Integrating Analyses with Decision-Making: Food for Thoughts

Modelling COVID-19 Pandemic: Resources, Methodology and Applications

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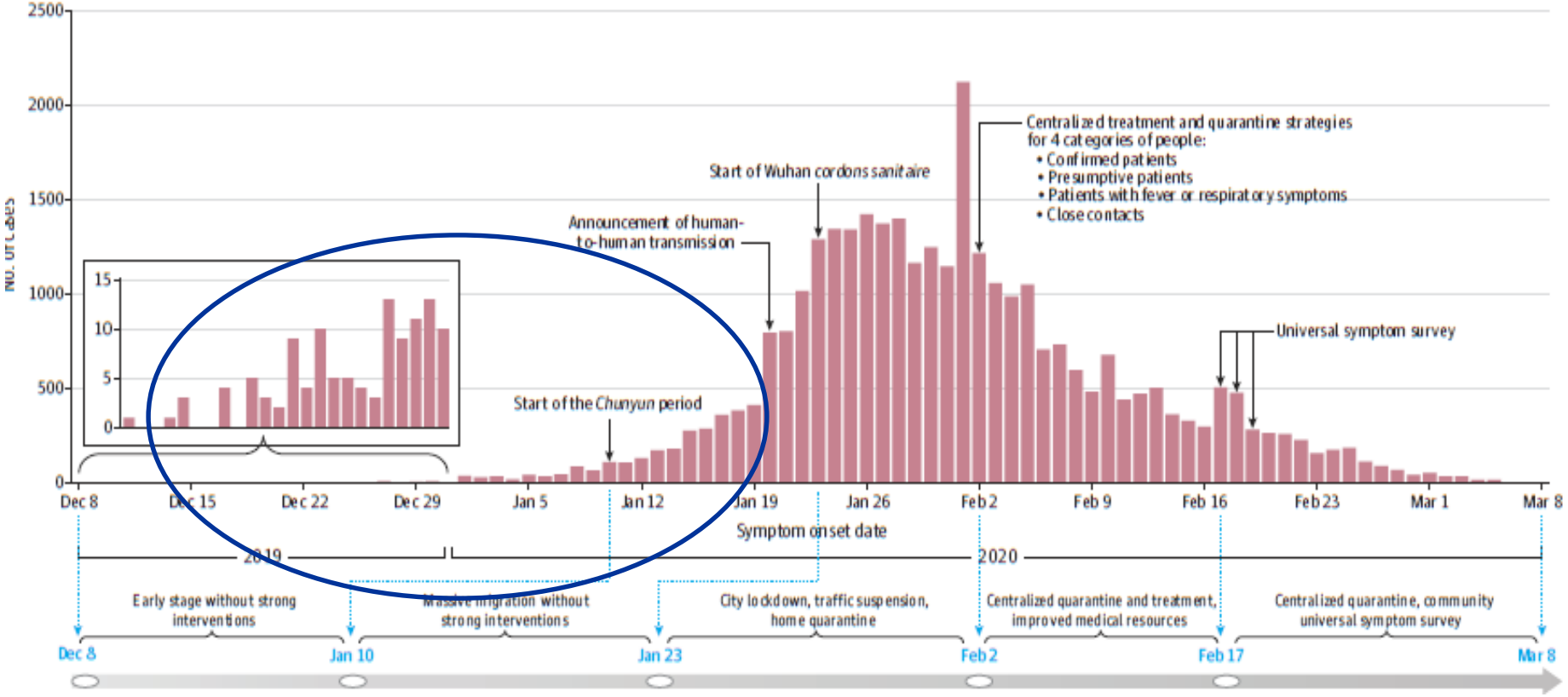
How could we better prepare for another future pandemic?
What can we learn from COVID-19 so we can do better—reduce/limit negative consequences on human well-being?

Multiple Dimensions of Human Well Being

Decisions under uncertainties and unknowns



Source: Pan et al. Association of Public Health Interventions With the Epidemiology of the COVID-19 Outbreak in Wuhan, China, JAMA doi:10.1001/jama.2020.6130

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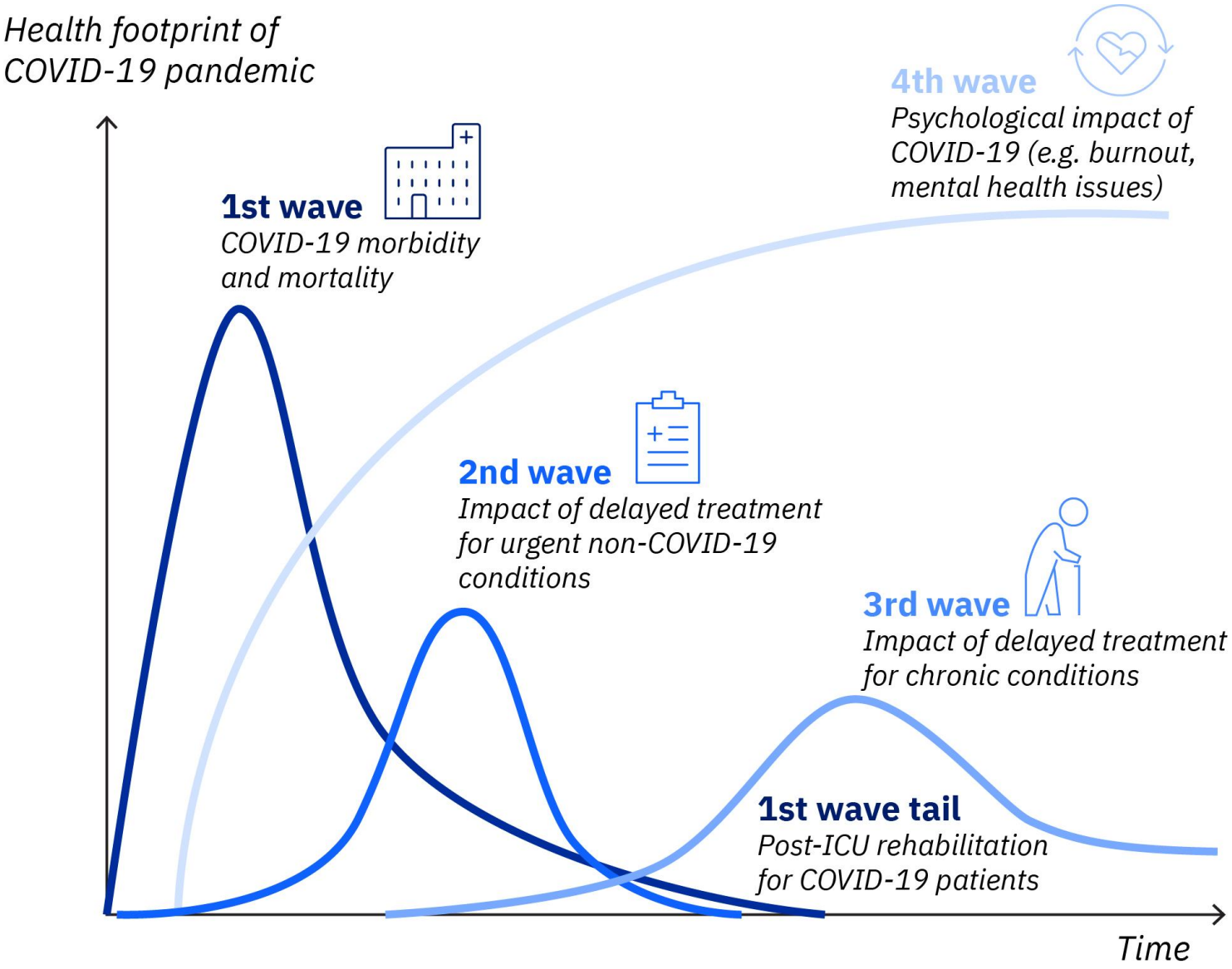
Decisions under uncertainties and unknowns

- *“Even if a pandemic is not a war, there is still the fog of war, especially at the early stages.”*
- Gathering “intelligence” to know where the enemies, when they might likely strike, how big might be the operations..
- The scale and speed of the virus’ spread and impact parallels decisions during war time…



https://www.ibm.com/thought-leadership/institute-business-value/blog/covid-19-healthcare-ireland

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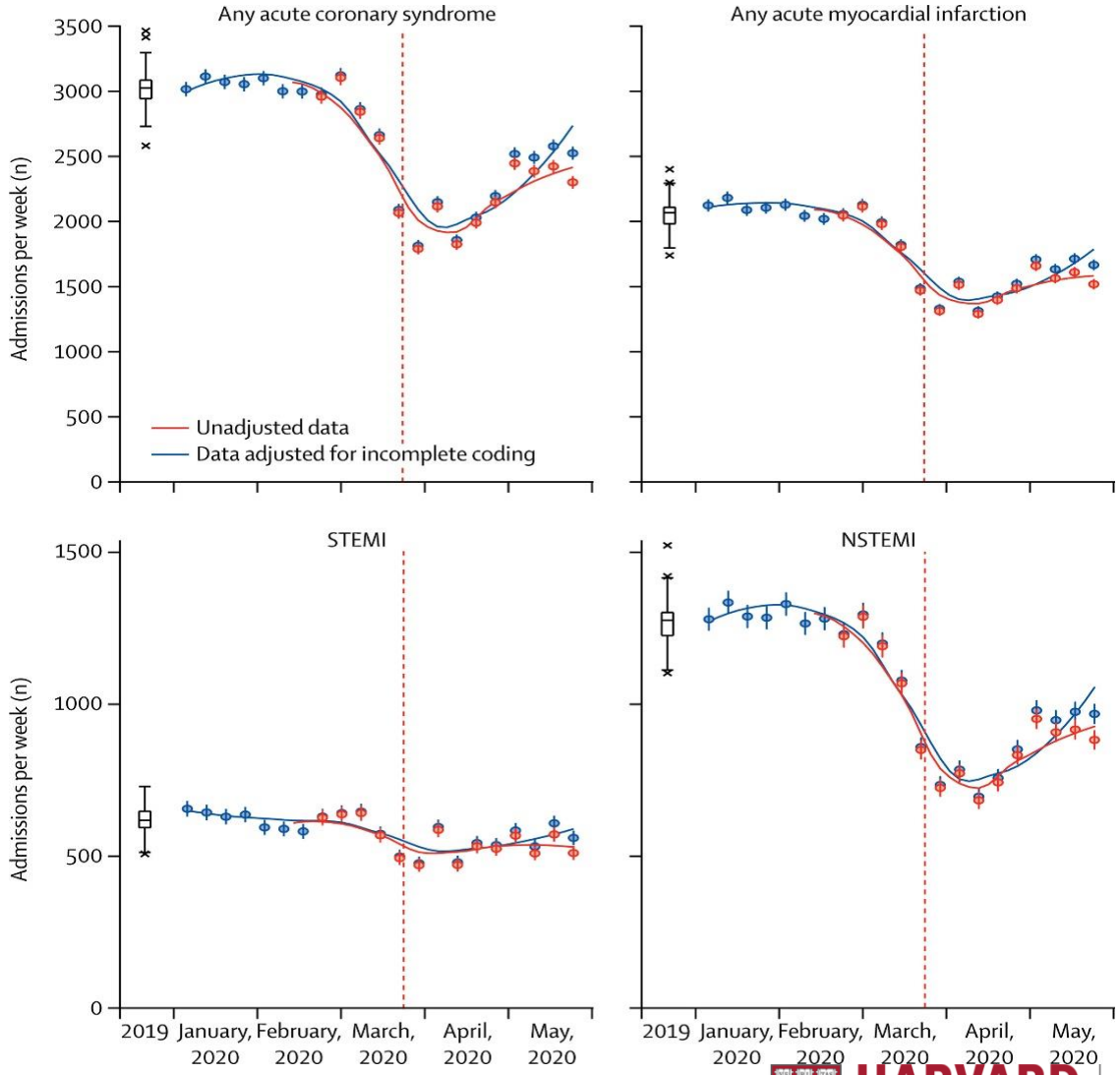
COVID-19 pandemic and admission rates for and management of acute coronary syndromes in England



Mafham et al, the Lancet July 14, 2020, DOI:https://doi.org/10.1016/S0140-6736(20)31356-8
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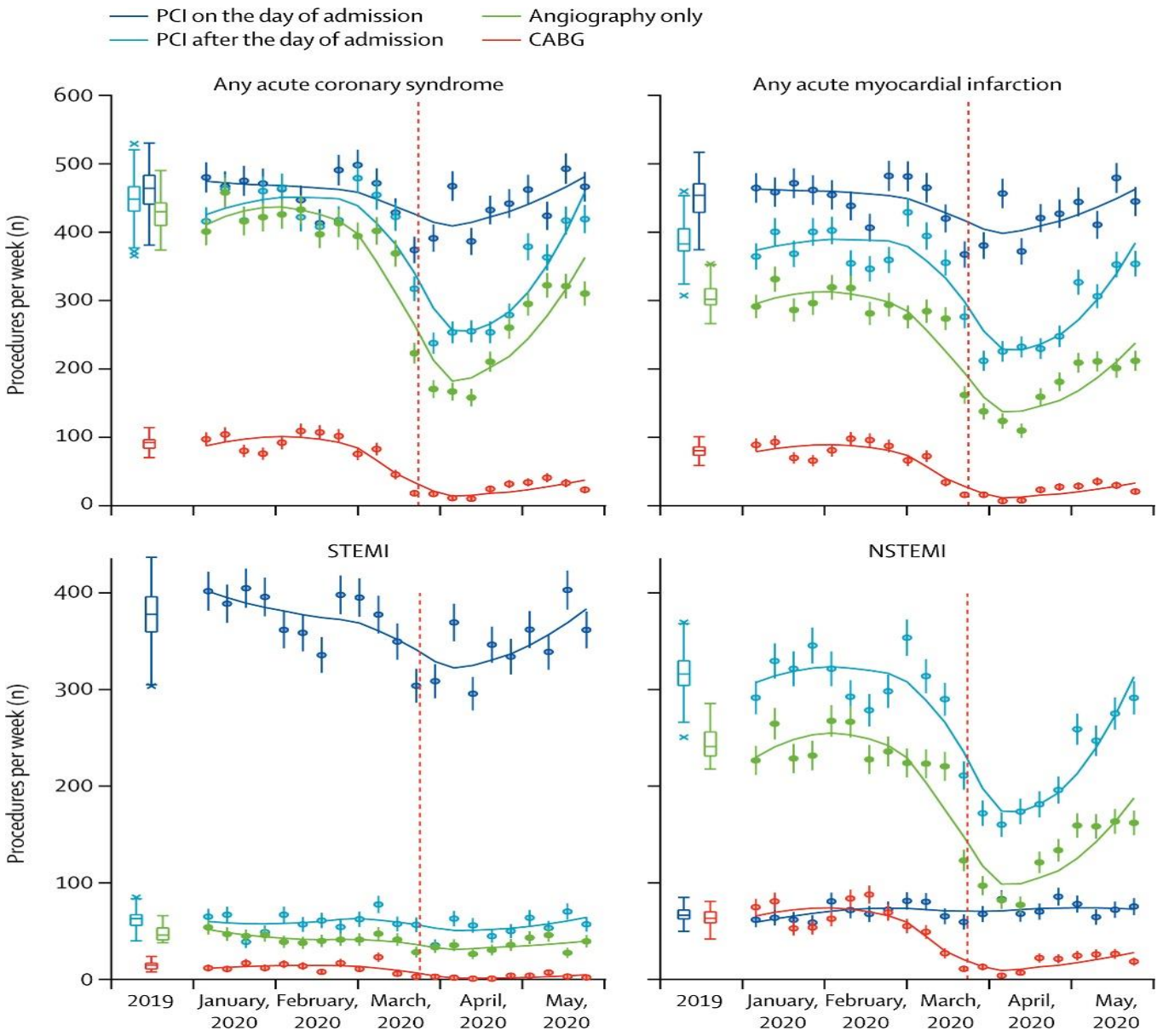

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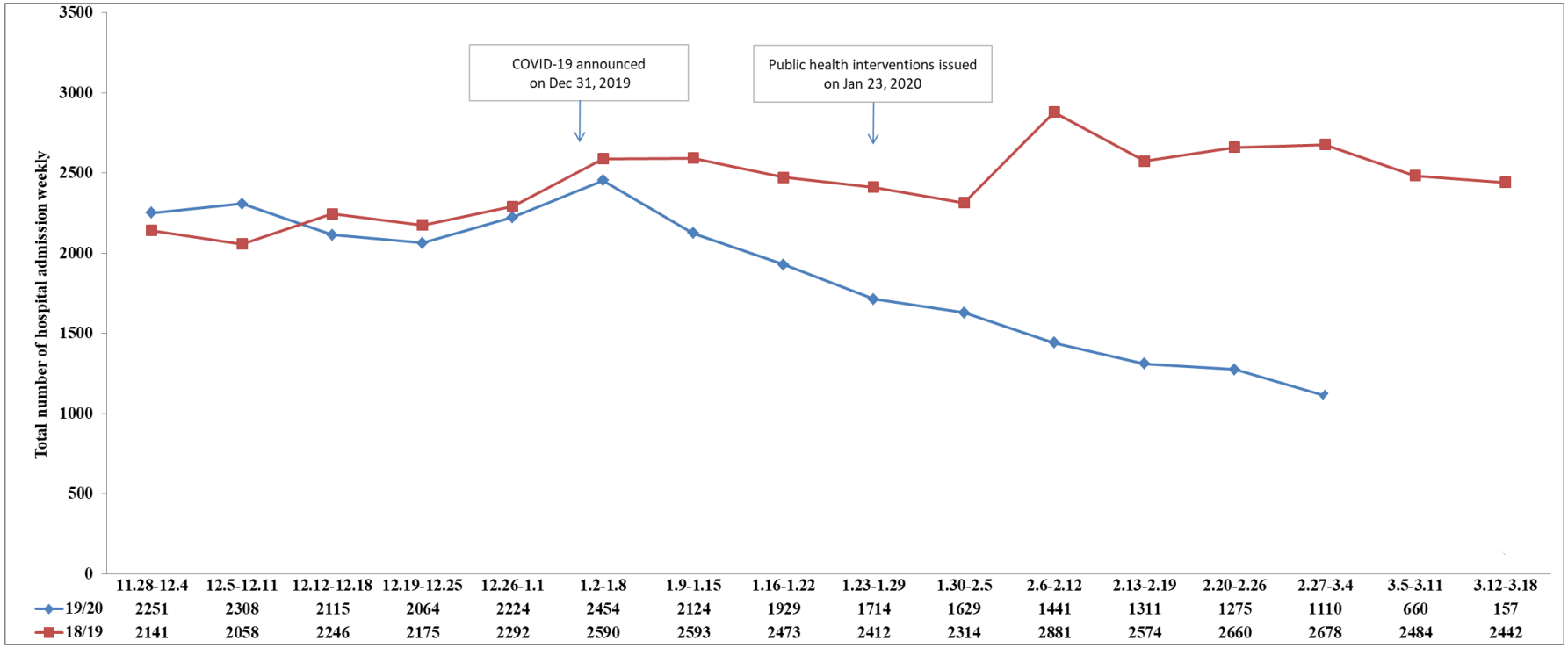
Ischemic Stroke in China
very preliminary, do not cite or quote



	11.28-12.4	12.5-12.11	12.12-12.18	12.19-12.25	12.26-1.1	1.2-1.8	1.9-1.15	1.16-1.22	1.23-1.29	1.30-2.5	2.6-2.12	2.13-2.19	2.20-2.26	2.27-3.4	3.5-3.11	3.12-3.18
19/20	2251	2308	2115	2064	2224	2454	2124	1929	1714	1629	1441	1311	1275	1110	660	157
18/19	2141	2058	2246	2175	2292	2590	2593	2473	2412	2314	2881	2574	2660	2678	2484	2442

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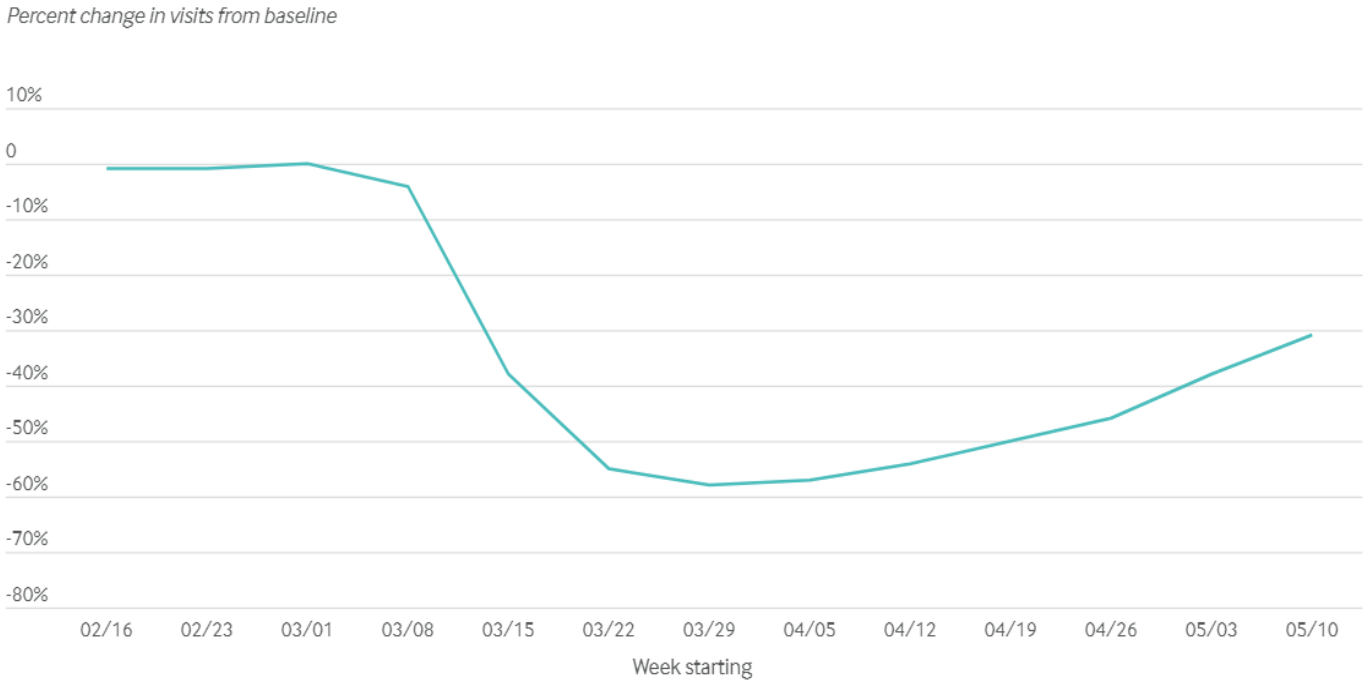
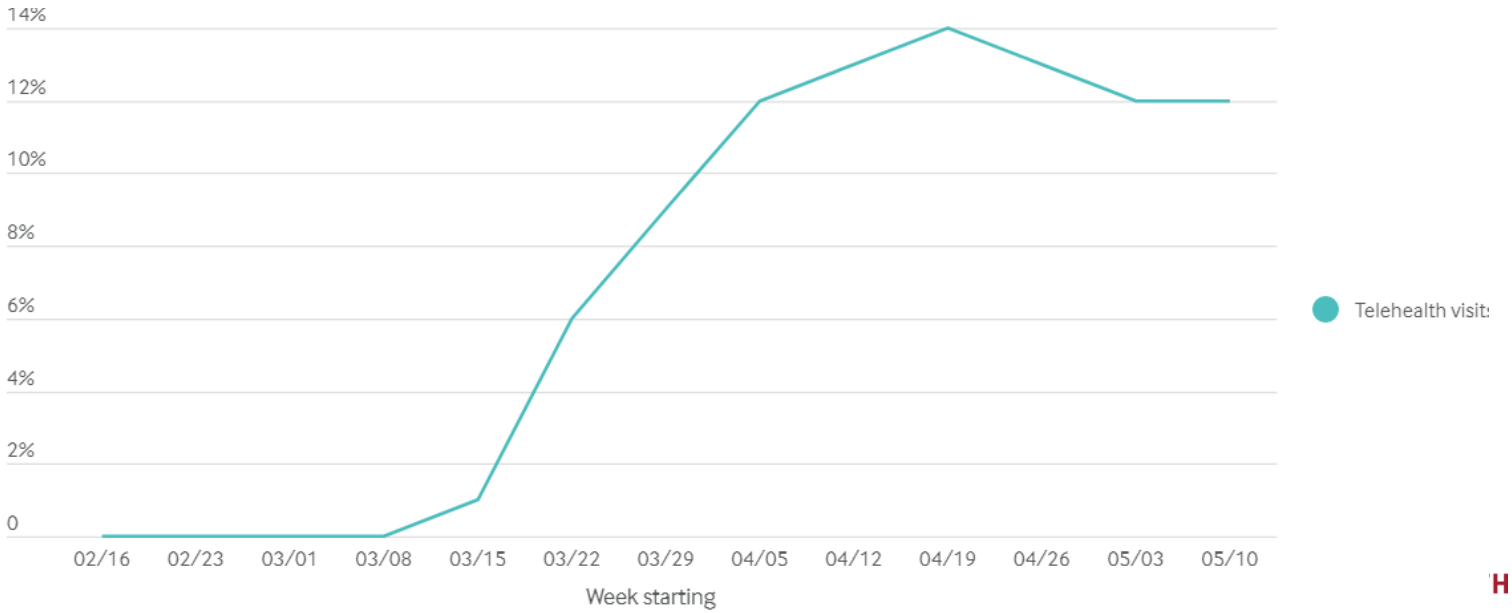
Consequences on Non COVID-19 Patients

- Delayed/forgone care and treatment: cardiovascular disease, stroke, cancer
- Disproportional burden on elderly
- Immunization and vaccinations
- Delayed diagnosis: such as colonoscopy, mammography, …
- In lower- and middle-income countries: TB, HIV/AIDS, maternal and child care, nutrition programs

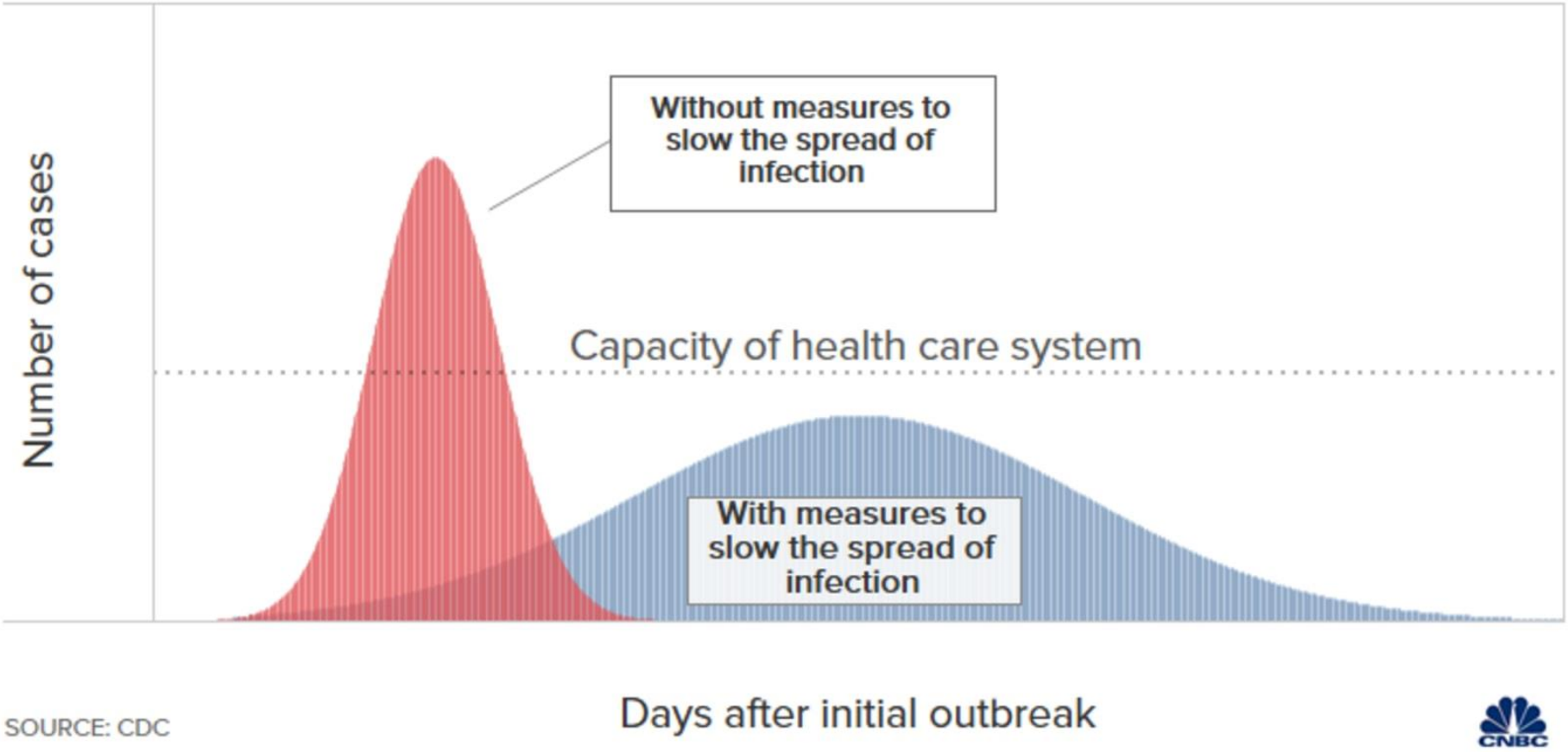




Source: https://www.commonwealthfund.org/publications/2020/apr/impact-covid-19-outpatient-visits

Should more hospitals be built?

Flattening the curve



SOURCE: CDC

CNBC

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一图看懂 长江日报·长江网

大手笔！武汉一天动工6家医院、中心

武汉一天动工 6 家医院、中心，基本都在新城区，这是武汉近年来最大的公共卫生投入，也是武汉首次大规模在新城区建设三甲医院。

2 黄陂区人民

- 级别：三甲
- 床位：1200 张
- 总投资：27.9 亿元
- 规划总用地面积：216 亩
- 建筑面积：24 万平方米
- 地点：黄陂产业新城
- 建成使用时间：2021 年底前
- 优势：· 面向 114 万黄陂群众服务面最广

3 蔡甸区武汉常福医院

- 级别：三甲
- 床位：1000 张
  并预留紧急动员床位 1000 张
- 总投资：25 亿元
- 规划总用地面积：291 亩
- 建筑面积：22 万平方米
- 地点：蔡甸区经济开发区常福新城西北角
- 建成使用时间：2021年10月31日以前
- 优势：· 规划用地面积 291 亩为四家医院之最

4 新洲区武汉航天城同济医院

- 三甲
- 一期 1000 张，二期 500 张
- 资 24.3 亿元
- 面积：约 222.09 亩
- 面积：一期 21.5 万平方米
- 武汉国家航天产业基地双柳航天新城核心区
- 使用时间：2021年10月30日前
- · 打造绿色生态智慧型医院

5 华中科技大学同济医院国家重大公共卫生事件医学中心

- 地位：首个在北京、上海之外设置的国家级医学中心，也是第六个国家级医学中心
- 地点：同济光谷院区
- 建成时间：3 到 5 年
- 特点：· 牵头构建覆盖全国的国家重大公共卫生事件应急救治系统（国家 - 省 - 市 - 哨点医院 / 社区）

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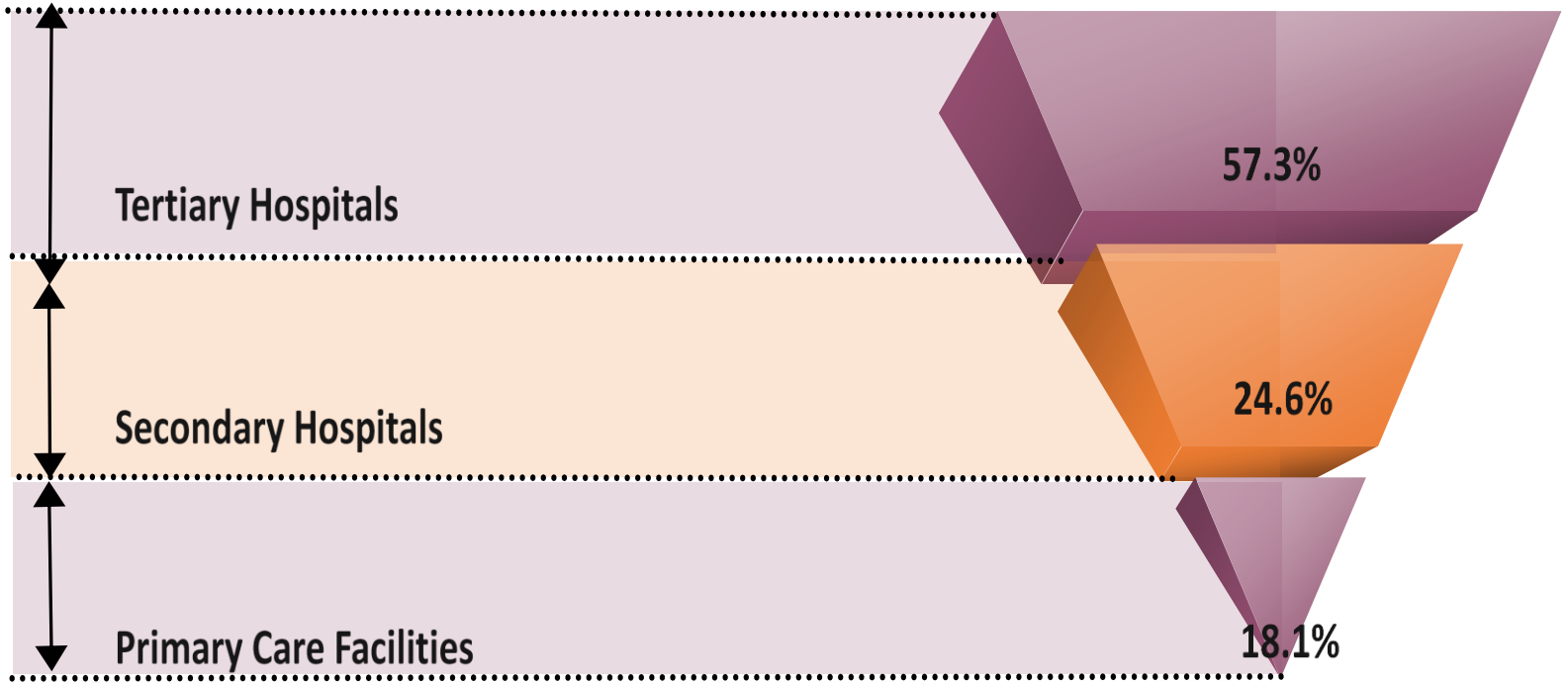
Current Resource Allocation by Facility Level, China



Source: Yip et al, Ten Years of Health Reform in China. (2019). The Lancet.

“In-hospital” vs “out-of-hospital” management of COVID-19

	Population (million)	Cases	Deaths	Case fatality rate	Mortality (per 100 000)
Lombardy	10·08	62 153	11 377	18·3%	112·9
Veneto	4·90	14 624	940	6·4%	19·2
Rest of Italy	45·39	88 378	9328	10·6%	20·6

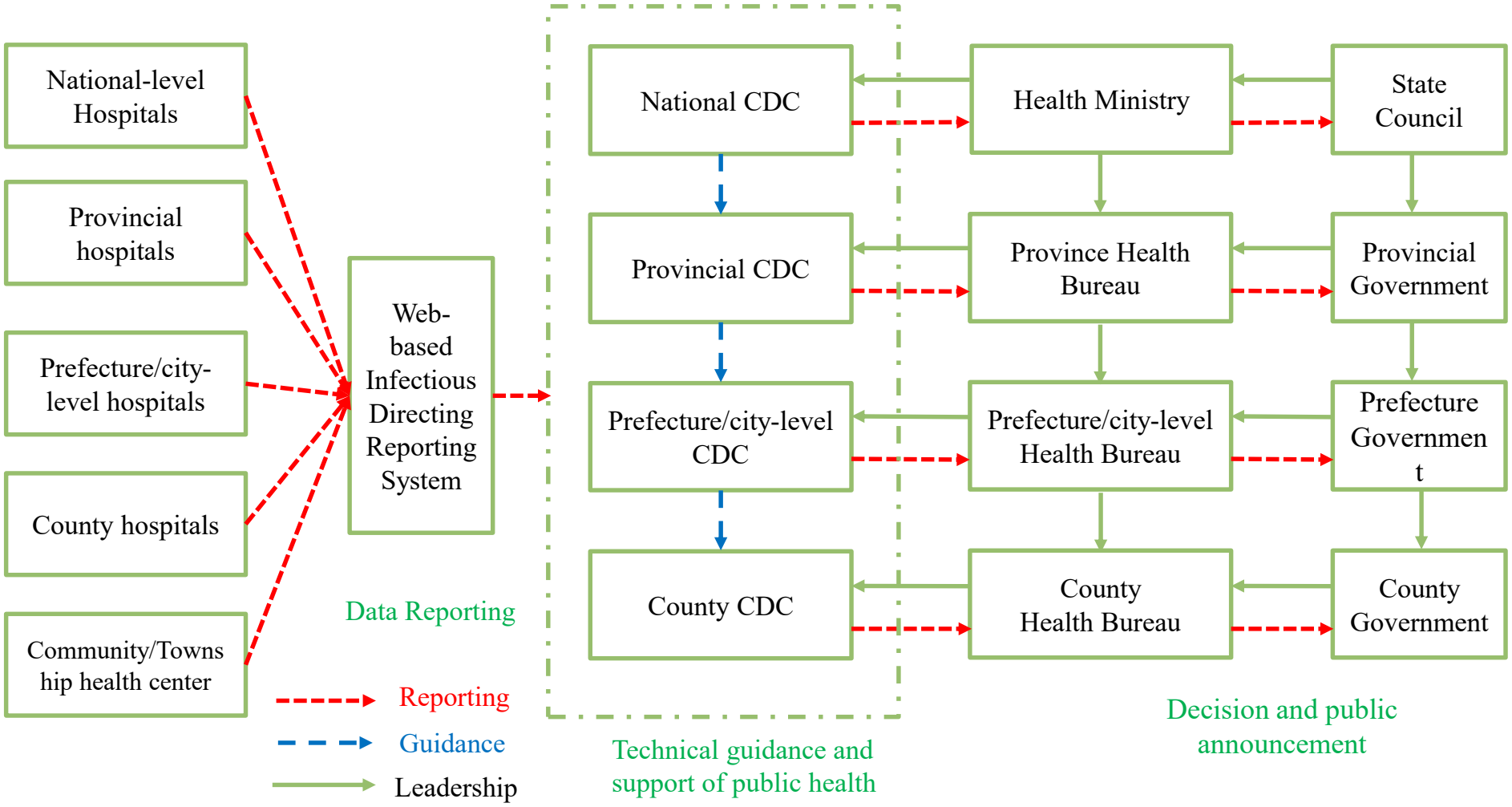
Data are n or %. Data are from the Civil Protection Department of the Italian Government, updated April 15, 2020.

Table: COVID-19 surveillance data in the Lombardy and Veneto regions and the rest of Italy

- China’s 网格管理—community based
- Modelling: “what IF primary health care were stronger, had people’s trust…?”

A Odone et al, “COVID-19 deaths in Lombardy, Italy: data in context” the Lancet, April 29, 2020

Economic Impacts

- GDP does not capture the full economic impacts
- Distributional effects are important:
  - Socioeconomic groups
  - Race/ethnic
- Poor/low-income population/countries:
  - Food, nutrition, housing, poverty
- Children:
  - Cognitive and social development

Incorporating Governance Structure