



A user guide to Covid-19

part i – gathering the facts



Paolo Surico and Andrea Galeotti
Professors of Economics at London Business School

Financial support from the European Research Council and the Wheeler Institute is gratefully acknowledged.

Part I – gathering the facts

What we do

- Present basic evidence on the pandemic
- Identify data patterns in existing research that may have been overlooked
- Discuss what drives the capacity of a country health system

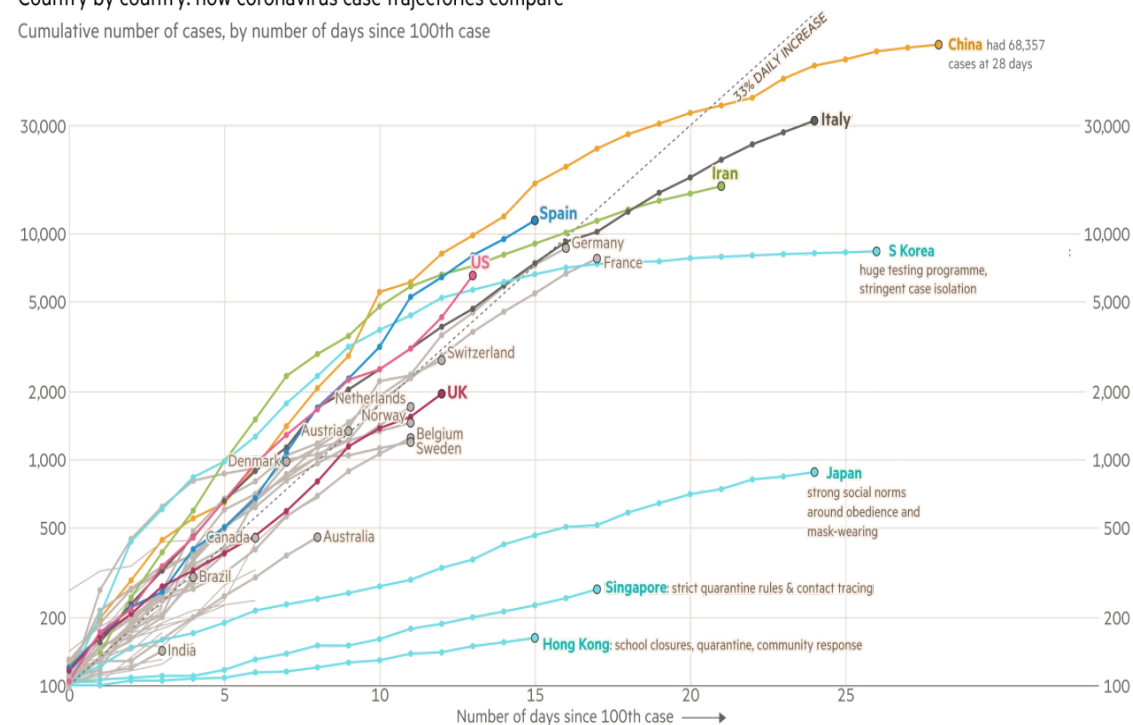
What you learn

- Understand the demographic composition of carriers and critical patients
- Use cross-country comparison to evaluate different health policy strategies
- Identify a country health system capacity and what policies can expand it

Patterns of contagion in different countries

Country by country: how coronavirus case trajectories compare

Cumulative number of cases, by number of days since 100th case

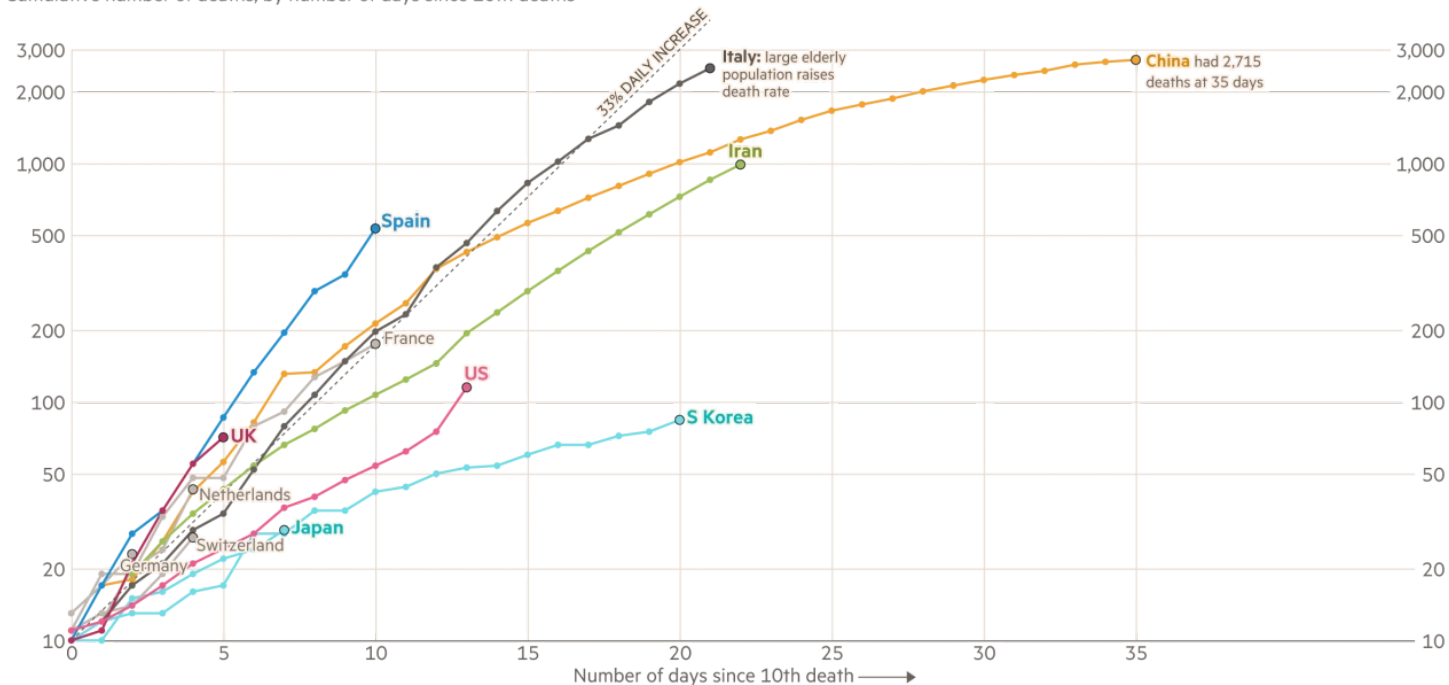


FT graphic: John Burn-Murdoch / @burnmurdoch
Source: FT analysis of Johns Hopkins University, CSSE; Worldometers. Data updated March 17, 23:00 GMT
© FT

Patterns of contagion in different countries

Spain and Italy have had more deaths attributed to coronavirus than China did at the same stage

Cumulative number of deaths, by number of days since 10th deaths



FT graphic: John Burn-Murdoch / @burnmurdoch
Source: FT analysis of Johns Hopkins University, CSSE; Worldometers. Data updated March 17, 23:00 GMT
© FT

Covid-19 infects more the young!

KEY DIFFERENCE

Korea has tested large share of the population 'at random'

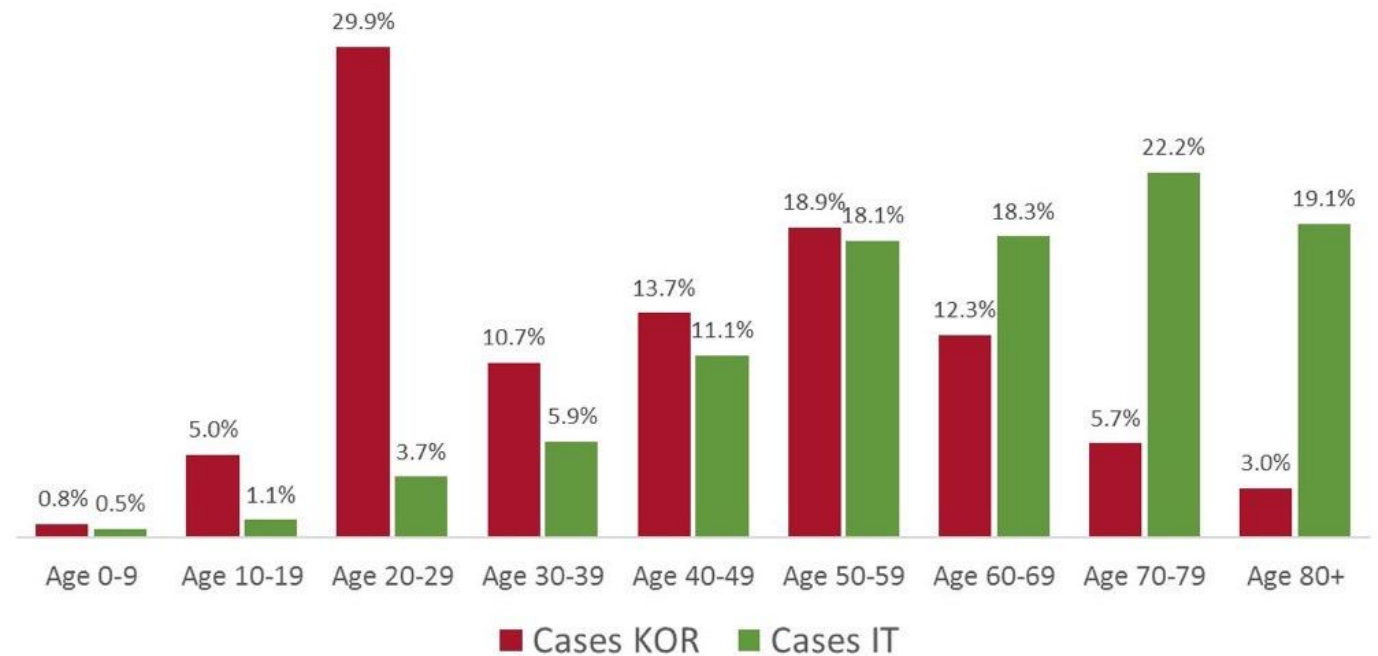
WHEREAS

Italy has tested only (worst) symptomatic cases.

Comparison suggests that most carriers are actually in younger groups!

A quasi-natural experiment: the case of the Italian town of Vo in Veneto ([FT, March 17th](#)).

Coronavirus cases (%) in South Korea and Italy by age groups



Source: <https://medium.com/@andreasbackhausab/coronavirus-why-its-so-deadly-in-italy-c4200a15a7bf>

But kills more the old

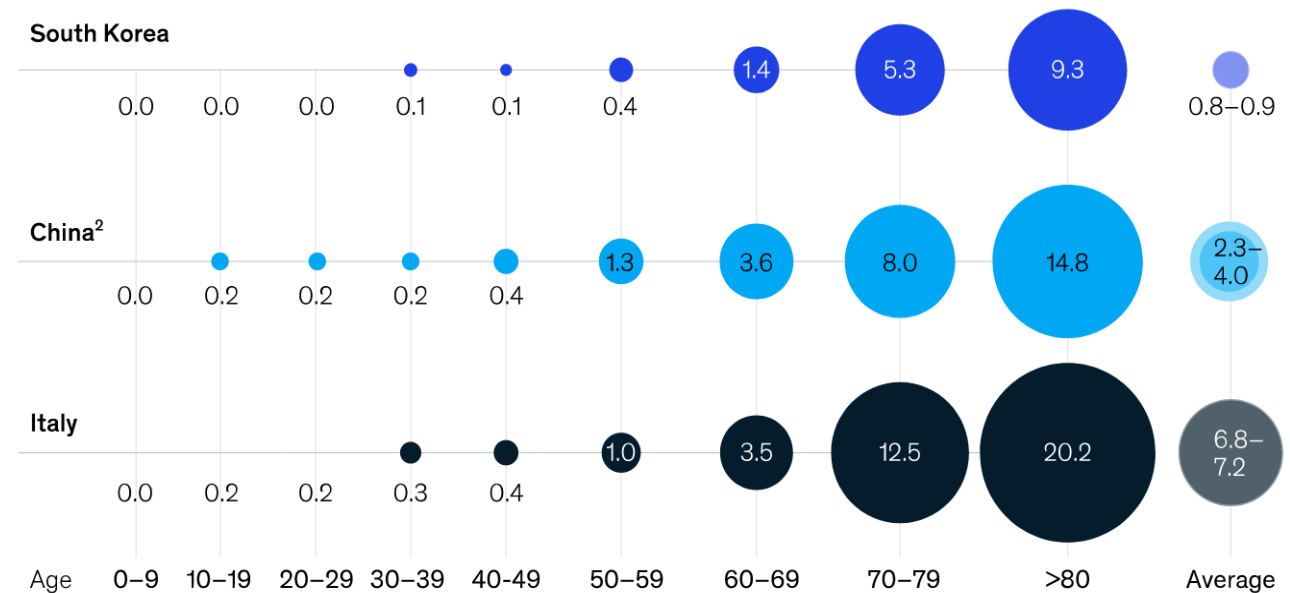
Fatality rate = (Deaths / Cases)

We are sure about number of deaths but, because of the asymptomatic cases, there is very high uncertainty around the actual number of cases.

Estimated fatality rates are probably much higher than actual fatality rates.

Data from three countries show that older populations are at greater risk.

Case-fatality rate by age segment,¹ % mortality

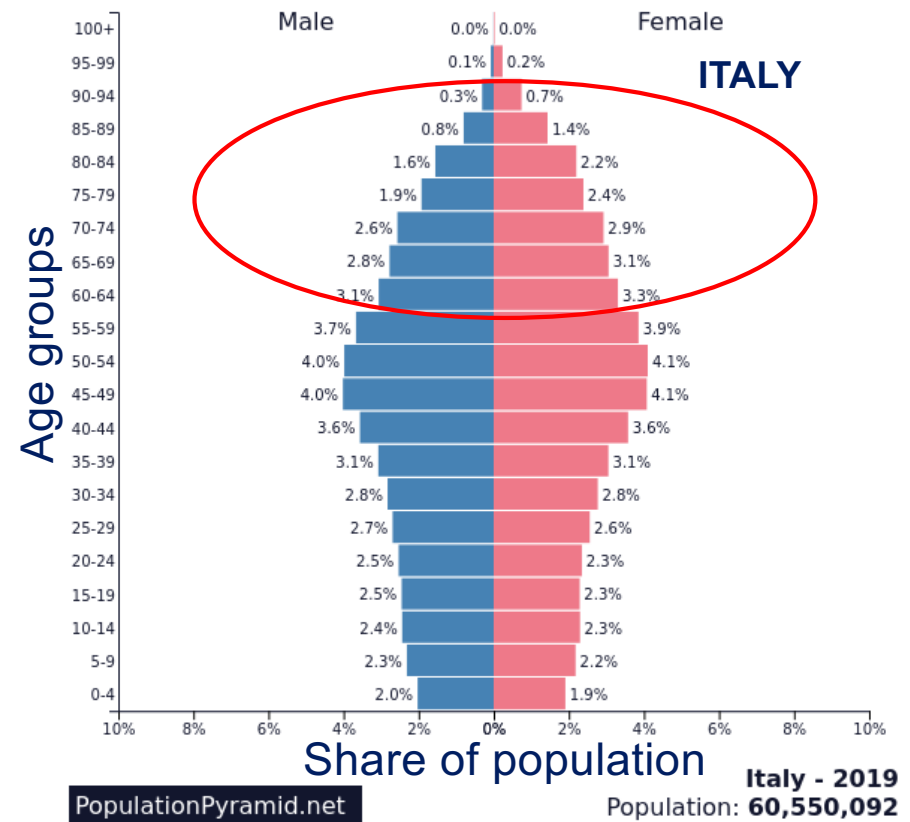
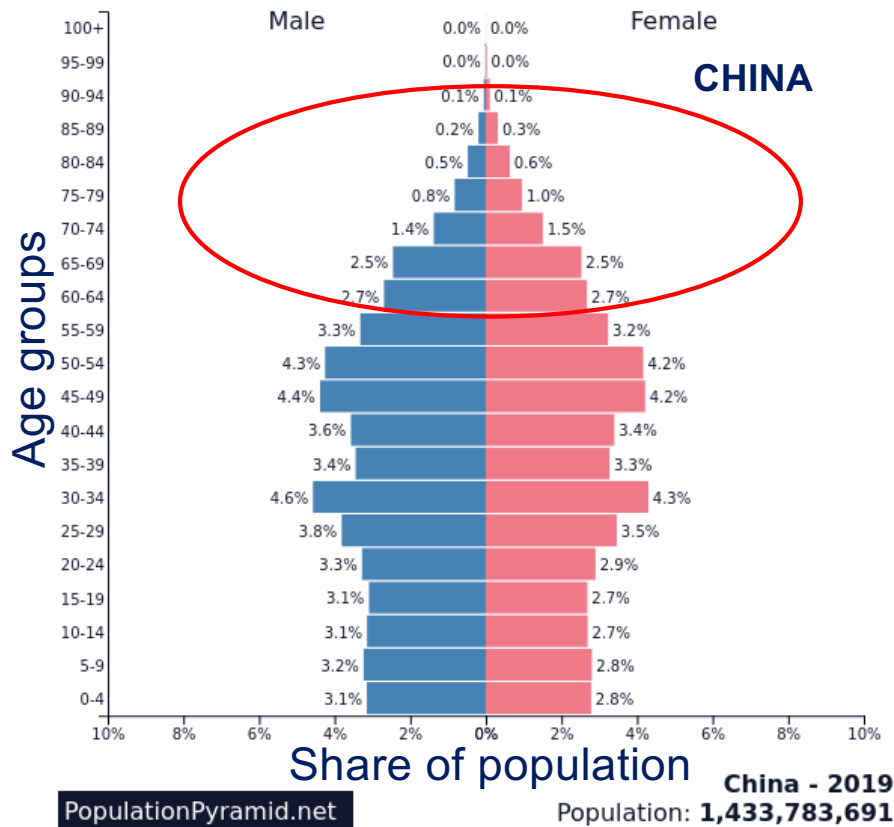


¹As of data from Feb 11, 2020, in China and as of March 16 and 15, 2020, in South Korea and Italy, respectively.

²Data reported from China Feb 11, 2020, reports 2.3%, however latest deaths/cases from WHO indicate this may be higher.
Source: China CDC; Korea CDC; L'Istituto Superiore di Sanità (ISS) Italy; WHO; McKinsey analysis

Source: McKinsey & Company: Coronavirus COVID-19: Facts and Insight, updated 16th March 2020.

Italy has a far larger share of 60y+ people



Source: <https://www.populationpyramid.net/>, based on United Nations Data

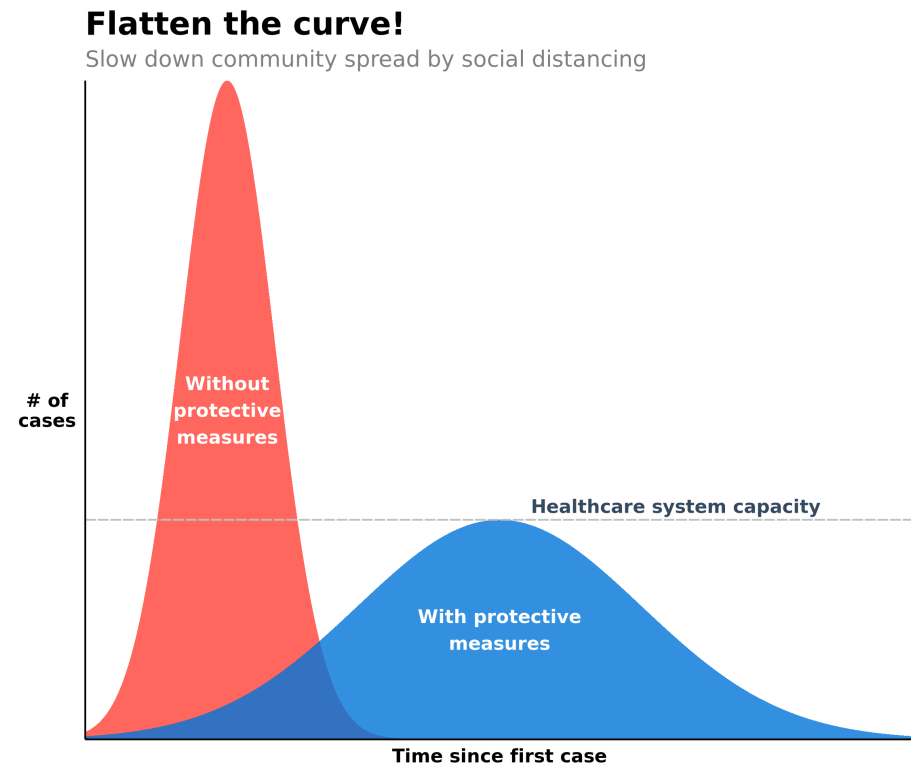
The consensus: flattening the curve

How to flatten the curve?

- A. Expand intensive care capacity
(expand supply of health care)
- B. Slowdown the speed of contagion
(contract demand for health care)

Goal: avoid excess of demand

How to achieve this more effectively?



Adapted from the CDC and The Economist
Visit [flattenthecurve.com](https://www.flattenthecurve.com)

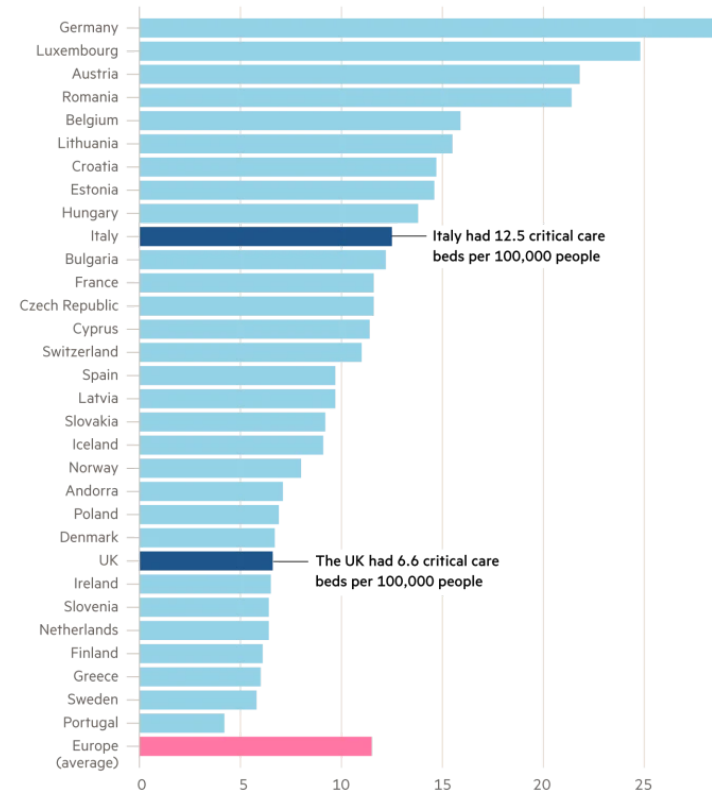
Health system capacity constraints

- Lack of capacity of health systems
- Number of Intensive Care Unit beds in most countries cannot cope with the spread of disease if peak is high
- Lack of ventilators:
 - Italy asked its only domestic manufacturer to quadruple supply from 125 a month to 500 (each costs €17k)
 - Germany has ordered 10,000
 - Matt Hancock, UK health secretary: “We’re saying that if you produce a ventilator, then we will buy it. No number is too high”

Source: <https://www.ft.com/content/5a2ffc78-6550-11ea-b3f3-fe4680ea68b5>

There is wide variation in critical care infrastructure

Total numbers of critical care beds per 100,000 of population

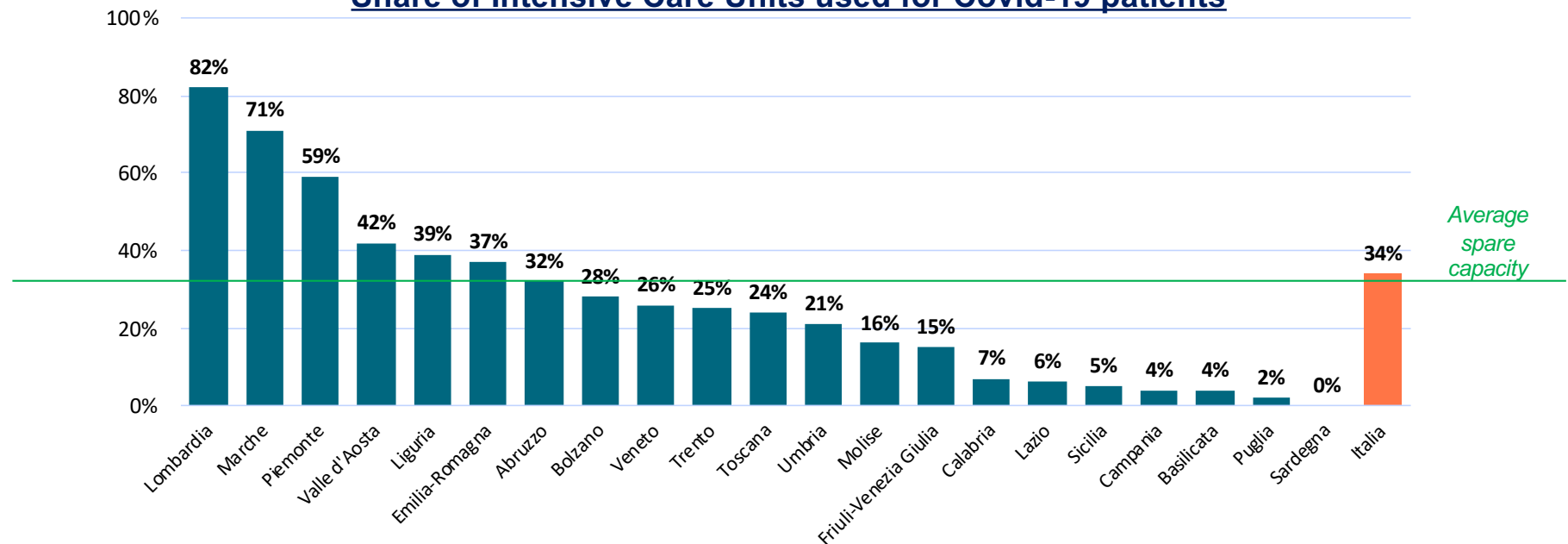


Source: A Rhodes, P Ferdinande, H Flaatten, B Guidet 'The variability of critical care bed numbers in Europe', 2012
© FT

Health system capacity constraints across Italian regions

COVID-19: Stress sul sistema sanitario per Regione
Pazienti COVID-19 ricoverati in terapia intensiva al 16 marzo
vs capienza massima

Share of Intensive Care Units used for Covid-19 patients



Dati: Protezione Civile e Ministero della Salute.

Source: Matteo Villa ([Istituto per gli studi di politica internazionale](#))

The short-run elasticity of health care supply

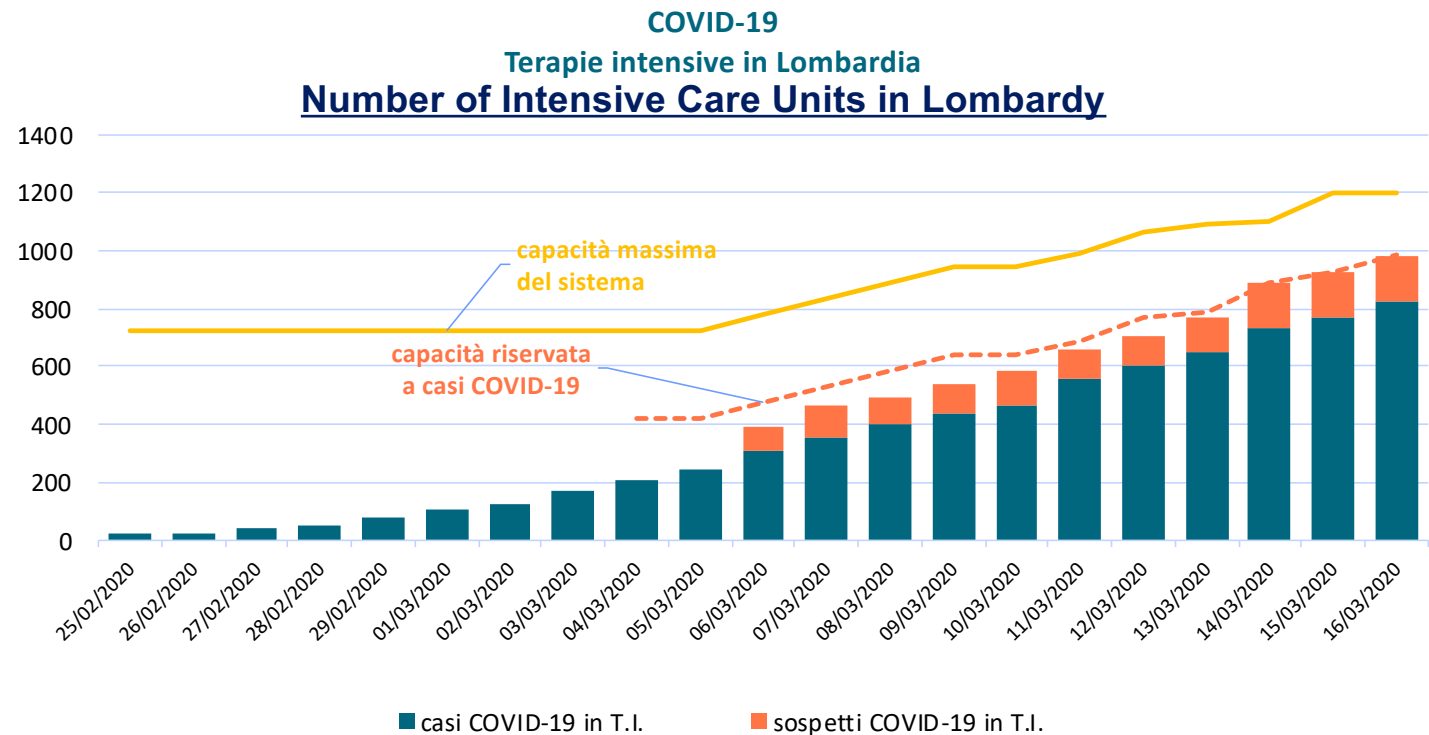
Whenever possible, use hotels, class rooms and barracks as Intensive Care Units (ICU).

Turn to manufacturing industry to produce or convert intensive care equipment (e.g. ventilators).

Pay for intensive care beds in independent sector (in the UK, this is 8% of public health system ICU)

Even if the elasticity of supply for beds and equipment is high, how quickly can we train new medical personnel? Recall retired workers.

If cases regionally concentrated, spread non-contagious intensive care cases to other regions.



Dati: Protezione Civile e Regione Lombardia.

Source: Matteo Villa ([Istituto per gli studi di politica internazionale](#))

Summary

- Covid-19 is the worst health crisis of our times
- Young far more likely to be infected (the carrier) but old more likely to die
- Many countries are facing strong excess demand for health care: too many critical patients (not only Covid-19 cases) for too few ICU beds and ventilators
- Expanding health care supply requires turning hotels, barracks and possibly schools into ICU and converting selected manufacturers into ventilator makers
- Not enough medical personnel. Recall retired nurses and doctors. Train police officer and volunteers while the army carries out police duties

Full set of slides available at <https://sites.google.com/site/paolosurico/covid-19>

Next video: A user guide to Covid-19. Part ii – epidemiology for dummies