

# Determining cause of death in LTC during the pandemic

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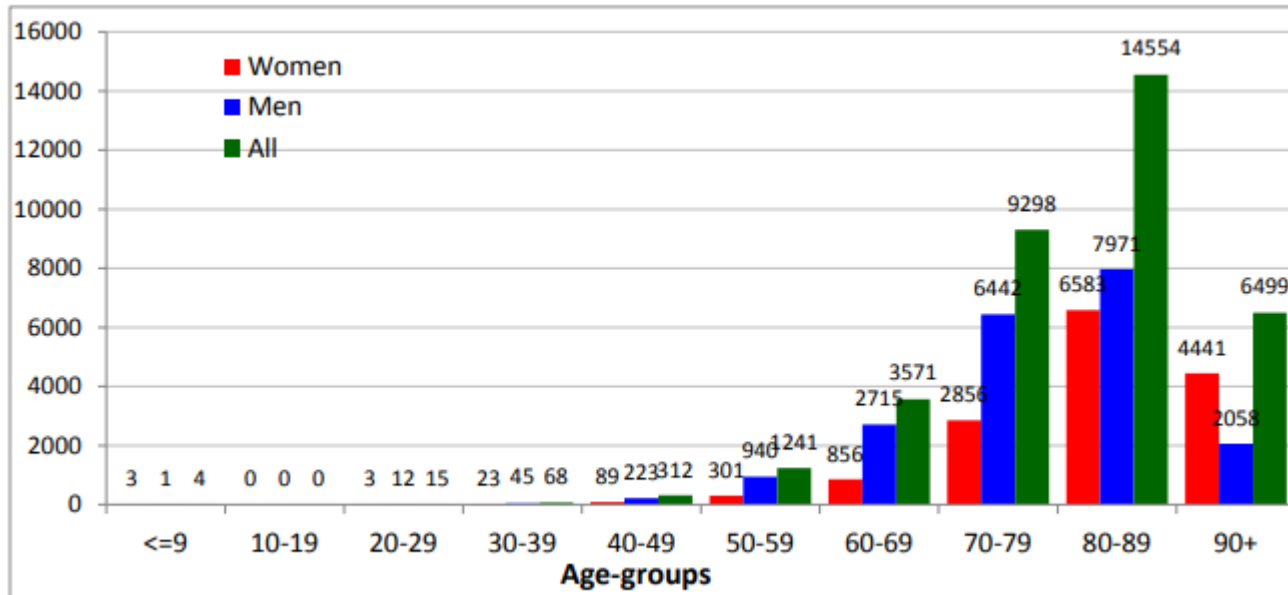


**Dr. Mike Ryan** - Director of the World Health Organization's Health Emergencies Programme, leader of the team responsible for the international containment and treatment of COVID-19

*'... Fatality rates in care homes have been high, partly because the **elderly are more vulnerable to the disease** but also because the **response has been lacking**, leading to some centres being overwhelmed, with bodies left unattended in rooms even in some rich countries ...'*

# Intrinsic non-modifiable risk factors in NH residents

- Age
- Chronic diseases/multimorbidity
- Frailty/disability
- Dementia



Absolute number of death by age group in Italy  
[https://www.epicentro.iss.it/en/coronavirus/bollettino/Report-COVID-2019\\_7\\_september\\_2020.pdf](https://www.epicentro.iss.it/en/coronavirus/bollettino/Report-COVID-2019_7_september_2020.pdf)

	Italy as of March 17, 2020		China as of February 11, 2020	
	No. of deaths (% of total)	Case-fatality rate, % <sup>b</sup>	No. of deaths (% of total)	Case-fatality rate, % <sup>b</sup>
All	1625 (100)	7.2	1023 (100)	2.3
Age groups, y				
0-9	0	0	0	0
10-19	0	0	1 (0.1)	0.2
20-29	0	0	7 (0.7)	0.2
30-39	4 (0.3)	0.3	18 (1.8)	0.2
40-49	10 (0.6)	0.4	38 (3.7)	0.4
50-59	43 (2.7)	1.0	130 (12.7)	1.3
60-69	139 (8.6)	3.5	309 (30.2)	3.6
70-79	578 (35.6)	12.8	312 (30.5)	8.0
≥80	850 (52.3)	20.2	208 (20.3)	14.8

Case-fatality rate by age group in Italy and China  
*Onder G et al. JAMA 2020*

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# COVID-19 deaths by Multimorbidity

	All (n = 3,032)	Younger Adults <65 y (n = 368)	Older Adults ≥ 65 y (n = 2,664)	p-Value <sup>a</sup>
	n (%)	n (%)	n (%)	
<b>Comorbidities</b>				
Ischemic heart disease	856 (28.2)	42 (11.4)	814 (30.6)	<.001
Atrial fibrillation	681 (22.5)	18 (4.9)	663 (24.9)	<.001
Heart failure	490 (16.2)	31 (8.1)	459 (16.9)	<.001
Stroke	310 (10.2)	16 (4.3)	294 (11.0)	<.001
Hypertension	2,071 (68.3)	188 (51.1)	1,883 (70.7)	<.001
Type 2 diabetes	914 (30.1)	106 (28.8)	808 (30.3)	.586
Dementia	480 (15.8)	12 (3.3)	468 (17.6)	<.001

	All (n=3,032)	< 65 years (n=368)	≥ 65 years (n=2,664)
<b>0 diseases</b>	124 (4.1%)	40 (10.9%)	84 (3.2%)
<b>1 disease</b>	454 (15.0%)	85 (23.1%)	369 (13.9%)
<b>2 diseases</b>	648 (21.4%)	82 (22.3%)	566 (21.2%)
<b>3 or more diseases</b>	1,806 (59.6%)	161 (43.8%)	1,545 (61.7%)

Diarrhea	175 (5.8)	34 (9.2)	141 (5.4)	.004
Hemoptysis	17 (0.6)	3 (0.8)	14 (0.5)	.453
<b>Complications during hospitalization</b>				
Acute Respiratory Distress Syndrome	2,856 (96.9)	353 (97.2)	2,503 (96.9)	.871
Acute renal failure	641 (21.8)	109 (30.0)	532 (20.6)	<.001
Acute cardiac injury	314 (10.7)	49 (13.5)	265 (10.3)	.069
Superinfection	364 (12.4)	112 (30.9)	252 (9.8)	<.001
<b>Treatments</b>				
Antibiotics	2,390 (85.4)	338 (90.6)	2,216 (84.9)	.003
Antivirals	1,760 (59.0)	268 (71.8)	1,492 (57.2)	<.001
Steroids	1,115 (37.4)	178 (47.7)	937 (35.9)	<.001

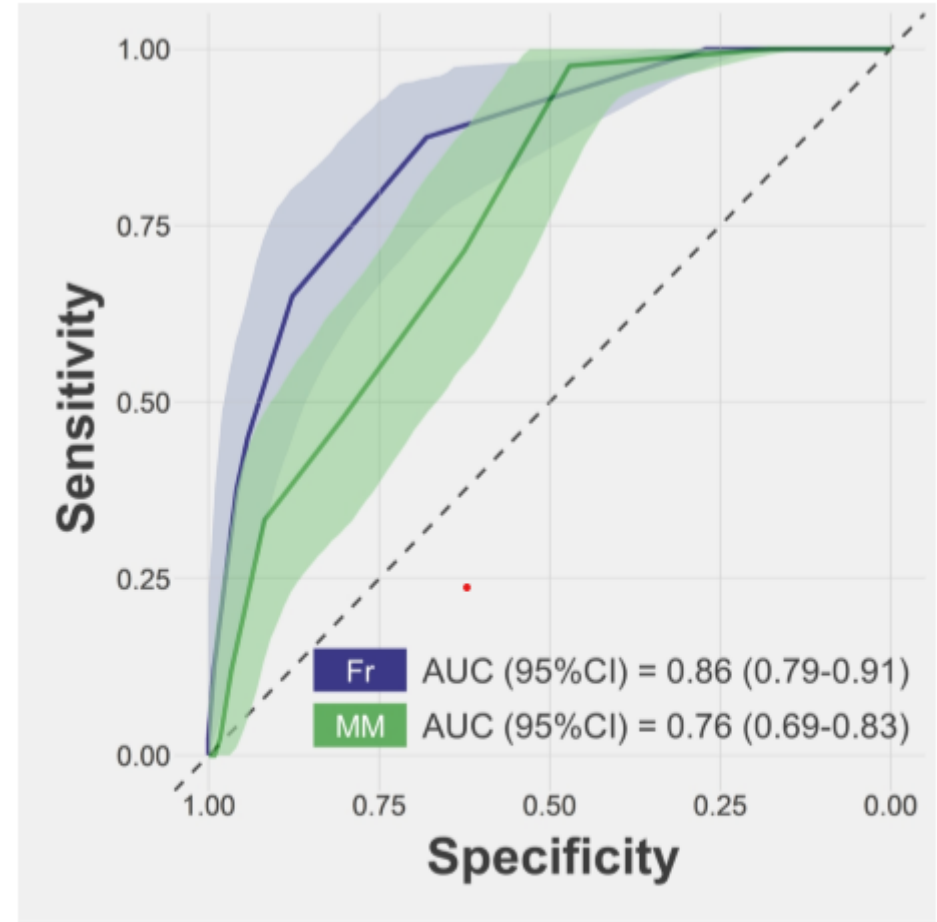
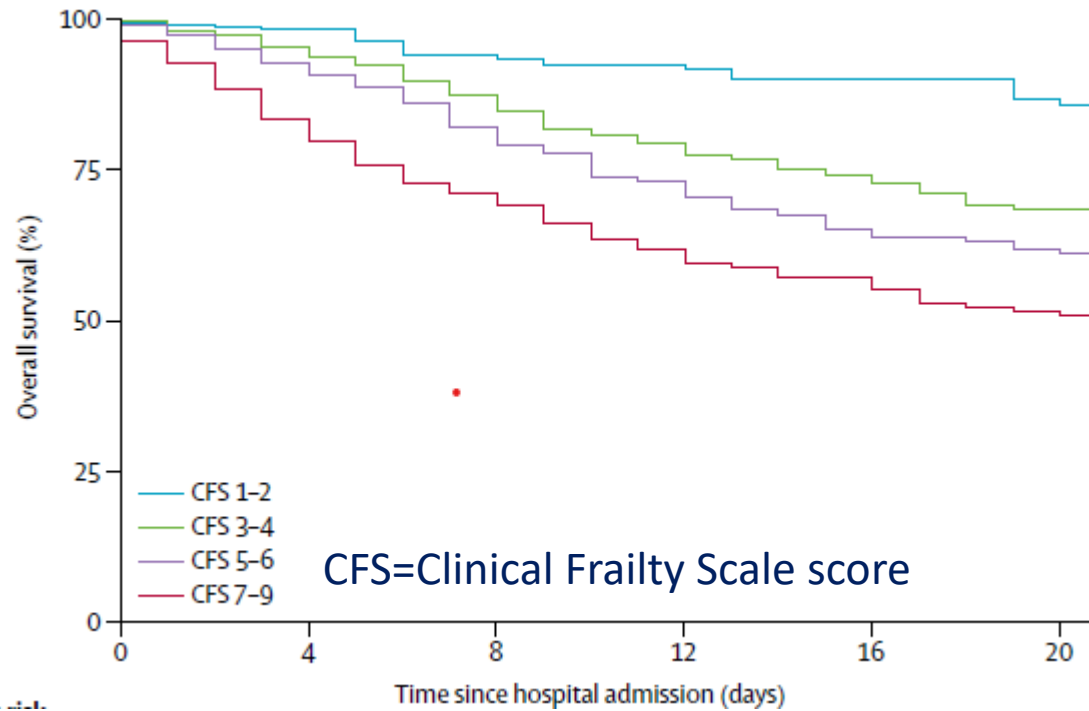
## Multimorbidity in persons dying with COVID-19

### *Clinical chart review*

Patients had a high number of comorbidities (mean number **3.2 ± 1.9**).

Hypertension, diabetes, and ischemic heart disease were the most common pre-existing comorbidities.

Survival by Clinical Frailty Scale score  
 Hewitt J et al. *Lancet Public Health* 2020



ROC curves for Clinical Frailty Scale (Fr) score and mulimorbidity (MM) in the prediction of mortality.  
 Marengoni A et al. *In press*

	Sens.	Spec.	PPV	NPV	LLR+	LLR-
CFS ≥ 6	0.38	0.96	0.75	0.82	9.15	0.65
2+ Chronic cond.	0.98	0.47	0.39	0.98	1.85	0.05

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# COVID-19 deaths by dementia status

## Dementia in persons dying with COVID-19

*Clinical chart review*

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1	454 (15.0)	85 (23.1)	369 (13.9)	
2	648 (21.4)	82 (22.3)	566 (21.2)	
3 or more	1,806 (59.6)	161 (43.8)	1,645 (61.7)	
<b>COVID-19 Symptoms</b>				
Fever	2,292 (76.4)	283 (77.3)	2,009 (76.3)	.694
Dyspnea	2,211 (73.7)	270 (73.8)	1,941 (73.7)	1.000
Cough	1,162 (38.7)	146 (39.9)	1,016 (38.6)	.647
Diarrhea	175 (5.8)	34 (9.3)	141 (5.4)	.004
Hemoptysis	17 (0.6)	3 (0.8)	14 (0.5)	.453
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Clinical Characteristics of Hospitalized Individuals Dying With COVID-19 by Age Group in Italy  
*Palmieri L, et al. J Gerontol A Biol Sci Med Sci. 2020*

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They would have died anyway...

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## *An analysis of death certificates*

ICD-10	Underlying cause of death	Whole sample (n=5,311)	
		N	%
<b>U07.1</b>	<b>COVID-19</b>	<b>4,691</b>	<b>88.3</b>
A00-B99	Infectious and parasitic diseases	12	0.2
C00-D48	Neoplasms	137	2.6
E00-E99	Endocrine, nutritional and metabolic diseases	46	0.9
	of which		0.0
E10-E14	Diabetes	37	0.7
F01-F03, G30	Dementia and Alzheimer	38	0.7
G00-H99	Diseases of the nervous system (excluding Alzheimer)	15	0.3
I00-I99	Diseases of the circulatory system	235	4.4
	of which		0.0
I10-I15	Hypertensive diseases	40	0.8
I20-I25	Ischaemic heart diseases	87	1.6
I48	Atrial fibrillation	12	0.2
I60-I69	Cerebrovascular diseases	55	1.0
J00-J99	Diseases of the respiratory system	58	1.1
	of which		0.0
J40-J47	Chronic lower-respiratory diseases	55	1.0
K00-K99	Diseases of the digestive system	36	0.7
N00-N99	Diseases of the genitourinary system	14	0.3
S00-T98	External causes of death	26	0.5
	Other causes	14	0.3
	Total	5,311	100.0

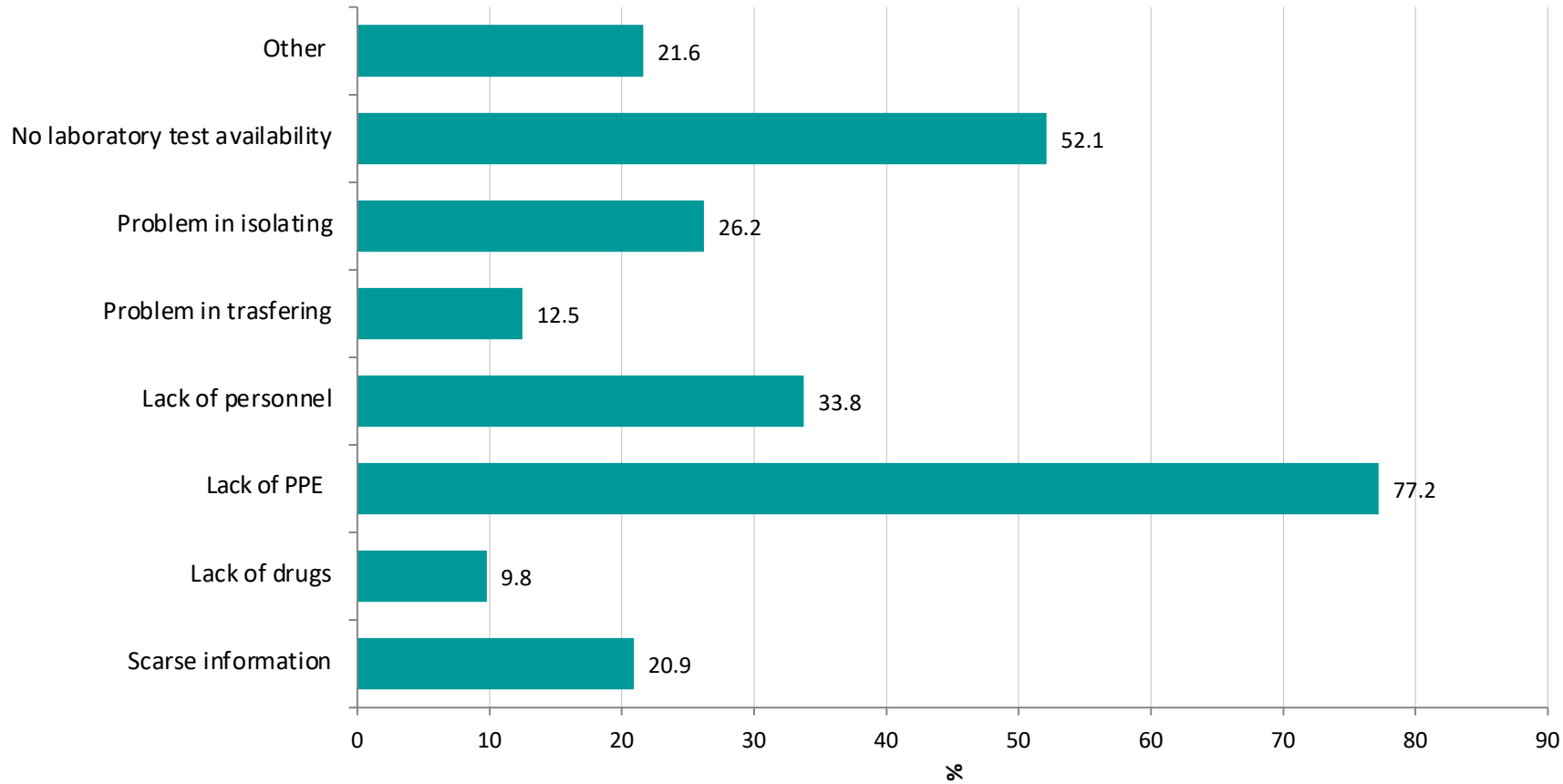
Onder G et al.  
*submitted*

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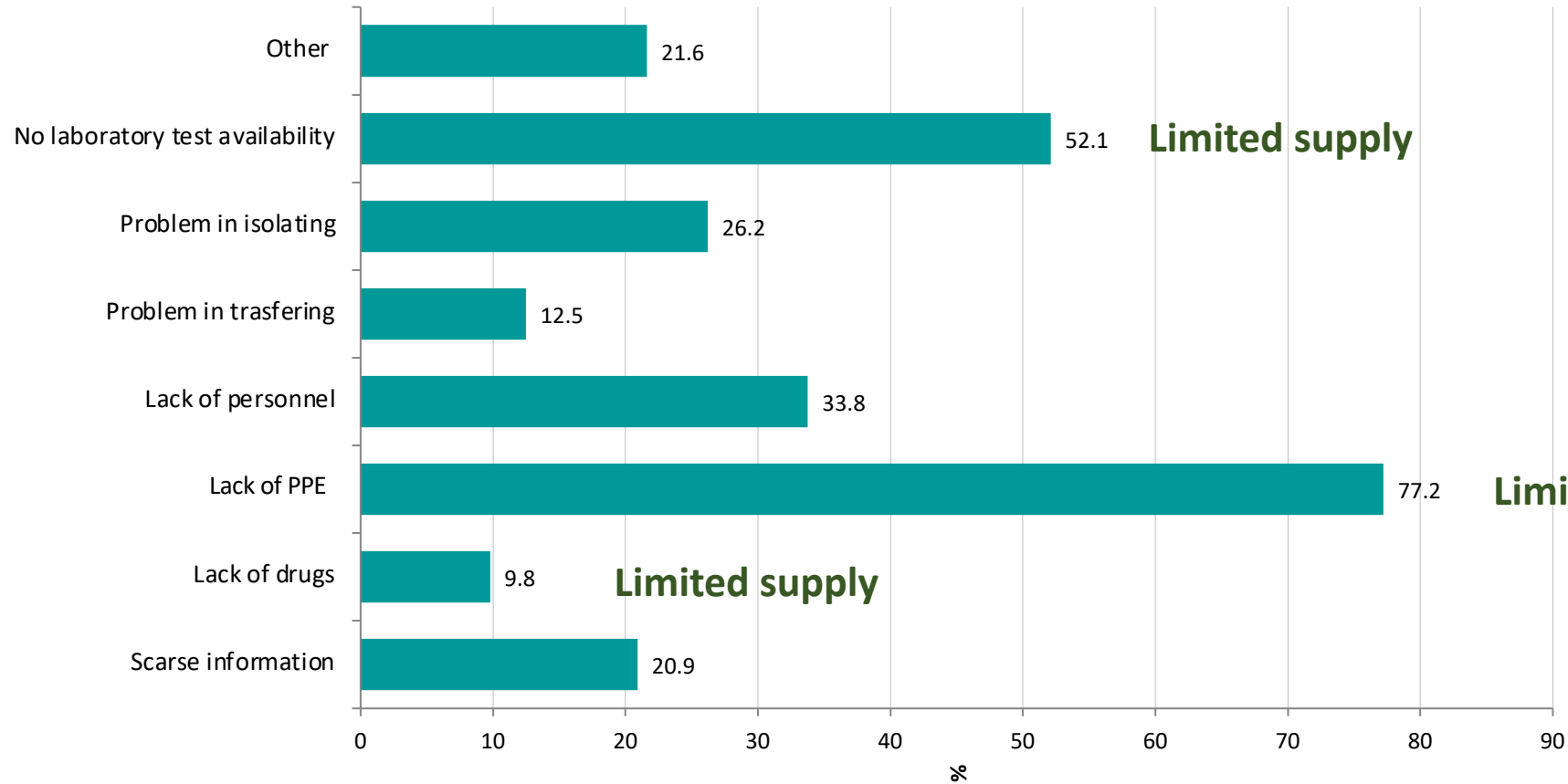
# Modifiable risk factors in NH residents



**Reported critical issues  
faced during the epidemic  
(March/April 2020)**

**Survey performed in 1356  
nursing homes in Italy**

# Modifiable risk factors in NH residents



Limited supply

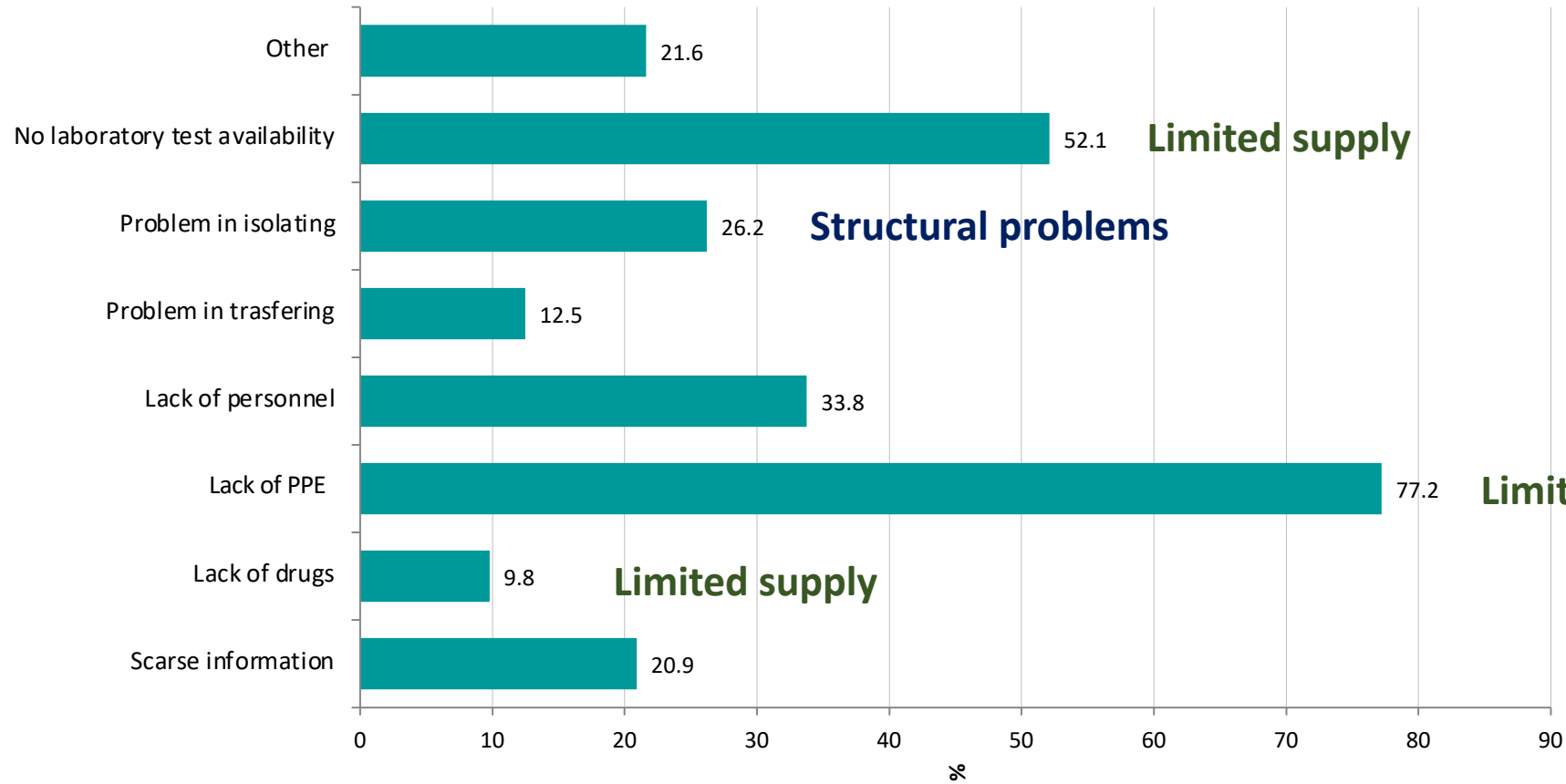
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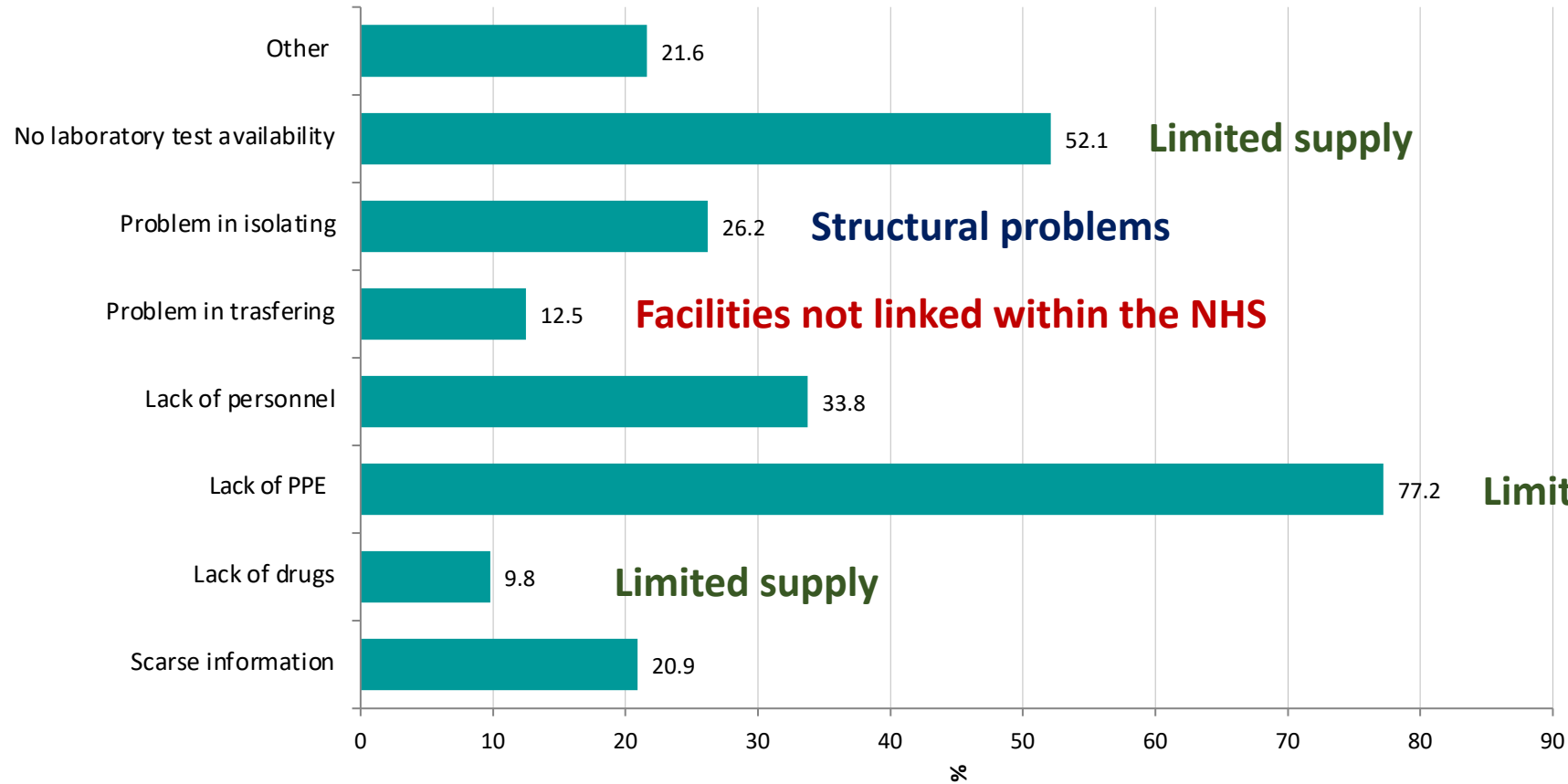


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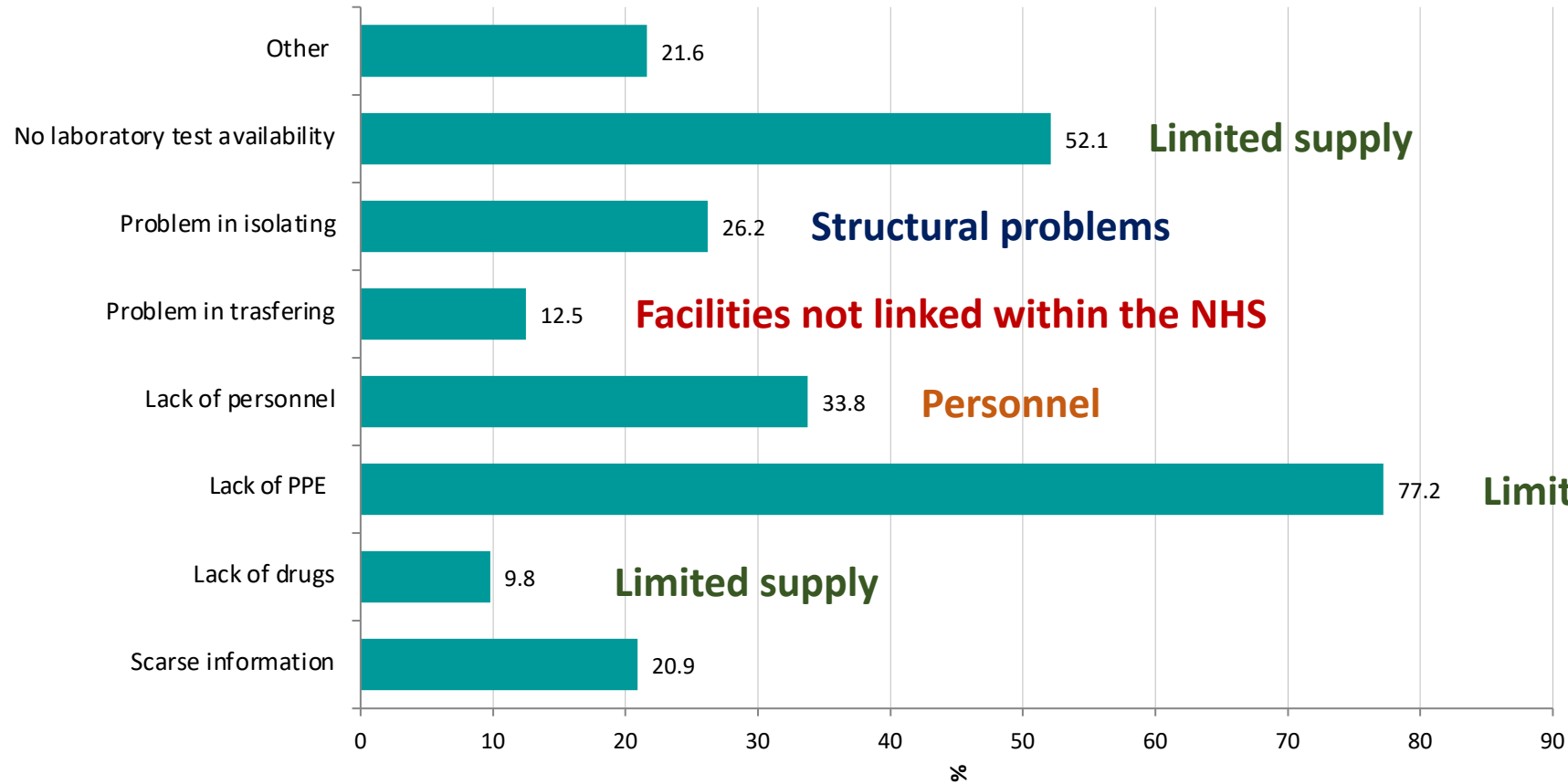
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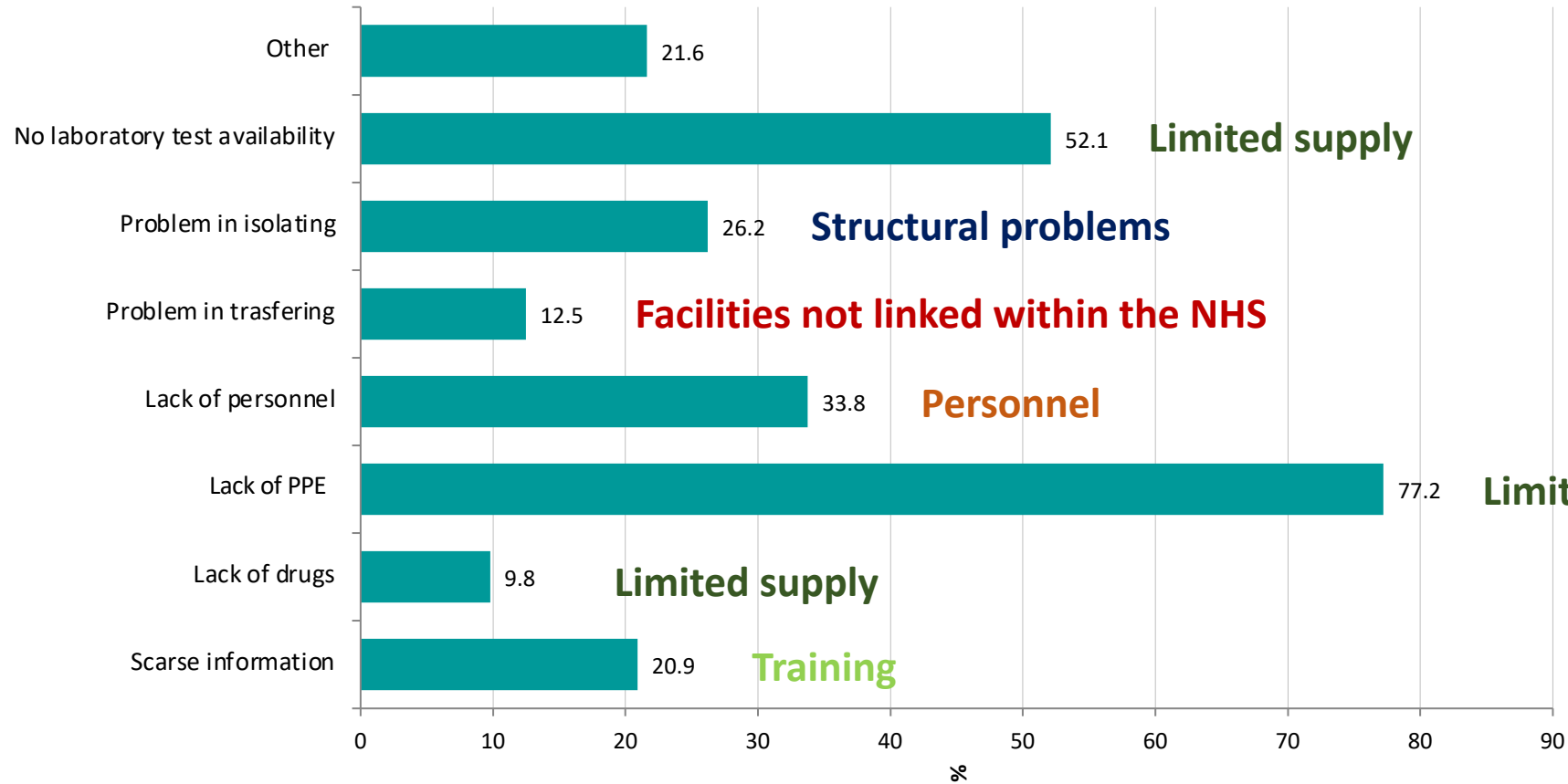
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# Modifiable risk factors in NH residents

**Lack of personnel (OR=3.22,  $p<0.001$ )**

**Difficulties in transferring (OR=4.67,  $p<0.001$ )**

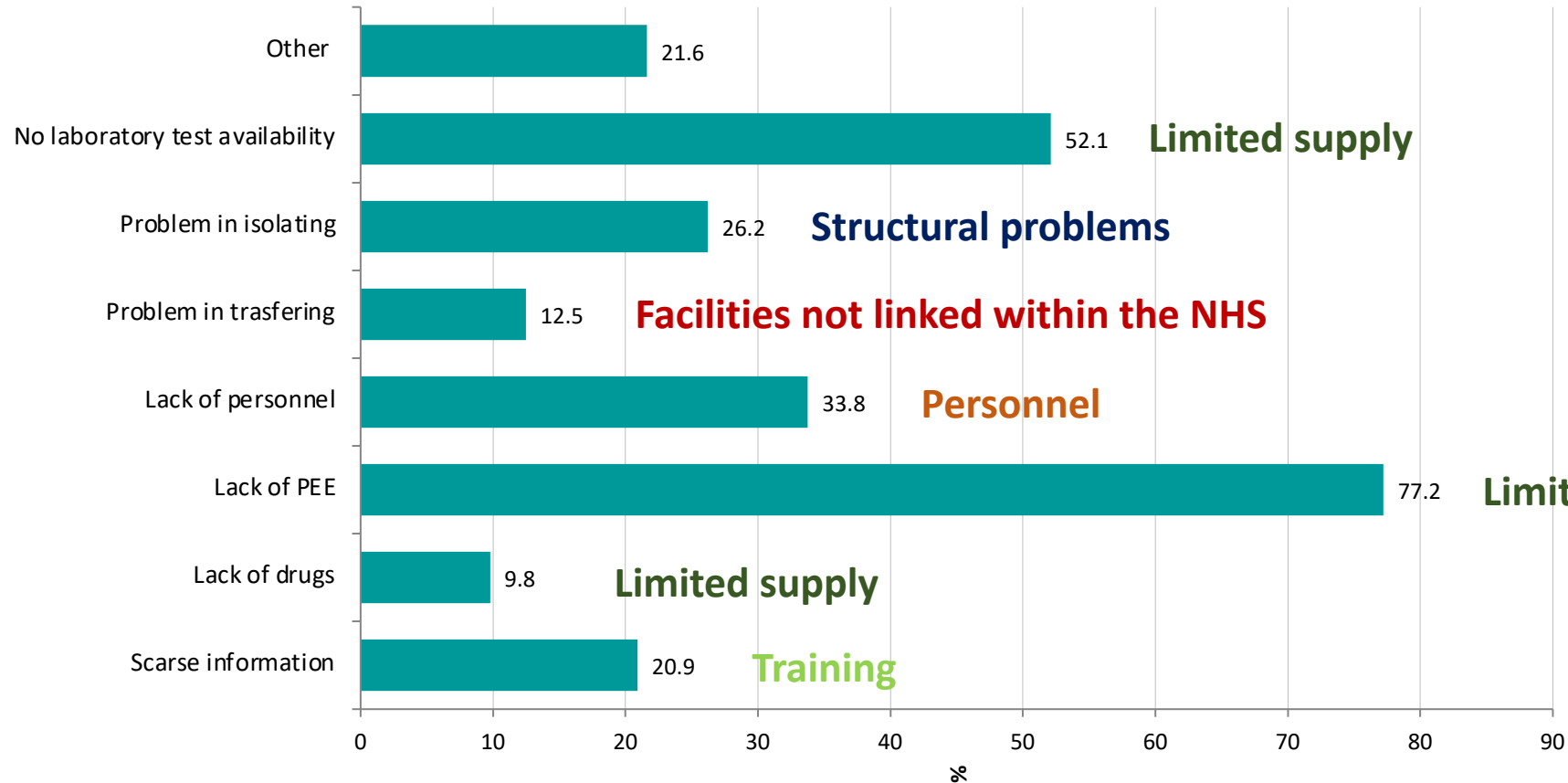
**Difficulties in isolating (OR=1.98,  $p<0.001$ )**

**Size of the facility higher than the median of 60 beds (OR=1.50,  $p=0.013$ )**

**Geographic area (OR=7.6, 6.6, 3.3 for respectively N-W, N-E, Centre vs South)**

were all **positively associated to the no COVID-19 free status.**

# Modifiable risk factors in NH residents



**Reported critical issues faced during the epidemic (March/April 2020)**

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**Lack of monitoring and standardized evaluation of LTC  
LTC not a priority for the NHS**

**Dr. Mike Ryan** - Director of the World Health Organization's Health Emergencies Programme, leader of the team responsible for the international containment and treatment of COVID-19

*'... Fatality rates in care homes have been high, partly because the elderly are more vulnerable to the disease but also because the response has been lacking, leading to some centres being overwhelmed, with bodies left unattended in rooms even in some rich countries ... **Access to healthcare in COVID-19 has not been fair. We need to fundamentally rethink the relationship we have with older generations and the way in which we provide care for that generation...***