

年度研究

深



2020

CICC
中金公司

3-4

2022

|

|

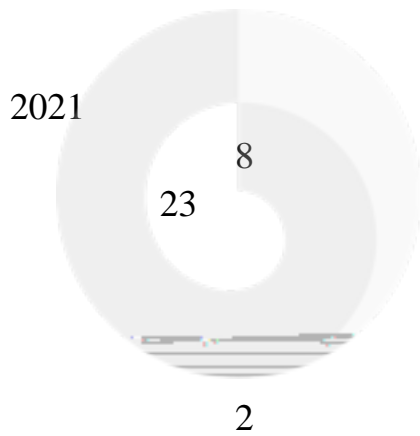
FDA 2020 12

Moderna

2020

3 GDP

1



CICC 1
2021
中金公司

3-4

2021

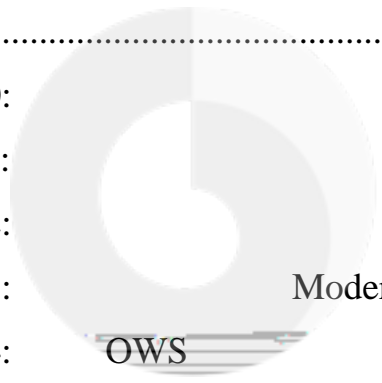
2021

.....	1
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.....	9
.....	11
.....	14
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CICC
中金公司

1:			2
2:	2020	4	2
3:	9	III	4
4:	40		6
5:	100		6
6:	19		74%	7
7:			9
8:			9
9:	10	III	10
10:			11
11:			11
12:			12
13:		Moderna	.....	12
14:	OWS		.....	13
15:			.....	14
16:			.....	15
17:	2021		.....	16
18:			17
19:			18
20:		10	18
21:			18
22:			18
23:	2017-2018	2018-2019	19
24:	2014	65	20
25:			22
26:			23



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27:	24
28:	25
29:	30	26
30:	27
31:	27
32:	28
33:	28
34:	29
35:	30
36:	30



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2020 11 /BioNTech¹ Moderna ²
III FDA 50%

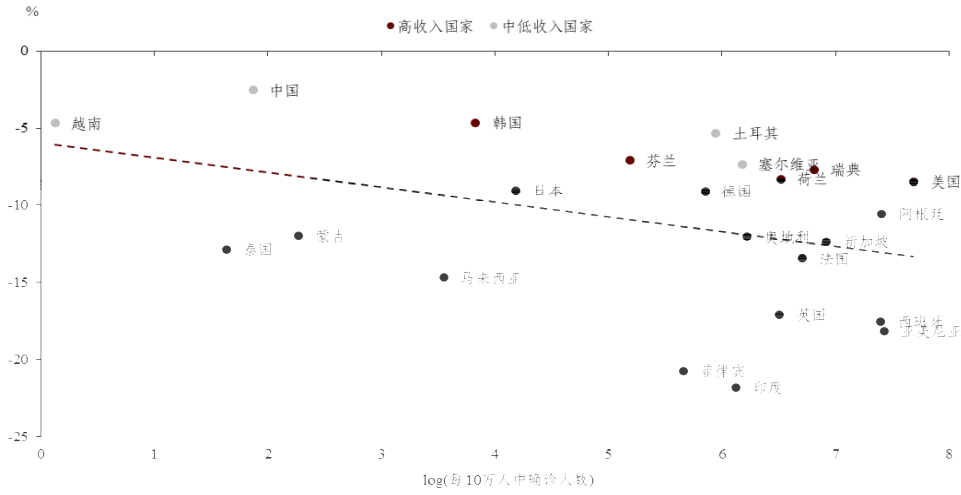
/BioNTech Moderna
EUA ³

2020 9 3 ⁴ 11 III
12 2 EUA
FDA 12 Moderna

2020
2021

1:

各国2020年2、3季度GDP缺口与新冠确诊比例关系

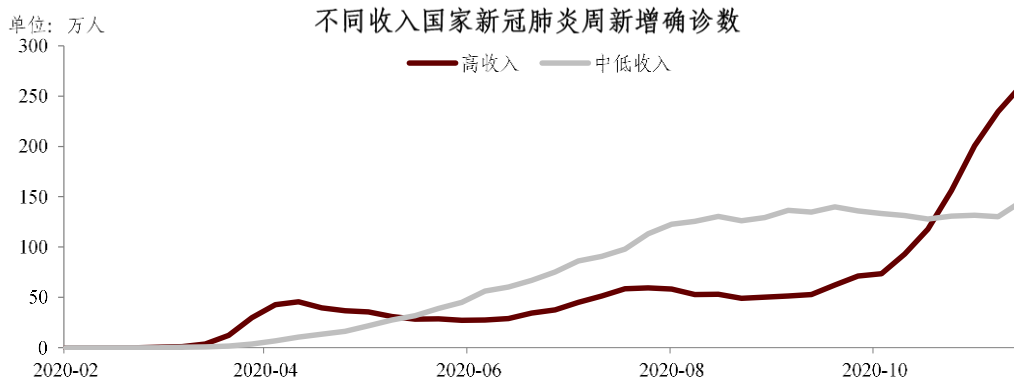


: Federal Reserve Bank of Dallas, log



2: 2020 4

	0.24	0.30
2019	12.04	50.02
	1.99%	0.60%



: ECDC OurWorldinData World Bank

GNI

1,036
12,535

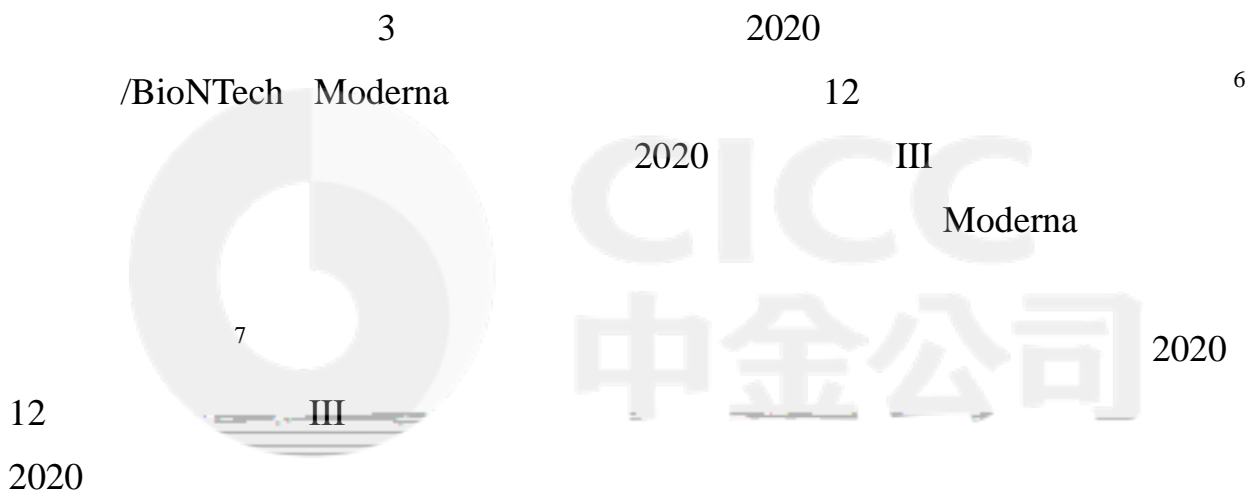
1,036 - 4,045

4,046 - 12,535

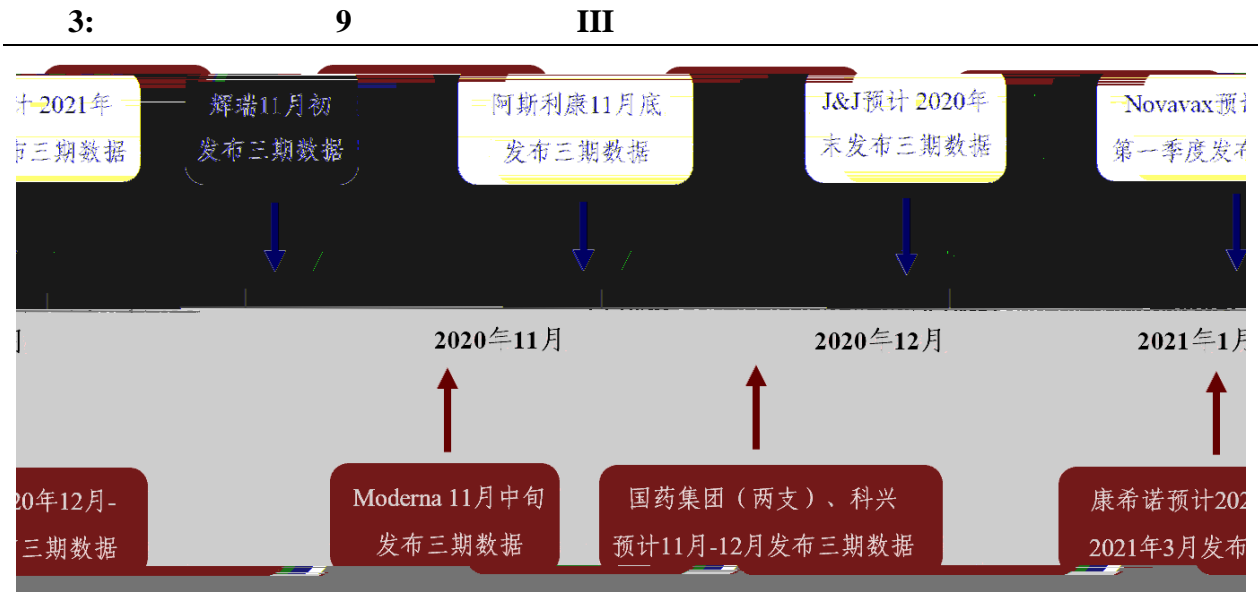
2020 11 16

5

2



5
6
7
/BioNTech Moderna 2020 5000 2000
-19 vaccine results. STAT. Nov. 9, 2020.
[https://www.statnews.com/2020/11/09/four-reasons-for-encouragement-based-on-pfizers-covid-19-vaccine-resu
lts/](https://www.statnews.com/2020/11/09/four-reasons-for-encouragement-based-on-pfizers-covid-19-vaccine-results/)



： ， ， Moderna, J&J, Novavax, New York Times, Financial Times, Reuters,



2020 9 Nature

8

RNA

D614G

10 8

9

D614G

⁸ Callaway, Ewen. (2020). The coronavirus is mutating — does it matter?. *Nature*. 585. 174-177. 10.1038/d41586-020-02544-6.

⁹ McAuley, A.J., Kuiper, M.J., Durr, P.A. *et al.* Experimental and in silico evidence suggests vaccines are unlikely to be affected by D614G mutation in SARS-CoV-2 spike protein. *npj Vaccines* 5, 96 (2020). <https://doi.org/10.1038/s41541-020-00246-8>

DNA RNA

III

/BioNTech

Moderna 95%

FDA

$V_c = (1 - 1/R_0)/E$

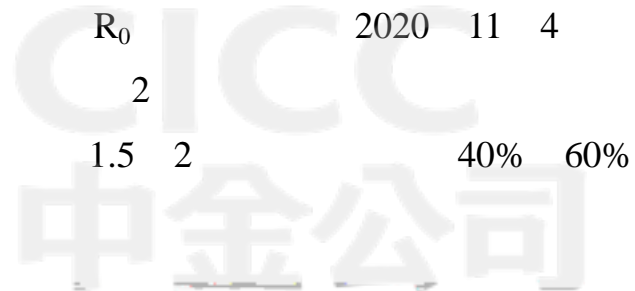
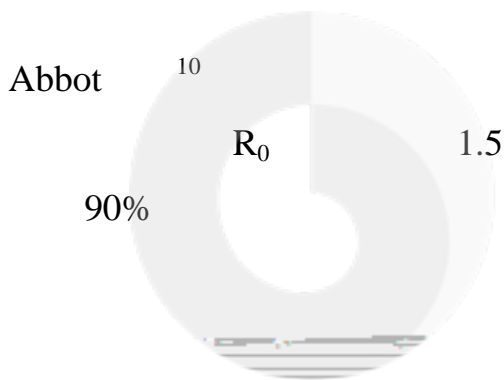
V_c

R_0

E

Sam

Abbot



2020 11 4

R_0

1.5 2

40% 60%

11 2

UK Coronavirus Immunology

Consortium

11

T

Charles Bangham

Jennifer M. Dan

2020 11 15

12

¹⁰ Abbott, Sam; Hickson, Joe; Allen, Jamie; Funk, Sebastian, 2020, "National Reproduction Number (R) Based on Reported Cases", <https://doi.org/10.7910/DVN/TTLQRN>, Harvard Dataverse, V31

¹¹ Zuo J, Dowell A, Pearce H, et al. Robust SARS-CoV-2-specific T-cell immunity is maintained at 6 months following primary infection[J]. bioRxiv, 2020. <https://doi.org/10.1101/2020.11.01.362319>

¹² Dan, J.M., Mateus, J., et al. Immunological memory to SARS-CoV-2 assessed for greater than six months after infection.

bioRxiv 2020.11.15.383323; doi: <https://doi.org/10.1101/2020.11.15.383323>

6-8

Stephen M. Kissler

13

40

4

100

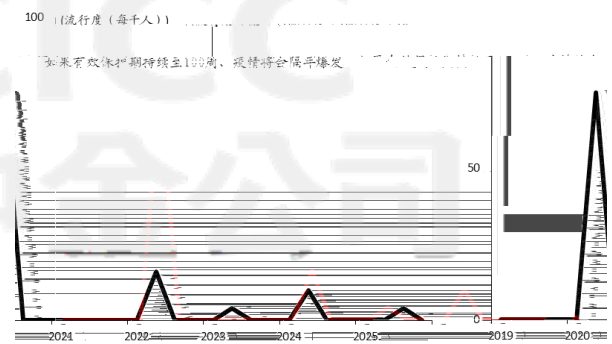
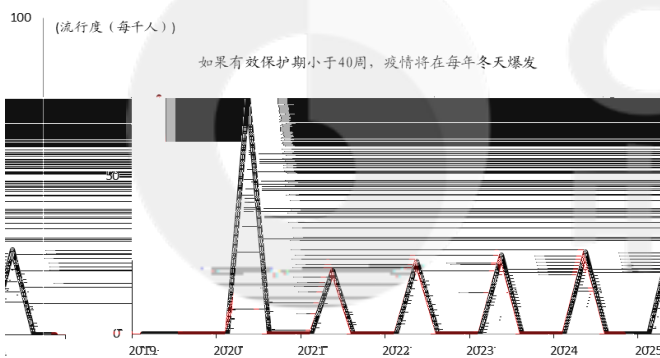
5

4:

40

5:

100



: Kissler, S., Tedijanto, C. et al. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period *Science*, 22 May 2020: Vol. 368, Issue 6493, pp. 860-868. DOI: 10.1126/science.abb5793

: Kissler, S., Tedijanto, C. et al. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period *Science*, 22 May 2020: Vol. 368, Issue 6493, pp. 860-868. DOI: 10.1126/science.abb5793

14

¹³ Kissler, S., Tedijanto, C. et al. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period *Science*, 22 May 2020: Vol. 368, Issue 6493, pp. 860-868. DOI: 10.1126/science.abb5793

¹⁴ 2020

2020 6
74% 6
50%

2020 6

17

7 2020

65

80%

8

65



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¹⁷ Reiter P L, Pennell M L, Katz M L. Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated?[J]. Vaccine, 2020, 38(42): 6500-6507

7:

8:

: Reiter P L, Pennell M L, Katz M L.

Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated?[J]. Vaccine, 2020, 38(42): 6500-6507

Relative Risk

RR

survey of

potential acceptance of a COVID-19 vaccine[J].

medRxiv, 2020

: Reiter P L, Pennell M L, Katz M L.

Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated?[J]. Vaccine, 2020, 38(42): 6500-6507

2021

2021

2021

9

2020

7000

9: 10

III

		I	II	I/II	III		
	/			4.23	6.11	2020	2020 10 30
	Moderna	3.16	5.29		7.27	2020	2020 2000 2021 5-10
	/			4.12	7.16	2020 12	2020 6.1 2021 10 2020 1 2021 3
	/			4.27	7.16	2020 12	
				4.16	7.06		
	Gamaleya	6.17			8.11	9	2020 230
	/BioNTech				4.23	5000	2020 5000 2020 4 3 13
		3.17	4.12		9.02		2021 3
	Johnson& Johnson			7.15	9.05		2021 10
	Novavax		8.17		9.28		2021 20

: , Moderna, J&J, Novavax, New York Times, Reuters, Financial Times, 2020 12 2

10

Moderna Johnson&Johnson

Novavax 2021

18

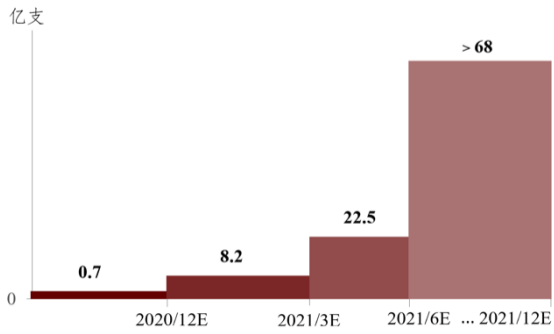
2021 1 8.2

2 22.5

10 11

2022 70

10:



11:

	2020/12	2021/03	2021/06	2021/12
	0.5	3	6	13
Moderna	0.2	1.2	2.5	5
J&J	0	2	5	10
	0	2	4	20
Novavax	0	0	5	20
	0.7	8.2	22.5	68

: , Moderna, J&J, Novavax, CNBC, Reuters, The Economic Times
2020 12 2

: 19



2021

2020 12 2

12

Moderna

13

2021

80%

20

19 Moderna 2020 0.5 2021 1 3 2020
0.2 J&J 2021 10 III 1
2 2 5
2021 1
2021 10 1/2 Novavax

20

8

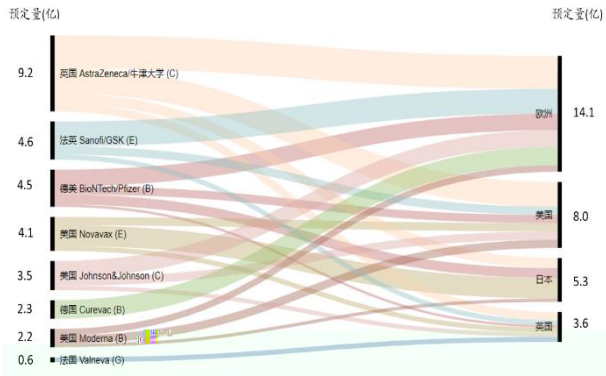
4

3

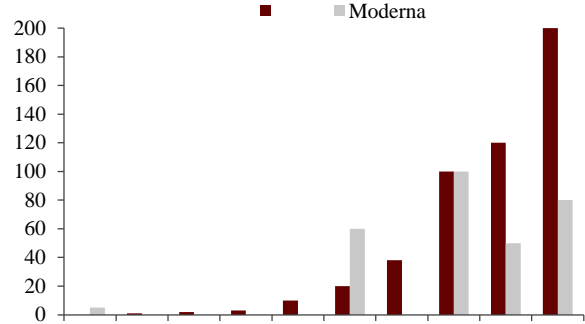
1

<https://www.npr.org/sections/goatsandsoda/2020/11/11/933942711/why-poorer-countries-arent-likely-to-get-the-pfizer-vaccine-any-time-soon>

12:



13: Moderna



: Moderna
2020 12 2

: Duke Global Health Innovation Center,

2020 11 16



OWS Operation Warp Speed

10

2021 6

20

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14

14: OWS

加入“曲速行动” (Operation)	接受资助金额	优先供给协议内容	以及最新预计产量或产能
20日资助4.56亿美元	5日资助10亿美元	优先为美国提供1亿支，之后美国可以选择继续购买2亿支，将近10亿支/年	Johnson & Johnson 3月28日
4月16日资助4.83亿美元	7月16日资助4.72亿美元	优先为美国提供至少3亿支，首批疫苗计划于2020年10月开始生产，2021年底之前生产20亿支	Moderna
8月11日资助1.5亿美元	8月11日资助1.5亿美元	优先为美国提供1亿支，之后美国可以选择继续购买5亿支	Sano and GlaxoSmithKline

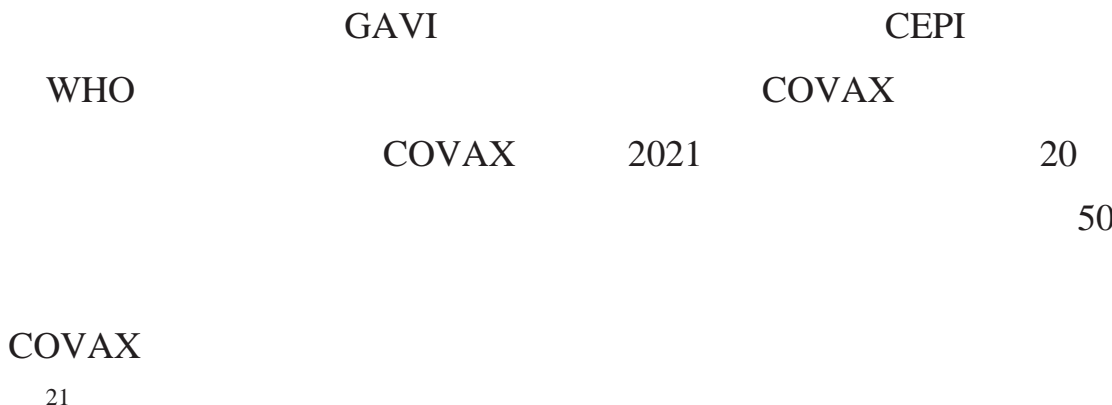
: HHS, CNBC, Reuters, Fiercepharma, Bloomberg, Euronews, Seattle Times,

2020 12 2



0.5 /

15

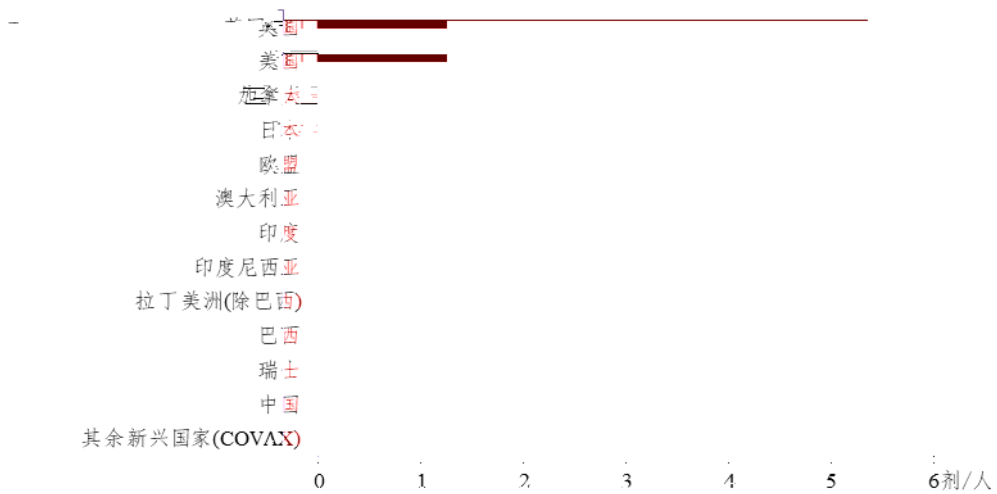


COVAX
21

²¹ <https://www.startribune.com/push-to-bring-coronavirus-vaccines-to-the-poor-faces-trouble/572596322/>

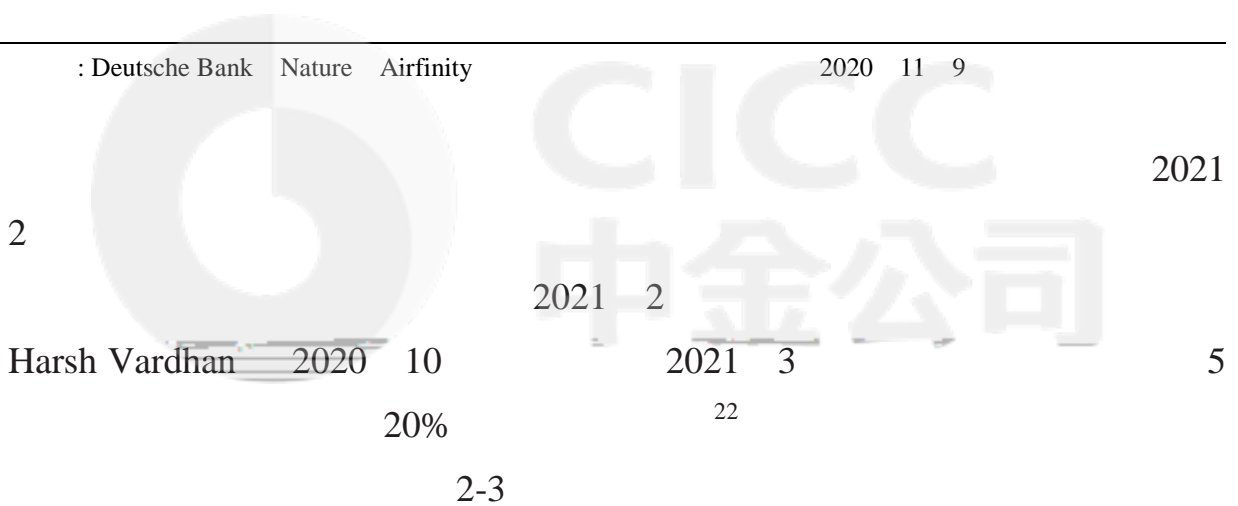
15:

各国新冠疫苗人均预定量



: Deutsche Bank Nature Airfinity

2020 11 9

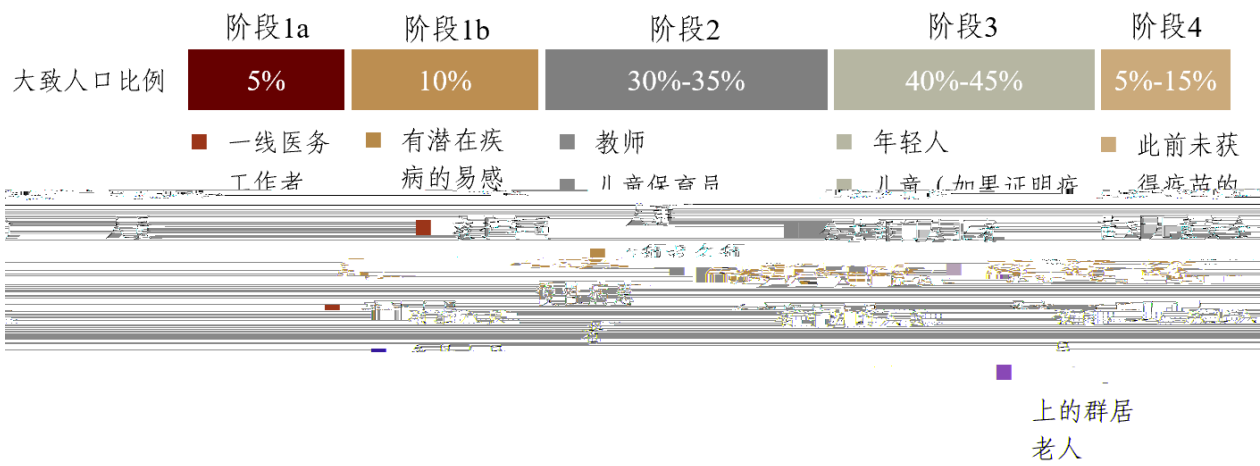


65

16

²² India seeks up to 500 million coronavirus vaccine doses by July. Reuters.Oct.4,2020.
<https://www.reuters.com/article/health-coronavirus-india/india-seeks-up-to-500-million-coronavirus-vaccine-doses-by-july-idUSKBN26P0F1>

16:



: EUROSTAT, Office for National Statistics, National Academy of Medicine,



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mRNA DNA

mRNA

/BioNTech

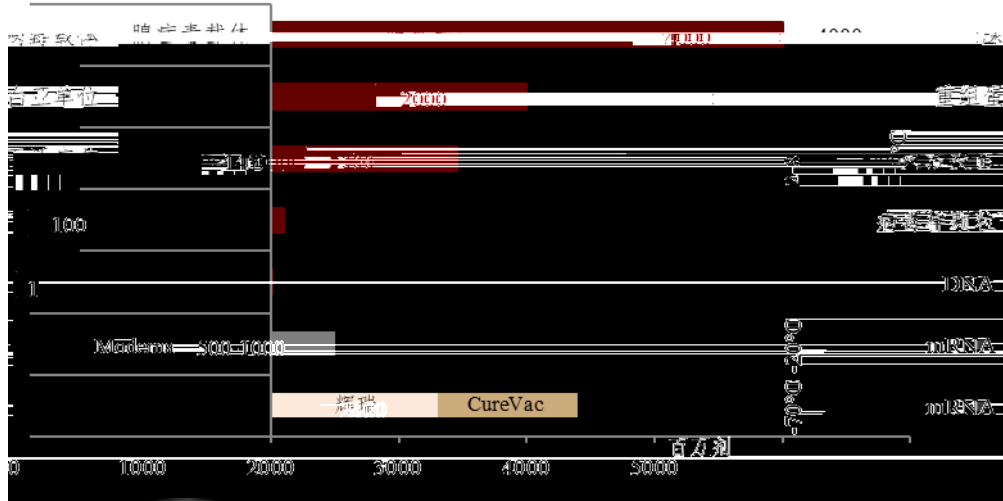
Moderna

-70°C

17

17: 2021

主要疫苗厂商宣布的产能（至2021年末）

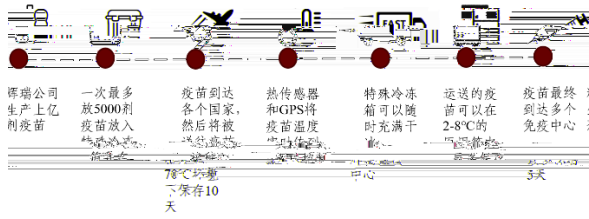


: DHL : Delivering Pandemic Resilience September 2020.



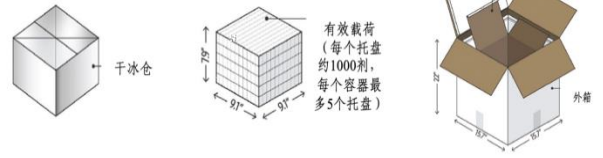
18:

19:



: The Guardian

20:



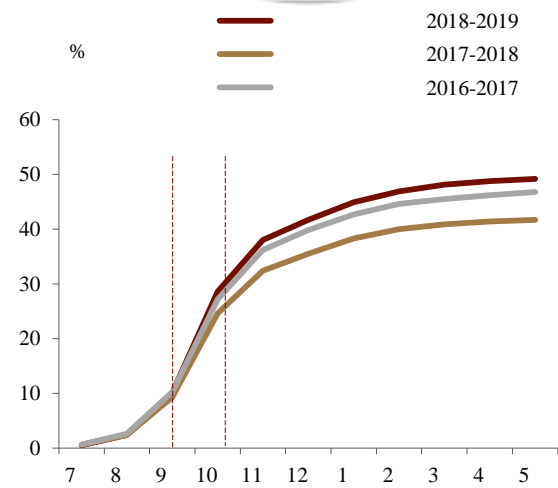
:

10

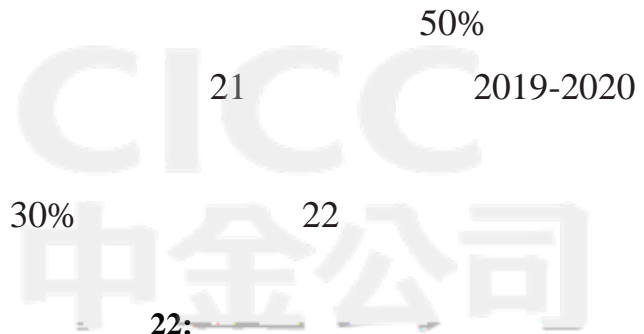
CDC 2020 10



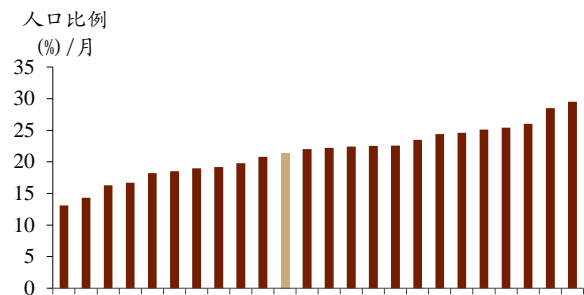
21:



: CDC (2020). 2019-20 Influenza Season Vaccination Coverage Report,



22:



: CDC (2020). 2019-20 Influenza Season Vaccination Coverage Report,

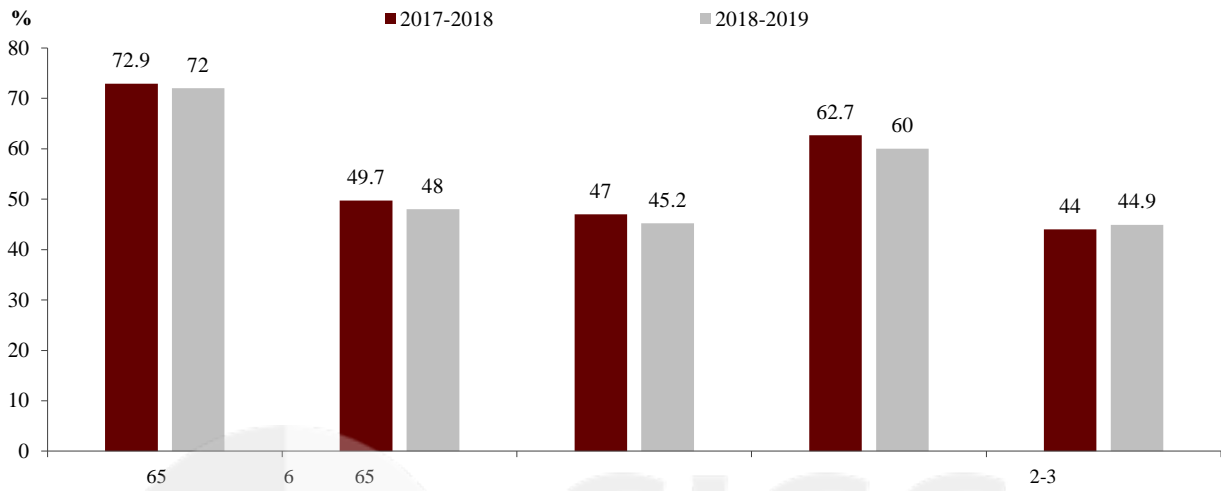
50
2018-2019

2017-2018 2018-2019

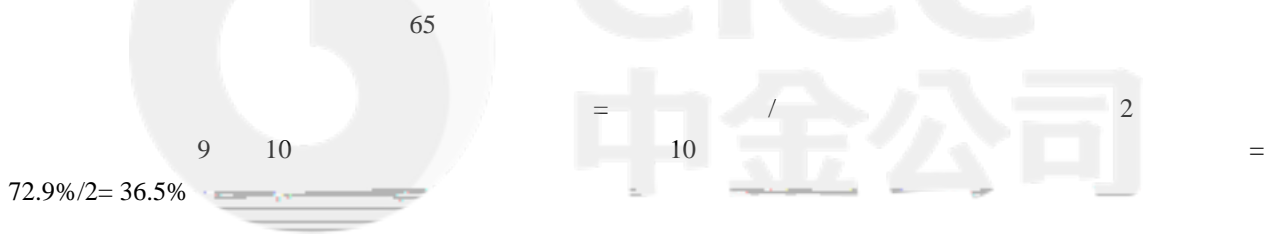
36.5%

23

23: 2017-2018 2018-2019



: PHE(2019) Seasonal influenza vaccine uptake in GP patients: winter season 2018 to 2019,



2014

WHO

24

WHO

24

10

25

²⁴ WHO (2014) Effective Vaccine Management

²⁵ What

Rodriguez, InspiraFarms, 2018



10

1.2

28

UIP

2670

2900

UIP

4%

2020 1 8

1200

67%

29



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2021

2021

1

3-4

2021 1

5% 65

10%-19% 1.7

1600

5000

1.1

2

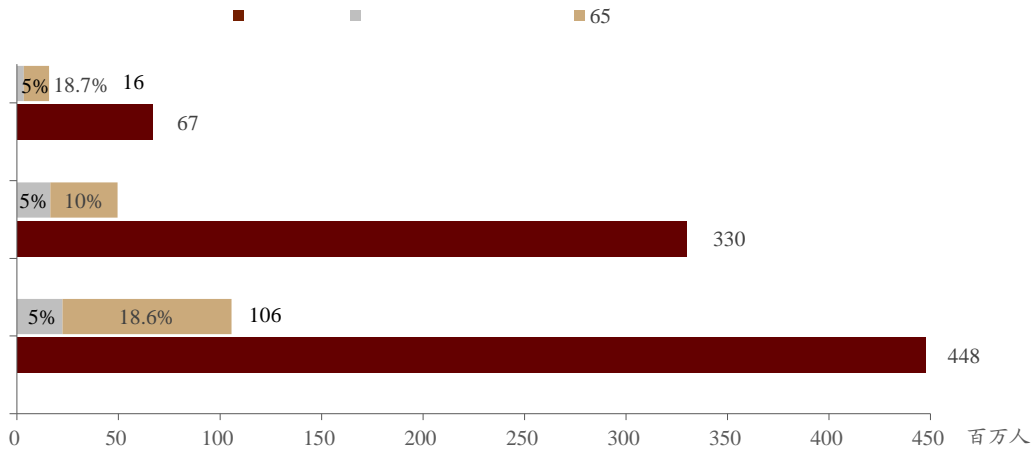
3.4

1

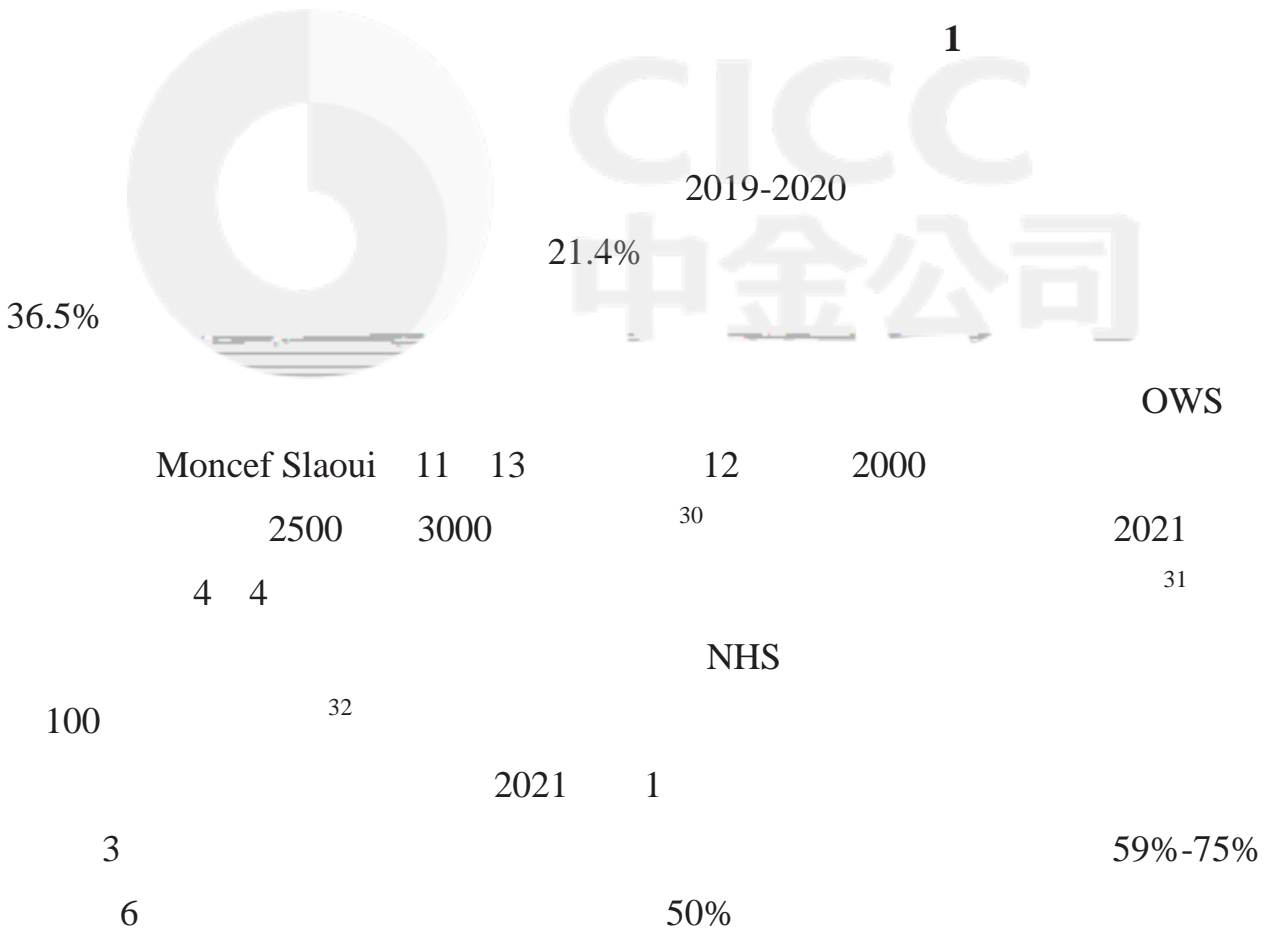
25

²⁸ <https://economictimes.indiatimes.com/prime/economy-and-policy/indias-vaccine-drive-will-need-100000-fridges-11500-refrigerated-trucks-a-cold-chain-evolution/primearticleshow/78625967.cms>
²⁹ https://www.numbeo.com/health-care/rankings_by_country.jsp?title=2019

25:



: EUROSTAT, Office for National Statistics, National Academy of Medicine,



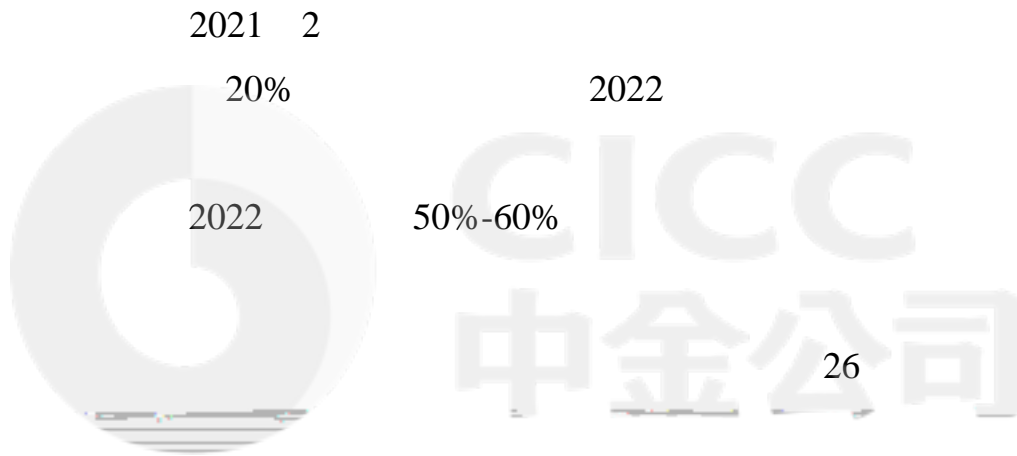
³⁰ 20 million Americans could receive Covid-19 vaccine in December. Sarah Owerhohle. Nov. 13, 2020. <https://www.politico.com/news/2020/11/13/trump-covid-vaccine-december-436481>

³¹ <https://www.theguardian.com/politics/live/2020/nov/23/uk-coronavirus-live-oxford-covid-vaccine-success-tier-lockdown-england-boris-johnson>

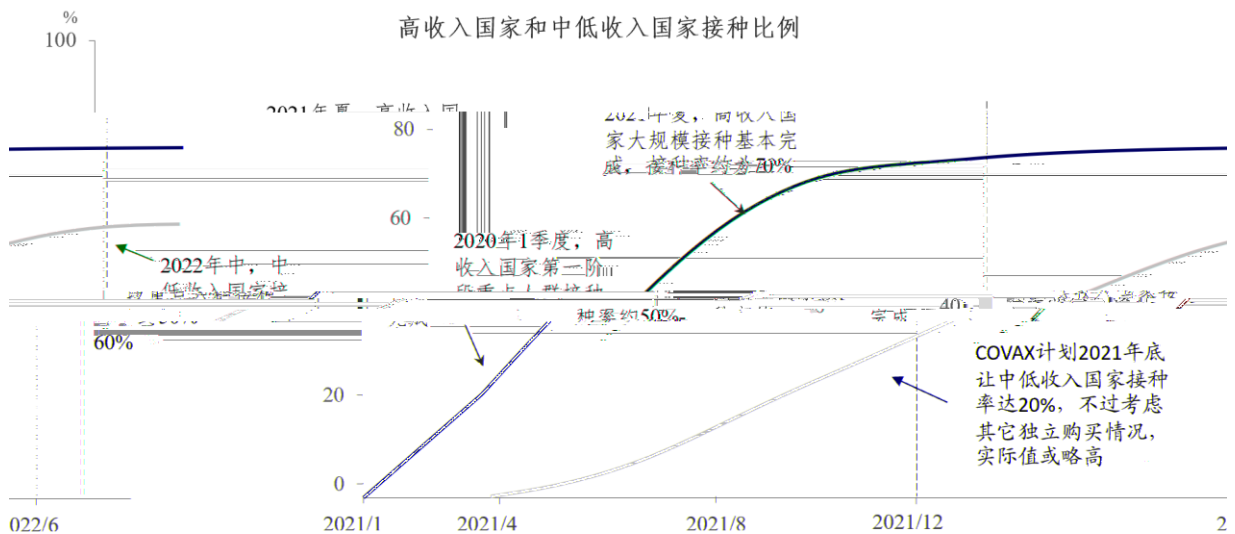
³² <https://www.mirror.co.uk/news/uk-news/brits-to-1m-coronavirus-jabs-23039828>

70%

2022
2021 20%
4000 2021 3 7.6%
2021 13
10%



26:



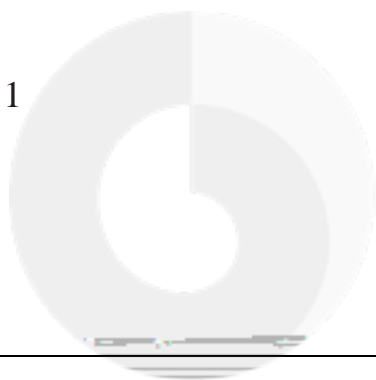
2021

2021

27

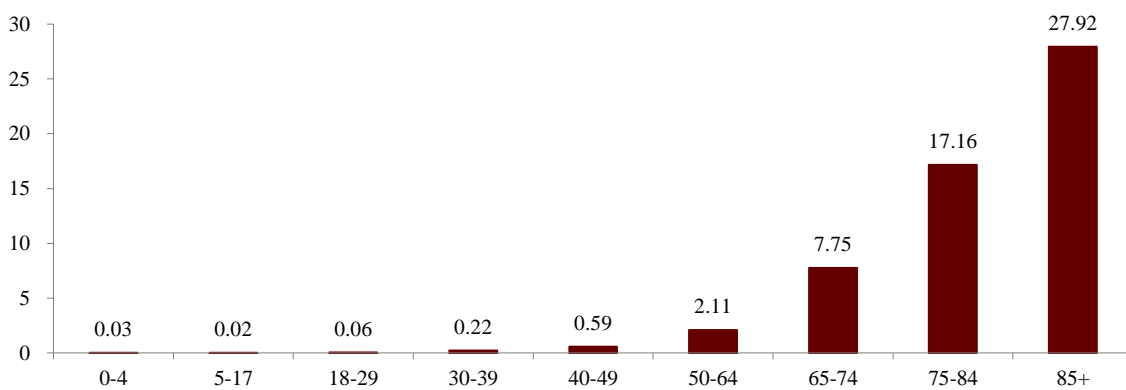
2021 1

2021 1
2021



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27:



： CDC COVID-19 2020 10 CDC COVID-19 /

2021

2021

30 Vox Eu 36
50% 20% 31

30:

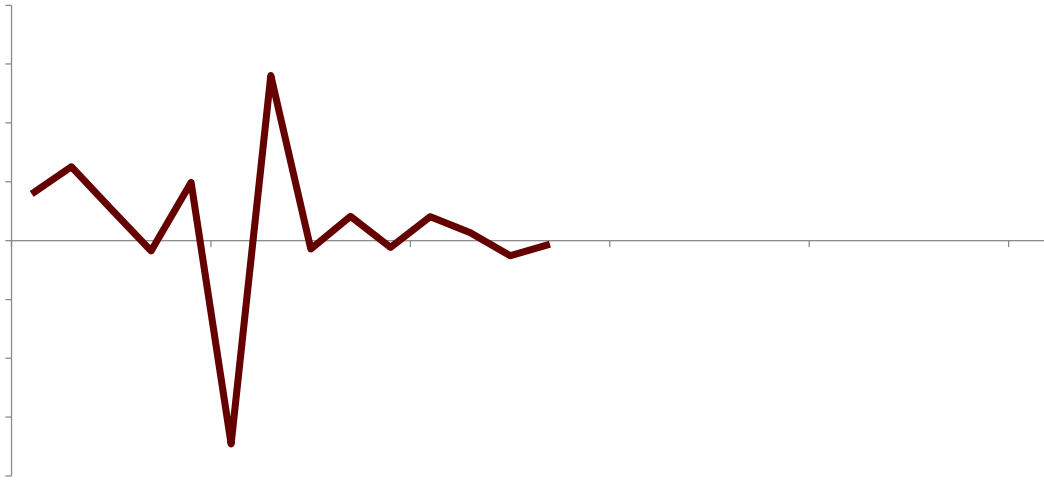
31:

: 2020
9

: Bengt Soderlund, The impact of travel
restrictions on trade during the Covid-19 pandemic

2021

34:



:

2020 10

FDA

MHRA

MHRA

FDA

FDA

2021

2021 1

2021 2

2021 4 35

35:

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36

36:

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