	H7N9	Cina -dal 2013 1624 cases 612 deaths (39%)
2017	Morbillo	
2019-2020	**COVID-19**	

Fase dell'epidemia

INITIAL/EARLY vs WIDESPREAD

CONTAINMENT vs MITIGATION

During the initial stages of the epidemic, containment phase protocols consider all confirmed cases were isolated in hospital and their contacts were traced and quarantined.

Contesto assistenziale

- DEA/PS
- MMG/PLS
- 118 Trasporto infermi
- *Recupero aereo (pazienti o esposti) ……. o navale*
- Ricovero in ospedale
- Terapia intensiva
- Trasporti interni e Servizi diagnostici
- Laboratori (BSL 2 e BSL 3)

……..

- Assistenza a domicilio

- Quarantena/Sorveglianza (ospedale, struttura dedicata, domicilio)

Infection Control Strategies in HCF

- Engineering Controls
  - Environmental ventilation (air changes per hour)
  - Patient placement
- Administrative Controls
  - Programmes, policies, procedures
  - Early recognition, treatment, contention and reporting
  - Triage, organization of work
- Personal Protective Equipment

Scientific Working Meeting on Occupational Influenza Prevention and Control in Health Care Settings
Ontario, Canada, October 26 – 27, 2006.

Superfici ambientali e sanificazione

Non vi sono al momento motivi che facciano supporre una maggiore sopravvivenza ambientale o una minore suscettibilità ai disinfettanti sopramenzionati da parte del SARS 2-CoV responsabile della COVID-19.

Pertanto, in accordo con quanto suggerito dall'OMS sono procedure efficaci e sufficienti una *"pulizia accurata delle superfici ambientali con acqua e detergente seguita dall'applicazione di disinfettanti comunemente usati a livello ospedaliero (come l'ipoclorito di sodio)"*.

Accoglienza/Primo contatto/ Triage

- Ridurre la probabilità di presentazione diretta
- Definire il percorso per chi si presenta direttamente evitando sale d'attesa in comune
- Accoglienza senza diretta esposizione

oppure

-mantenere distanza > 1m con DPI

-fornire una mascherina al paziente e igiene mani

Definire procedure per il caso sospetto

3.2 Percorso presso Pronto Soccorso/DEA

- Mettere in atto procedure operative per una tempestiva identificazione dei *casi in valutazione* e per la conseguente applicazione delle misure di isolamento da contatto, droplet e aereo, in aggiunta alle precauzioni standard e di igiene respiratoria, a partire dal punto di primo contatto con la struttura sanitaria (accoglienza e triage, sale d'attesa).
- Nella fase di accoglienza il paziente deve essere dotato di mascherina chirurgica e l'operatore effettua il colloquio mantenendosi ad una distanza di almeno un metro.
- Attivare e garantire l'utilizzo del percorso e la stanza di isolamento nei DEA come già predisposto da indicazioni ricevute in occasione della SARS e ribadite in occasione della pandemia da influenza H1N1 per i *casi in valutazione* di 2019-nCoV che devono essere visitati in un'area separata dagli altri pazienti.
- Realizzare materiale informativo con l'apposizione di cartelli nella/e lingua/e appropriata/e alla popolazione assistita, recanti istruzioni per i pazienti e per gli accompagnatori, a partire dal materiale messo a disposizione nella sezione "Bed Manager" regionale per le malattie infettive all'indirizzo http://www.inmi.it/bedmanager e sul sito del Ministero della Salute al link: http://www.salute.gov.it/nuovocoronavirus.
- Gli operatori che prestano assistenza dovranno indossare filtrante respiratorio (FFP2 o superiore) e protezione facciale (occhiali o schermo), camice impermeabile a maniche lunghe non sterile e doppi guanti;

Tende pre-triage

20/02/20 REFERENCES

- **WHO Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspectedInterim guidance 25 January 2020**
  https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125

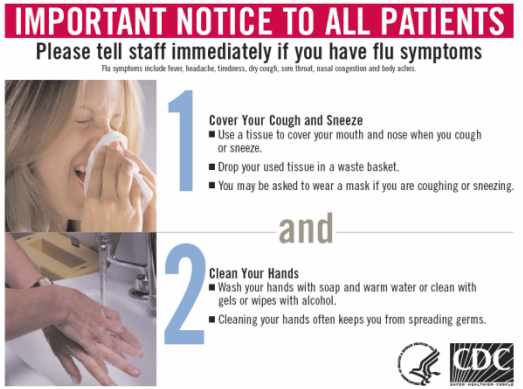
- **ECDC Infection prevention and control for the care of patients with 2019-nCoV in healthcare settings Technical report 2 Feb 2020**
- https://www.ecdc.europa.eu/en/publications-data/infection-prevention-and-control-care-patients-2019-ncov-healthcare-settings

- **US CDC Interim Infection Prevention and Control Recommendations for Patients with Confirmed 2019 Novel Coronavirus (2019-nCoV) or Persons Under Investigation for 2019-nCoV in Healthcare Settings February 12, 202**
  https://www.cdc.gov/coronavirus/2019-nCoV/hcp/infection-control.html

- **PHE Guidance COVID-19: infection prevention and control guidance 14 February 2020**
  https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/wuhan-novel-coronavirus-wn-cov-infection-prevention-and-control-guidance

- **INMI. Procedure operative per la gestione di casi sospetti probabili o confermati e contatti di infezione respiratoria da Coronavirus emergenti . Gennaio 2020**

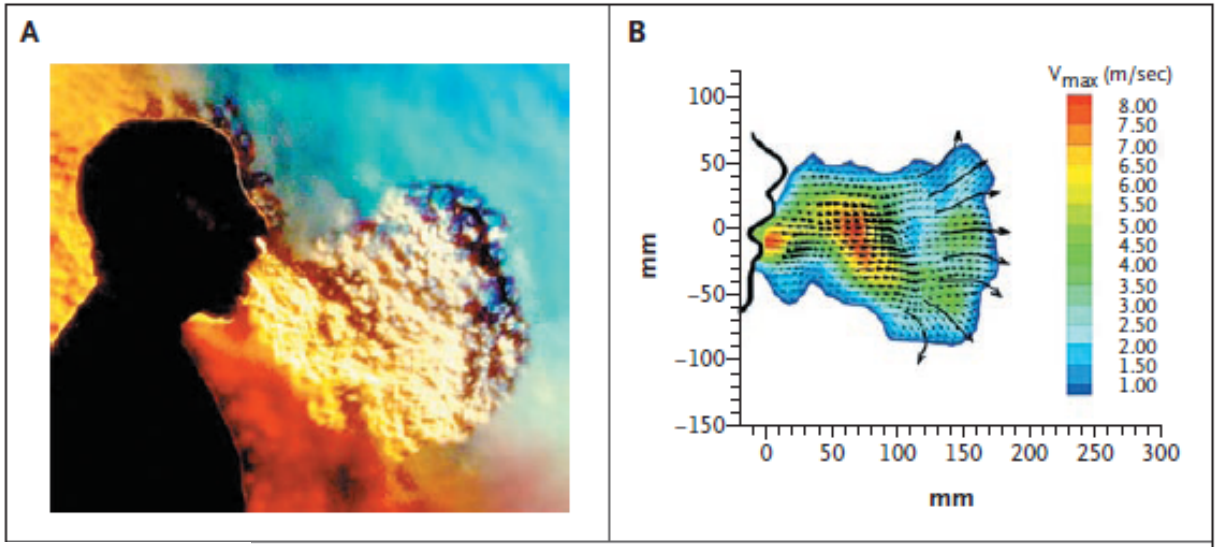
Precauzioni	**WHO**	**ECDC**	**US CDC**	**PHE**	**INMI**
Precauzioni standard/Igiene della tosse	X	X	X	X	X
Contatto	X	X	X + Eye Protection	X	X
Droplet	X	X		X	X
Aerea	aerosol-generating procedures	X	X	X	X



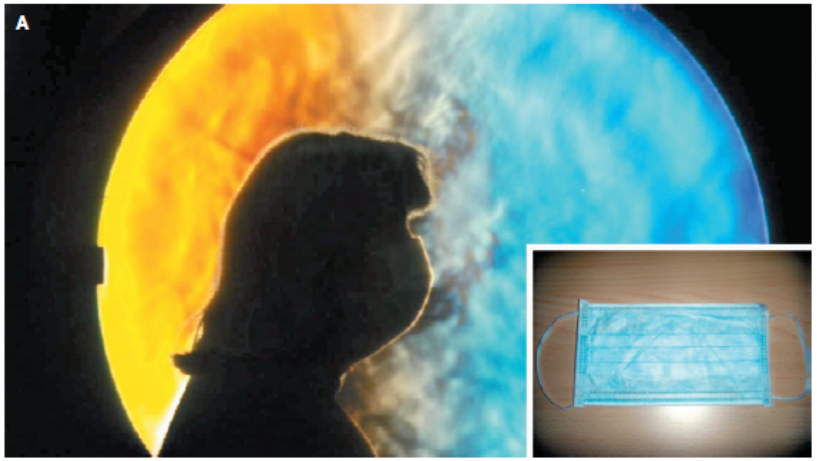
Igiene respiratoria/Etichetta della tosse

- Incoraggia i pazienti affetti da patologia respiratoria ad avvisare il personale sanitario
- Proponi ai pazienti l'uso della mascherina chirurgica o simile ai fini di coprire le mucose, naso e bocca
- Proponi ai pazienti il lavaggio delle mani dopo il contatto con il volto o le mucose orali
- Separa i pazienti con malattia respiratoria febbrile dagli altri (> 2 metri).
- Gestisci i pazienti con le precauzioni da droplet sino a quando non siano escluse le patologie per cui ne è previsto l'uso.

Coughing and Aerosols



Coughing and Masks



TRANSMISSION-BASED

	AIRBORNE	DROPLET	CONTACT
			
	Small particles (smaller than 5 micrometers)	Large particles (larger than 5 micrometers)	Direct or indirect contact
Room	Airborne infection isolation (AII) room preferred; private room, door closed required	Private room preferred; door may remain open	Private room preferred; **Equipment:** either disposable single-use or dedicate use of noncritical care equipment to one patient/resident
Hand hygiene	Standard precautions	Standard precautions	Standard precautions
Gloves	Standard precautions	Standard precautions	Wear gloves upon entering room and discard before leaving the area of the patient/resident
Gown	Standard precautions	Standard precautions	Wear gown upon entering room and discard before leaving the area of the patient/resident
Mask	N95 (or higher) respirator prior to room entry	Mask upon room entry	Standard precautions
Eye protection	Standard precautions	Standard precautions	Standard precautions

*This handout not intended to be all-inclusive. Certain diseases may require more specific precautions. Strict adherence to these precautions should help minimize the spread of illness, but will not guarantee absolute protection against infection transmission.

Ministero della Salute

DIREZIONE GENERALE DELLA PREVENZIONE SANITARIA
Ufficio 05 – Prevenzione delle malattie trasmissibili e profilassi internazionale

Per motivi precauzionali, si raccomanda che il personale sanitario, oltre ad adottare le misure standard di biosicurezza, applichi le precauzioni per prevenire la trasmissione per via aerea e per contatto. In particolare, dovrebbe indossare: mascherina e protezione facciale, camice impermeabile a maniche lunghe non sterile e guanti. Qualora siano necessarie procedure che possono generare aerosol, la mascherina dovrebbe essere di tipo FFP2.

Airborne transmission of communicable infection. The elusive pathway

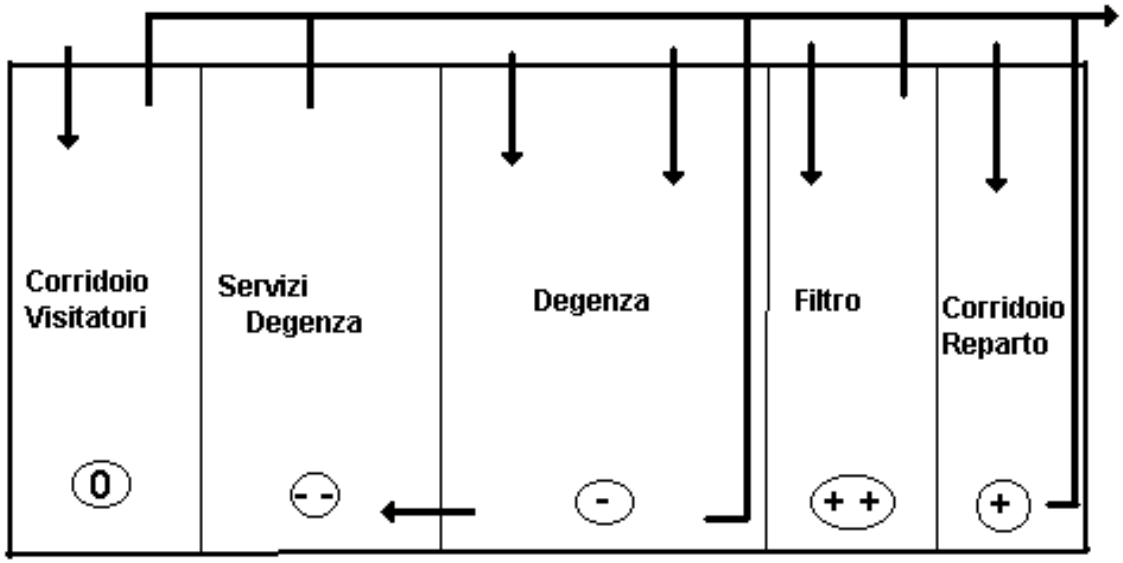
Roy e Milton N Engl J Med 2004; 350:1710-2 (modificata)

• Obbligata	M. Tuberculosis
• Preferita	Varicella, Morbillo
• Opportunistica	SARS
• Occasionale/rara	Vaiolo, Febbri emorragiche

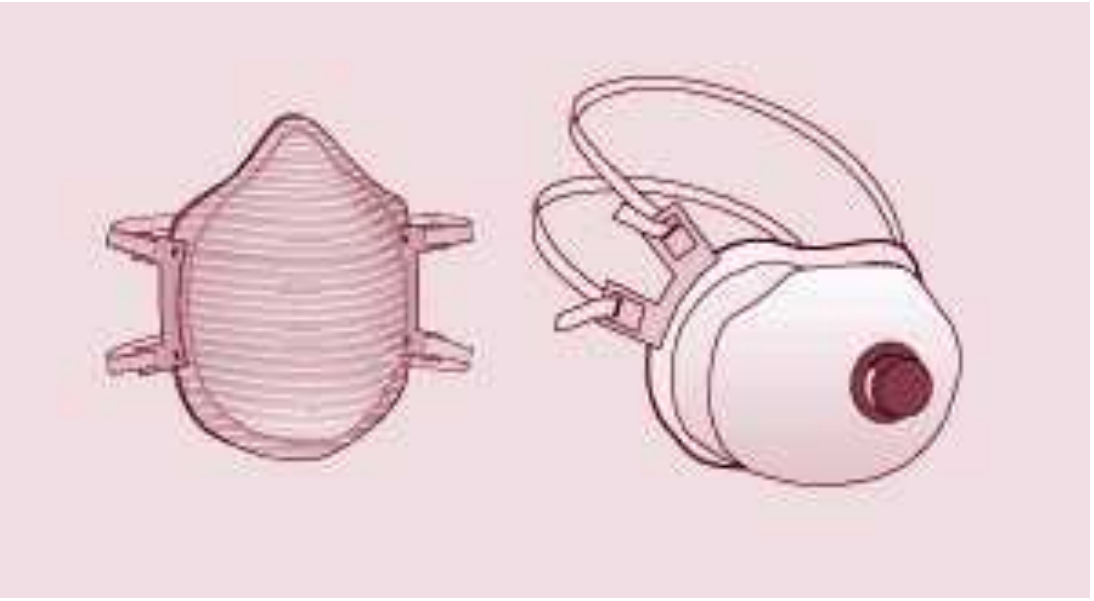
Collocazione	**WHO**	**ECDC**	**US CDC**	**PHE**	**INMI**
adequately ventilated single rooms	X	When AIR not available		When AIR not available	
Airborne isolation room (AIR, negative pressure, air changes, anteroom)	when aerosol-generating procedures	X	X	X	X

Cambi d'aria per ora	Minuti richiesti per la rimozione contaminanti 99%	99,9%
1	276	414
6	46	69
10	28	41
15	18	28
20	14	21
50	6	8

CDC 1993



DPI/PPE	WHO	ECDC	US CDC	PHE	INMI
Mascherina “chirurgica”	X				
Filtrante facciale (FFP)	aerosol-generating procedures	X FFP2 or 3 FFP3 aerosol-generating procedures	X (N95)	X FFP3	X FFP2/3 PAPR aerosol-generating procedures ICU



Classe	Efficienza filtrante totale minima
FFP1 / P1	78 %
FFP2 / P2	92 %
FFP3 / P3	98 %

NIOSH criteria,

filter materials would be tested at a flow rate of 85 L/minute for penetration by sodium chloride particles with a median aerodynamic diameter of 0.3 μm and, if certified would be placed in one of the following categories:

Type 100 (99.7% efficient),
Type 99 (99% efficient), and
Type 95 (95% efficient)

Requisiti dei facciali filtranti secondo la norma europea UNI EN 149

Il materiale filtrante deve essere testato per la penetrazione di particelle di diametro 0.6 μ ad un flusso di circa 100 L/minuto

	Perdita totale verso l'interno *	**Penetrazione attraverso il materiale filtrante**	
		cloruro di sodio	olio di paraffina
FFP1	25%	20%	-
FFP2	11%	6%	2%
FFP3	5%	3%	1%

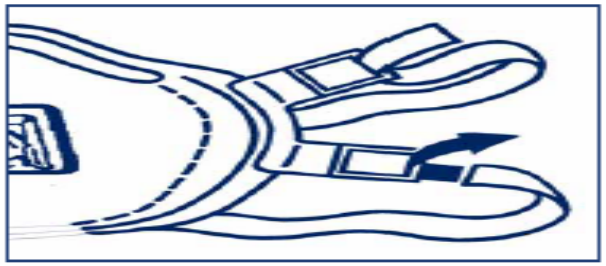
* Penetrabilità attraverso bordi, valvola, ecc alla prova con cloruro di sodio per particelle 0,02-2 micron

What are you breathing?

Without fit testing

With fit testing

Istruzioni per l'Indossamento



1. Inserire gli elastici nelle fibbie. Posizionare l'elastico inferiore intorno al collo sotto le orecchie. Non attorcigliare l'elastico.

2. Posizionare l'elastico superiore intorno alla testa sopra le orecchie. Non attorcigliare l'elastico.

3. Regolare la tensione tirando gli elastici come mostrato in figura.

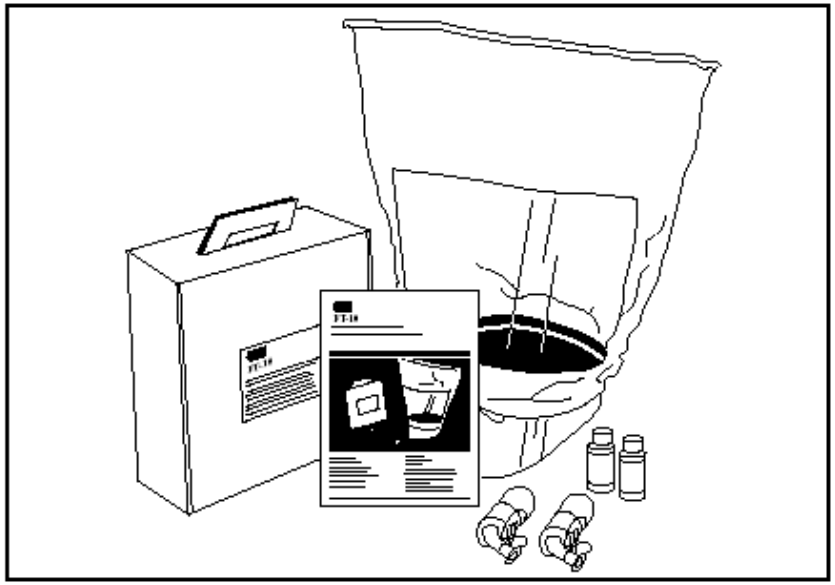
4. Posizionare le dita di entrambe le mani sulla parte superiore dello stringinaso. Premere lo stringinaso e modellarlo muovendosi verso le sue estremità. Evitate di modellare lo stringinaso con una sola mano poichè può causare una diminuzione della protezione respiratoria.

5. La tensione degli elastici può essere ridotta per scorrimento, senza togliere la maschera, premendo sulla superficie interna della fibbia dentata. Se non ottenete la necessaria tenuta non entrate nell'area contaminata.

NOTA: Non utilizzare in presenza di barba o basette lunghe che non permettono il contatto diretto fra il volto e i bordi di tenuta del respiratore.

6. La tenuta del respiratore sul viso deve essere verificata prima di entrare nell'area di lavoro.
— Coprire con le due mani il respiratore evitando di muoverlo dalla posizione ottenuta.
— Inspirare rapidamente. Una depressione all'interno del respiratore dovrebbe essere percepita. Se viene avvertita una perdita, aggiustare la posizione del respiratore e/o tensione degli elastici e ripetere la prova.

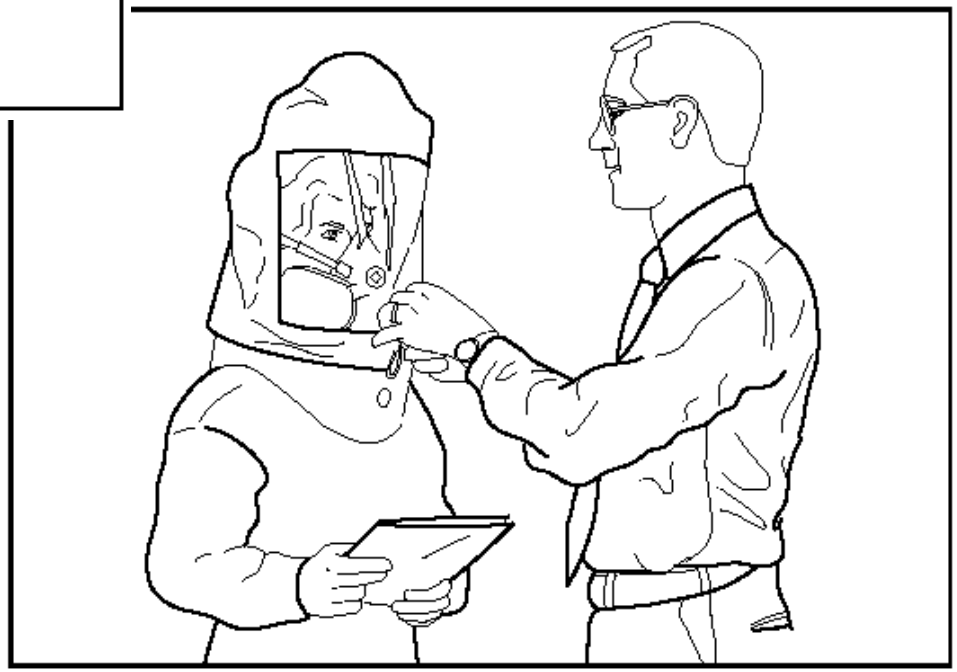
Fit test QUALITATIVO



Saccarina

Bitrex

Acetato isoamile

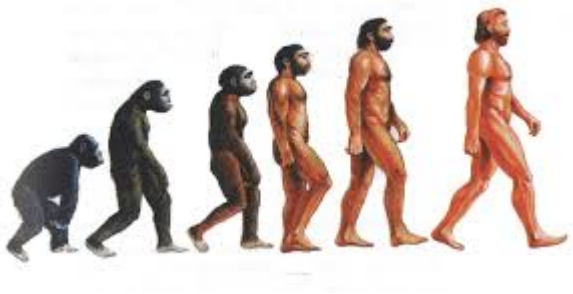


Quantitative Fit Test (QNFT)

An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

DPI/PPE	WHO	ECDC	US CDC	PHE	INMI
Mascherina "chirurgica"	X				
Filtrante facciale (FFP)	aerosol-generating procedures	X FFP2 or 3 FFP3 aerosol-generating procedures	X (N95)	X FFP3	X FFP2/3 PAPR aerosol-generating procedures ICU
Occhiali Goggles	X	X	X	X	X
Schermo	X	X	X	X	
Camice lungo impermeabile		X		X	X
Camice lungo	X		X		
Grembiule impermeabile	X aerosol-generating procedures	Se camice non impermeabile			X aerosol-generating procedures ICU
Guanti	X	X	X	X	Doppio paio

Levels of protective gear



Misure combinate isolamento

- Diagnosi confermata di
  - Monkey Pox
  - SARS-CoV
  - Avian Flu
  - MERS-CoV
  - nCoV

- Doppi GUANTI
- SOPRACAMICE
- FILTRANTE FACIALE FFP2/3
- MASCHERA/PIANO FACIALE/OCCHIALI

Alto isolamento

`

- Diagnosi confermata di FEV:
  - Malattia da Virus Ebola
  - Malattia da Virus Marburg
  - Febbre di Lassa
  - CCHF
  - Meingoencefalite da virus Nipah

ECDC Personal protective equipment needs in healthcare settings for the care of patients with suspected or confirmed novel coronavirus (2019-nCoV) February 2020
https://www.ecdc.europa.eu/en/publications-data/personal-protective-equipment-ppe-needs-healthcare-settings-care-patients

Due to the potential increase in the number of patients infected with 2019-nCoV, the public health authorities in EU/EEA countries are encouraged to plan for sufficient PPE supplies for their health professionals and ensure surge capacity procedures are also in place.

Table 2. Minimum number of sets for the different case scenarios

	Suspected case	Confirmed case *Mild symptoms*	Confirmed case *Severe symptoms*
Healthcare staff	**Number of sets per case**	**Number of sets per day per patient**	
Nursing	1–2	6	6–12
Medical	1	2–3	3–6
Cleaning	1	3	3
Assistant nursing and other services	0–2	3	3
Total	**3–6**	**14–15**	**15–24**