BCG

Executive Perspectives

Omicron fact pack:

Is Omicron Signaling a Shift to Endemic COVID?

Entering the Third Year of COVID-19

January 2022

BCG Executive Perspectives

IN THIS DOCUMENT

OMICRON IS A CONCERN DESPITE LOWER SEVERITY – BOOSTERS CRITICAL

Omicron, now the dominant COVID-19 variant, caused significant spikes in cases – reaching 3.3 million daily cases globally in January[1], more than three times the previous waves' peaks.

Studies of the variant show it is more transmissible than Delta, as it evades prior immunity. But it is less severe: it has a 40-45% lower risk of hospitalization, with reduced infectivity of lung cells compared with Delta. Nonetheless, the variant will put pressure on health care systems in some areas given its high transmissibility, which is likely to render containment measures less effective.

Vaccine boosters are critical for reducing the risk of infection (60%+) and severe illness (~90%), and an mRNA booster can restore the effectiveness even of some non-mRNA vaccines.

LEADERS NEED TO SUPPORT THE TRANSITION TO ENDEMIC COVID-19

We need to prepare to live with COVID-19 in the years ahead and continue to evolve interventions and collaboration to support the transition toward endemic COVID-19. We are better prepared now to do so – given the availability of vaccines, antivirals, and infusion therapies; reliable diagnosing and sequencing; and improved health care system capacity.

Yet there are many areas we still need to improve on. Governments should accelerate support for global equity in COVID-19 testing, vaccines, and therapeutics; invest in infrastructure to enable speed at scale for fighting new variants; increase vaccine adoption; and normalize the response to new waves. Businesses should work closely with governments and build flexibility in their operations.

1. Reported cases on 13th January (note: not a seven-day rolling average) – the highest peak till 17th January 2022;
Sources: BCG analysis and case experience; sources for numbers quoted within the document

BCG Executive Perspectives

AGENDA

Our Dec 2021 Executives Perspectives edition focused on early insights into the Omicron variant

COVID-19 | UPDATES AND FUTURE SCENARIOS

- Latest developments on Omicron
- Scenarios for 2022 and potential move to endemic COVID-19
- Implications for public and private sector leaders

UPDATED ANALYSES AND IMPACT

- COVID-19 economic and business impact

The Omicron wave has swept across nations, infecting millions

As of 17 Jan 2022

COVID-19 cases and fatalities continuing to grow globally

329M
# of cumulative confirmed cases (since beginning of the pandemic)

56M
# of active COVID-19 cases currently

5.6M
# of cumulative fatalities (since beginning of the pandemic)

80%+
Percentage of new cases in major countries that were Omicron[1] in past two weeks

Imperative to bolster boosters

5.4x
Higher risk of reinfection vs. Delta variant[2]

89%
Booster effectiveness against hospitalization upon infection with Omicron

1. Countries include the US, the UK, Canada, Australia, South Africa, India, Indonesia, Japan, Israel, Romania, Spain, Mexico, Colombia, etc. 2. Imperial College study. Sources: Johns Hopkins CSSE; Our World in Data; Worldometer, BCG

Summary

Is Omicron signaling a shift to endemic COVID-19?

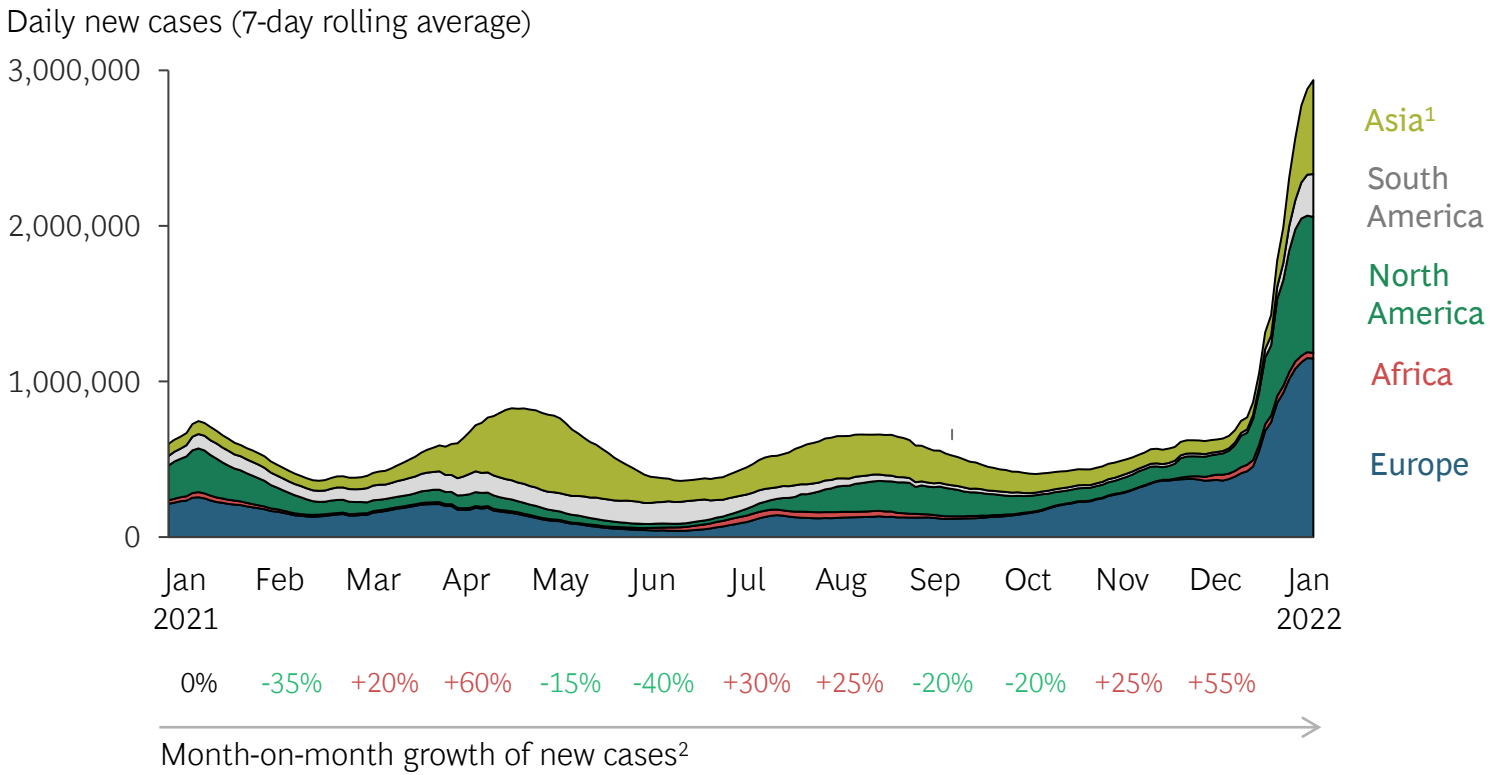
1	**Omicron: latest developments**	1 Omicron has dwarfed previous peaks, quickly displacing prior variants. It is more transmissible than Delta but less severe 2 Vaccines continue to protect - boosters are critical for reducing risk of infection (60%+) and hospitalization (~90%). The increase in hospitalization rates has been driven largely by the unvaccinated and nonboosted population 3 Vaccines are <20% effective against infection 3 months after the second dose. mRNA boosters can significantly recover protection 4 Impact of COVID-19 waves depends on the "immunity wall" (a function of natural immunity from previous infections, and vaccines and booster type, uptake, and timing) – which differs by country, and the progression of the virus 5 Case study: UK built strong immunity wall via early robust booster rollout, reducing hospitalizations, and restrictions 6 Cases expected to peak in January in most regions – followed by declines; some East Asian countries with peaks in February-March
2	**Future of the pandemic: scenarios and predictions**	1 Despite the emergence of new, more transmissible variants, we are better prepared this time compared with 2 years ago. But we must continue to solve for global inequity in resources to fight the virus 2 Two scenarios for 2022 – with a transition to endemic COVID-19 the most likely scenario 3 Endemic state: COVID-19 will continue to be present, with normalized infection rates, only localized flare-ups & limited disruptions
3	**Implications for leaders**	1 Transition to endemic state is rooted in equitable booster rollout and increased demand for vaccines – supporting shifts in government intervention and behaviors 2 Public sector: Prepare for emerging new variants and support global equity, while positioning for endemic COVID-19 3 Private sector: Localize COVID-19 requirements, support easy diagnosis and access, and build flexibility in op model

Source: BCG research, analysis, and experience

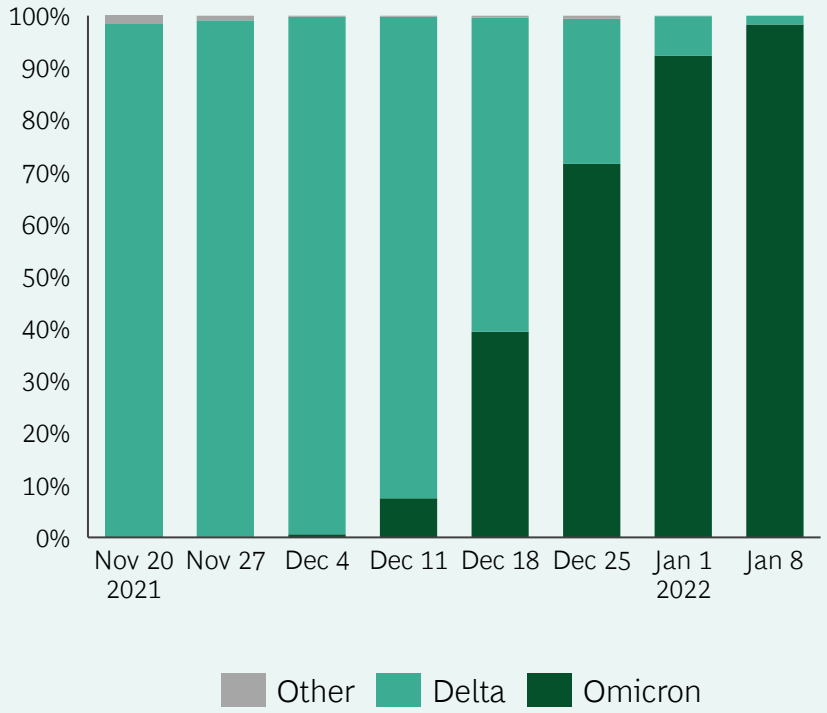
1.1 The new wave driven by Omicron has dwarfed previous case peaks, quickly displacing prior variants

As of 17 Jan 2022

Omicron's spread in Europe, North America and Asia drove an unprecedented peak of cases in the past month



It became dominant variant within a month – now 95%+ of all cases in the US[3]

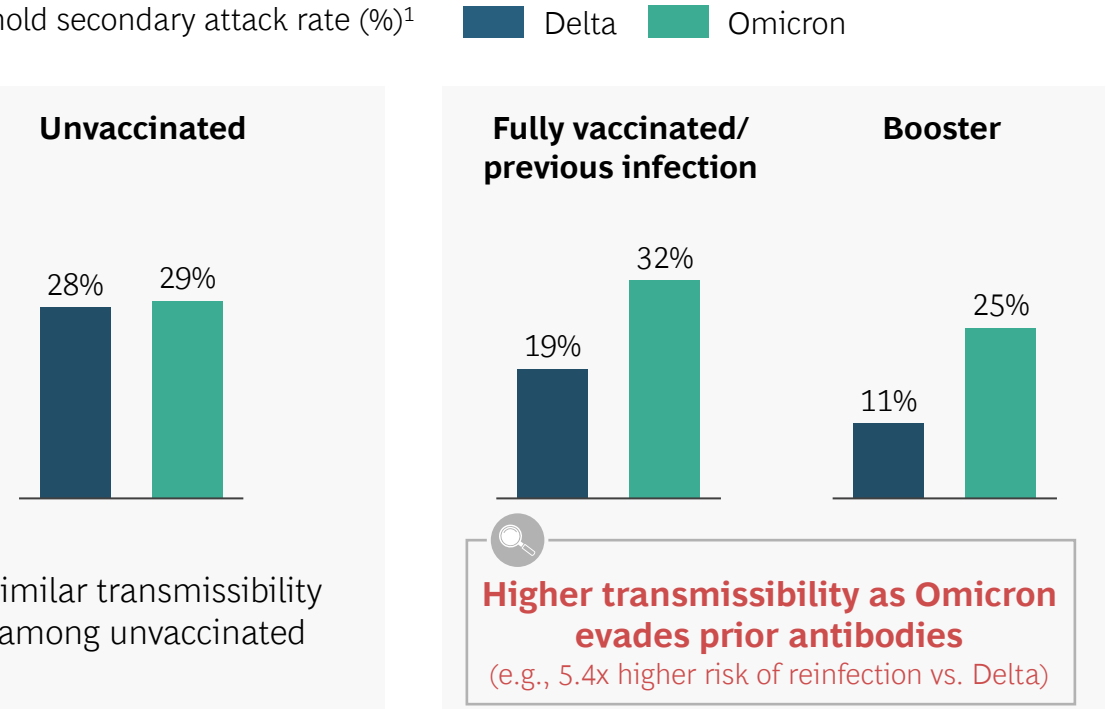


1. Includes Oceania (Australia, New Zealand, Papua New Guinea, and surrounding island nations of the Pacific Ocean). 2. Calculated monthly as average of daily cases compared with previous month's daily cases and rounded to nearest 5%; 3. Week ending 1/1, Nowcast estimates. Sources: Johns Hopkins CSSE; Our World in Data; Worldometer; CDC, press search; BCG research and analyses

1.1 What the science has told us: Omicron is more transmissible but less severe than Delta

Omicron is more transmissible than Delta due to higher immune evasiveness...

Household secondary attack rate (%)[1]



Similar transmissibility among unvaccinated

Higher transmissibility as Omicron evades prior antibodies
(e.g., 5.4x higher risk of reinfection vs. Delta)

...however, infections are less severe

↓ 40-45%
reduction in the risk of hospitalization relative to Delta at a population level[2]

↓ 74%
fewer ICU admissions relative to Delta

↓ 70% **decrease in length of hospitalization** for those infected with Omicron relative to Delta

Low severity because Omicron variant affects primarily the **upper respiratory cells – but has reduced lung cell infectivity**

Very **fast-moving variant,** which will **put pressure on health systems** (despite lower hospitalization rates) – given higher transmission rates, Omicron is likely to render containment measures less effective.

1. Proportion of those who got the virus variant after being exposed to it from someone else (primary case) who had the variant in the household. 2. When using hospitalization lasting 1 day or longer or hospitalizations with the ECDS discharge field recorded as "admitted" as the endpoint; Source: SARS-CoV-2 Omicron VOC Transmission in Danish Households study by medRxiv (founded by Cold Spring Harbor Laboratory, Yale University, and BMJ) (left side) and Imperial College London and "Clinical outcomes among patients infected with Omicron (B.1.1.529) SARS-CoV-2 variant in southern California," Joseph L., et. al (right side), FT, BCG research and analyses. Note: Data might be skewed given concentration of Omicron outbreaks among younger groups, and higher vaccination rates (protecting against hospitalization) now vs. at peak of Delta

1.2 Vaccines continue to protect – boosters are especially critical for reducing risk of infection, severe illness, and hospitalization

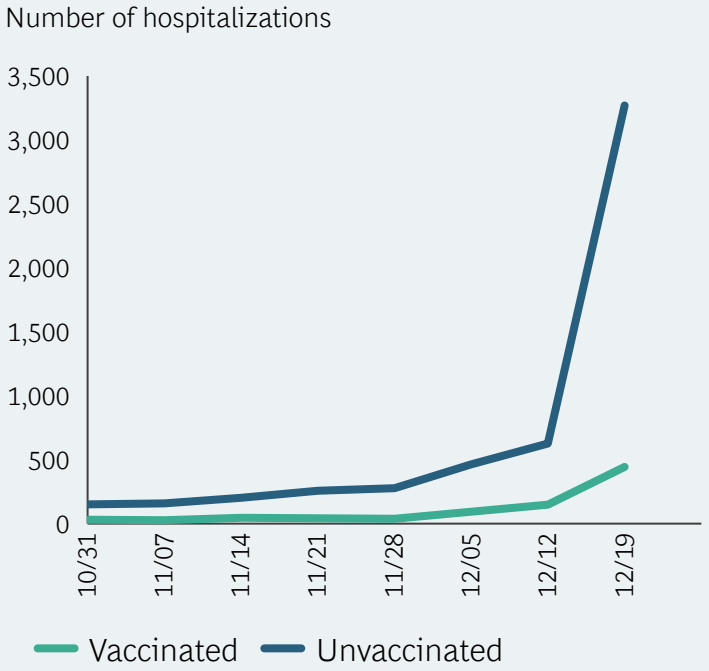
Vaccines less effective against Omicron, unless booster applied. Booster offers strong protection against hospitalization

Dose	1	2	2	Booster
Weeks after dose	*4+*	*2-24*	*25+*	*2+*
Reduced risk of symptomatic Omicron vs unvaccinated people[1]	**26%**	**18%**	**2%**	**63%**

Dose	Booster	Booster
Weeks after dose	*2-9*	*10+*
Vaccine efficacy against Omicron **hospitalization**[1,2]	**94%**	**89%**

Rise in hospitalizations driven by the unvaccinated and nonboosted

Example: New York City[3]

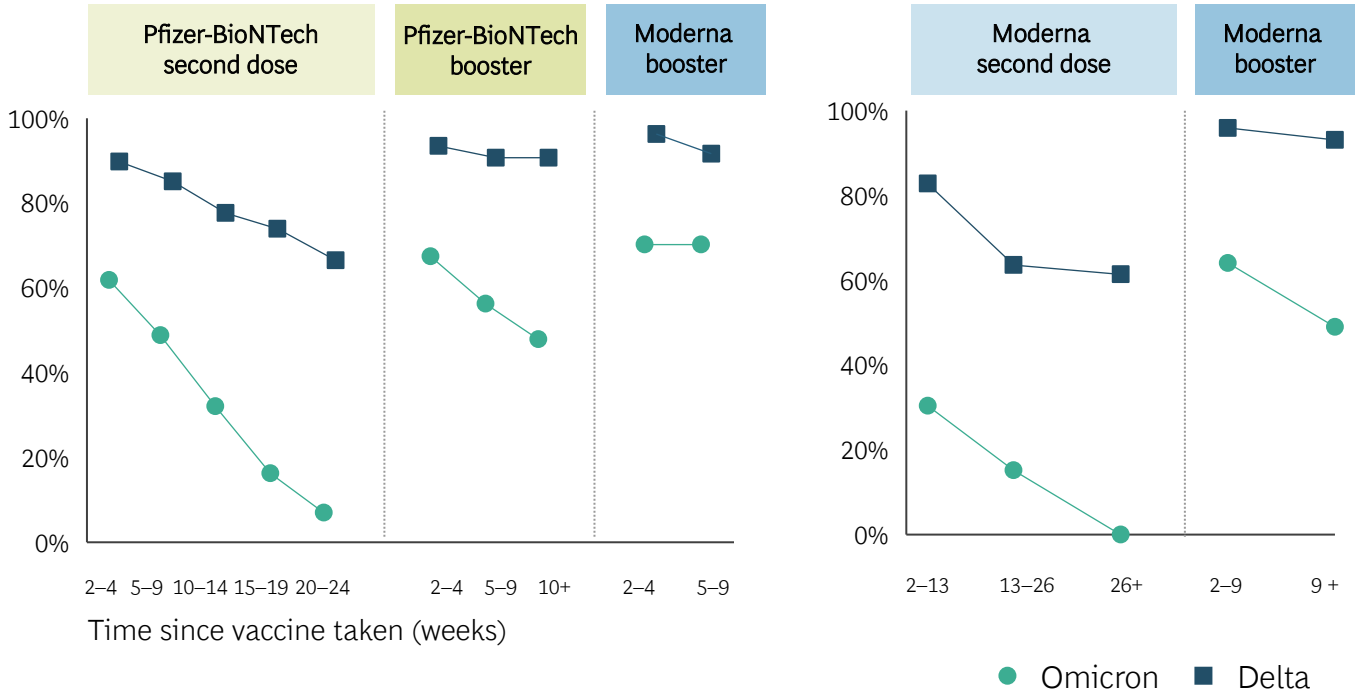


1. 95% confidence interval, all vaccine brands combined in the UK (BioNTech Pfizer, Moderna, AstraZeneca, etc.); 2. Study focused on those aged 65 years or older. The percentage of those not hospitalized, out of those infected by Omicron, falling in the category (e.g., vaccinated with one dose, boosted, etc.) Sources: Technical briefing, Update on hospitalization and vaccine effectiveness for Omicron VOC-21NOV-01 (B.1.1.529) UK health and security agency 31st Dec 2021; 3. NYC Department of Health and Mental Hygiene. Sources: Business Insider, CDC, BCG research and analyses

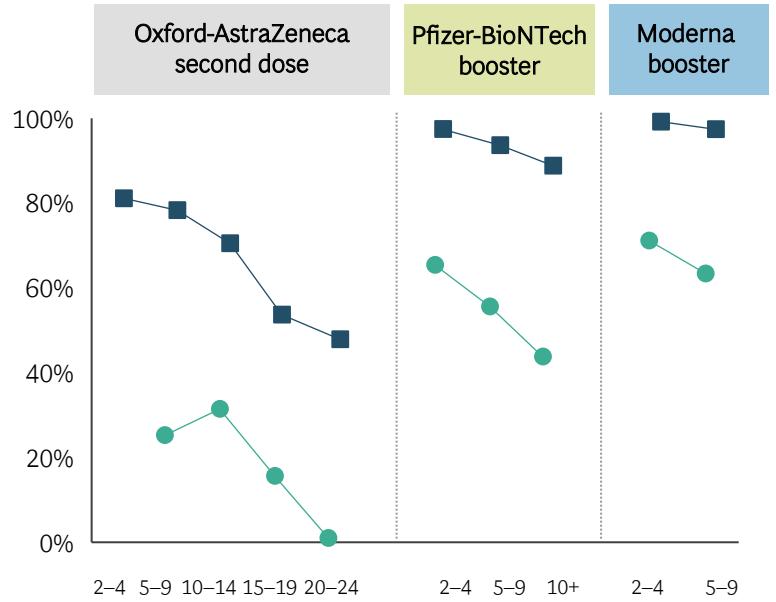
1.3 Across vaccines, two doses are <20% effective against infection with Omicron after 3 months – but mRNA boosters can recover effectiveness to ~60-70%

Pfizer or Moderna vaccines less effective against Omicron (vs Delta), but a third booster can recover effectiveness to 60-70%

Vaccine effectiveness against symptomatic disease



Oxford-AstraZeneca significantly less effective, but an mRNA booster can improve effectiveness

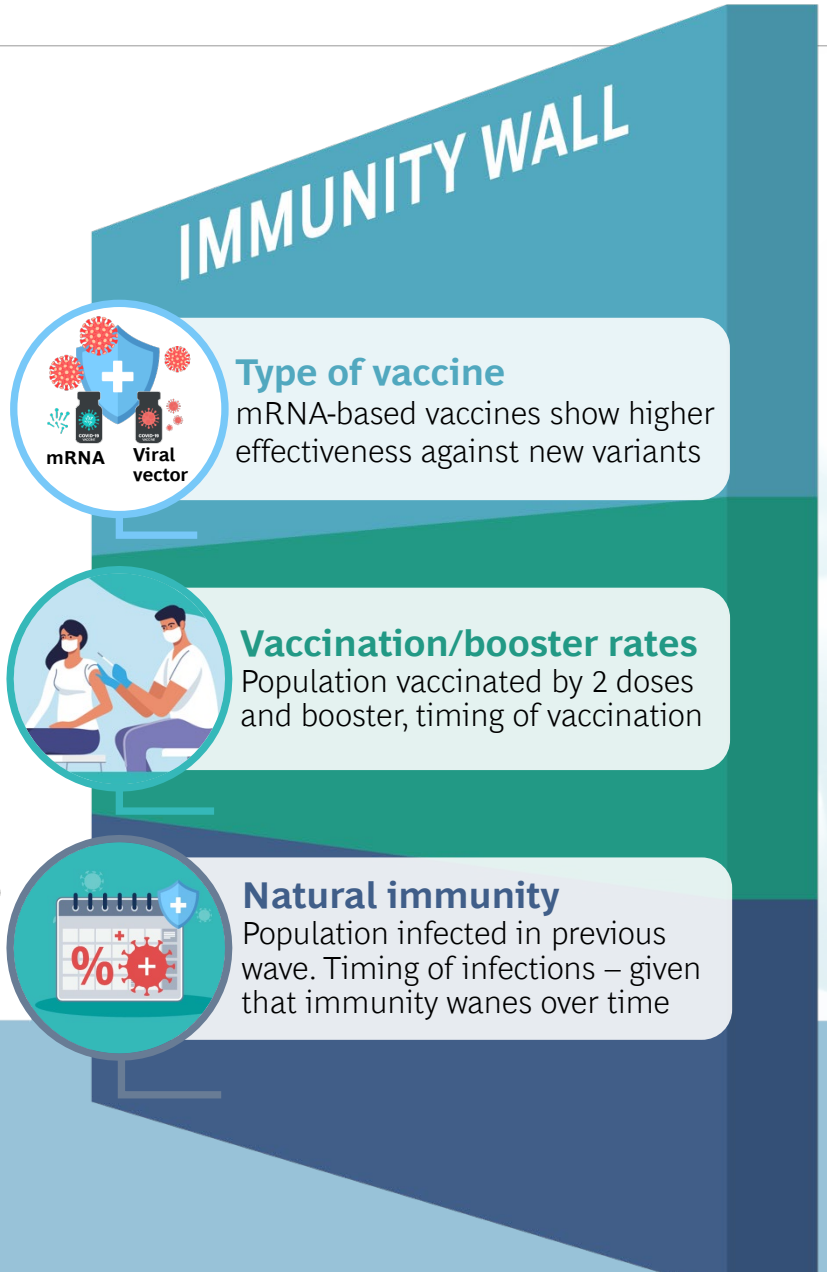


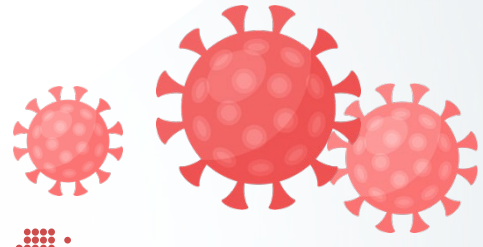
Source: UK's SARS-CoV-2 variants of concern and variants under investigation in England Technical briefing: Update on hospitalization and vaccine effectiveness for Omicron VOC-21NOV-01 (B.1.1.529); to estimate vaccine effectiveness against hospitalization the odds ratios (OR) for symptomatic disease were multiplied by the hazard ratios (HR) for hospitalization among symptomatic cases: VE hospitalization = 1-(OR symptomatic disease x HR hospitalization); BCG research and analyses

1.4 The impact of COVID-19 waves is a function of the "immunity wall" and progression of the virus

The immunity wall varies by country and region, given differences in its three main "building blocks"

It will **define the rate of infections and hospitalization**, need for new **booster** cycle, and **preventive** measures





Pace of mutation
Faster mutation likely to require more frequent boosters

Extent of changes to the virus's proteins[1]
Large shifts may render some vaccines ineffective and require speedy R&D and deployment

1. Antigenic drift
Source: BCG research and analyses

1.5 Case study: UK built a strong immunity wall through early booster rollout; the slower booster program in the US has resulted in peak hospitalizations

As of 17 Jan 2022

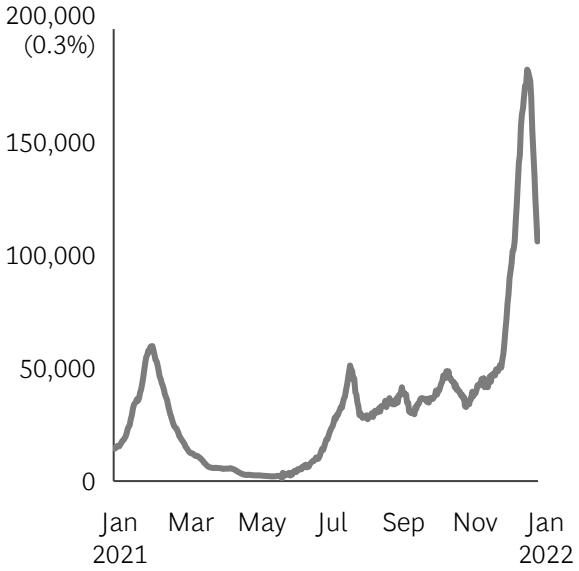
UK built a strong immunity wall, reducing hospital admissions from Omicron

78% Received 1st dose

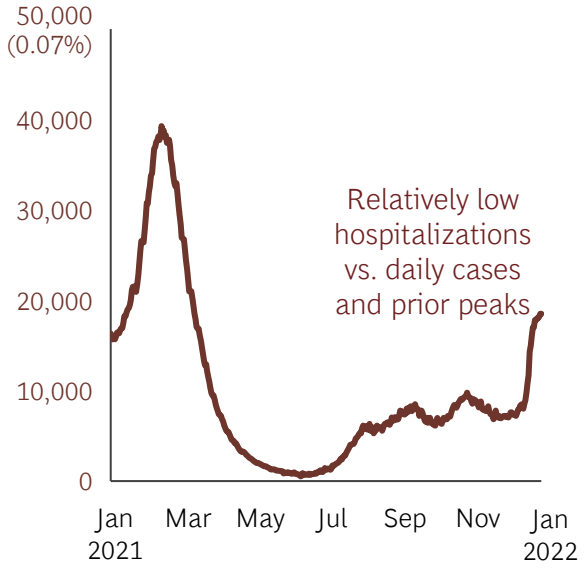
71% Received 2nd dose

54% Received booster

Daily cases[1]
(% of UK population)



People hospitalized[2]
(% of UK population)



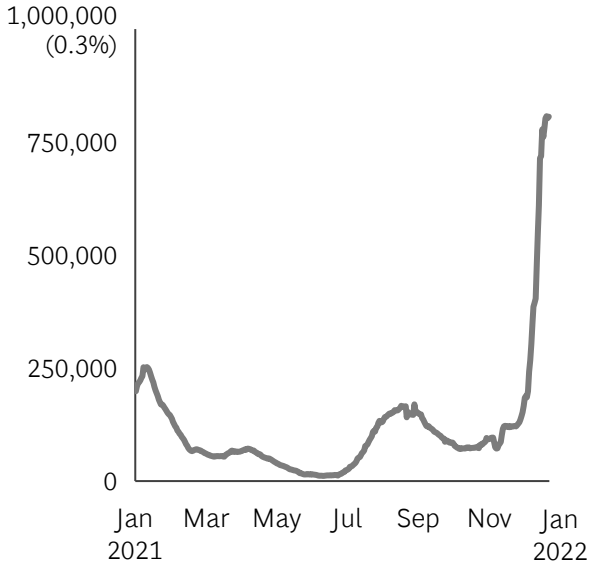
US booster program has been slower, limiting protection against severe illness

76% Received 1st dose

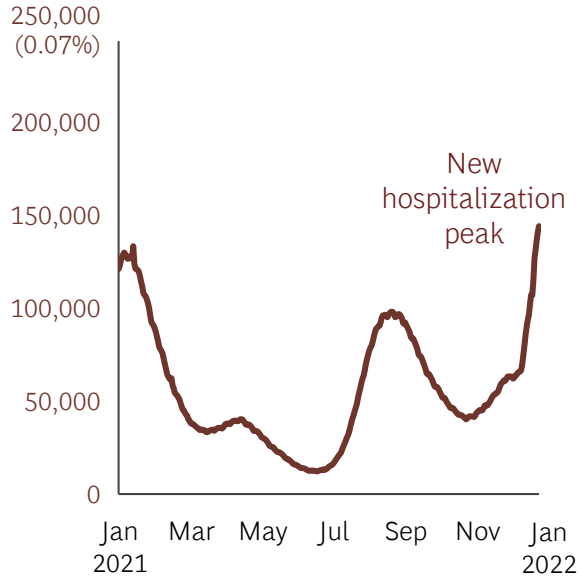
63% Received 2nd dose

24% Received booster

Daily cases[1]
(% of US population)



People hospitalized[2]
(% of US population)

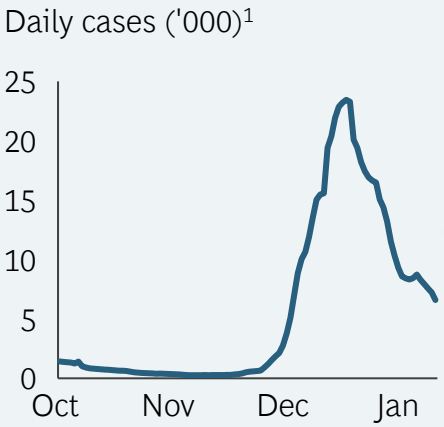


1. 7 day average, 2. Number of patients in hospital due to COVID-19;
Note: numbers for vaccinations and boosters represent % of total population (including under 18s); data published 10 Jan 2022. Source: Our World in Data for the US, data.gov.uk for the UK, BCG research hand analyses

1.6 Cases expected to peak in January in most regions – followed by sharp declines; some East Asian countries with peaks in February-March

As of 13 Jan 2022

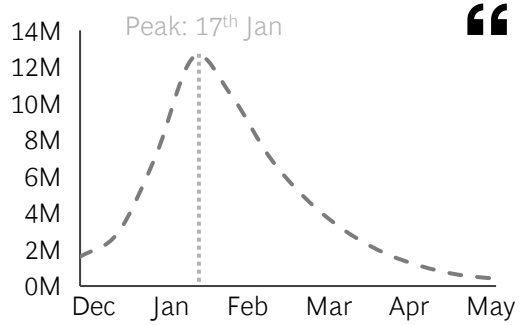
Peak cases 3 weeks after first reported infection with steep decline since then



> The daily cases [...] **will fall sharply** simply because **everybody who could be infected will be infected**
>
> - *University of Washington*

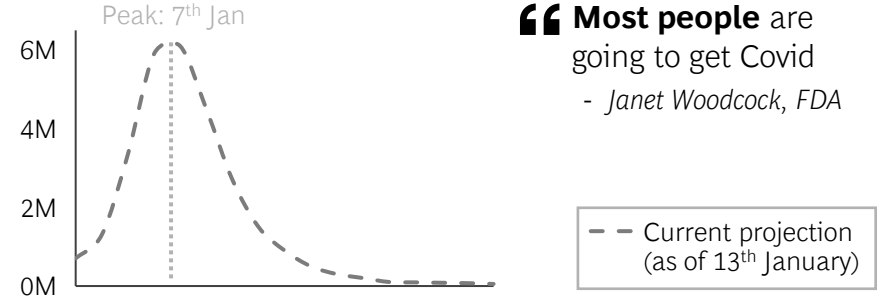
Credible models differ on their exact projections. A likely medium-term scenario is shown by IHME[2]

Peak in mid Jan – large variability between nations, with later peaks in Eastern Europe



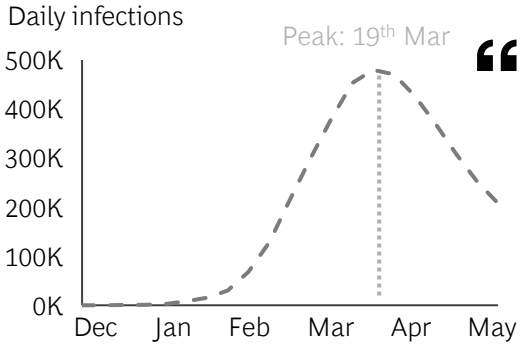
> **More than 50%** of the region will be infected in the **next 6-8 weeks**
>
> - *WHO, Health Metrics & Evaluation*

Peak nationally likely reached – but peaks in some states up to mid-Feb



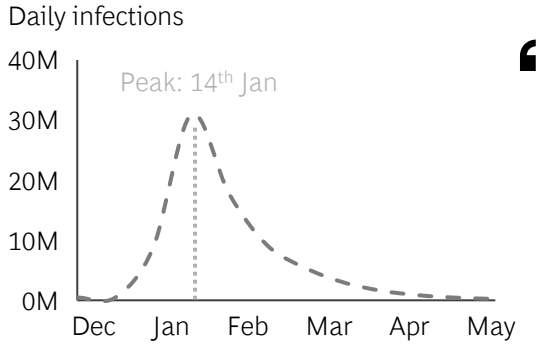
> **Most people** are going to get Covid
>
> - *Janet Woodcock, FDA*

Peak yet to occur – nation preparing via stringent containment measures



> Thanks to **the toughest border rules** in G7, we've been able to keep the spread of Omicron to a minimal level, giving us time to **prepare**
>
> - *Prime Minister Kishida*

Case peaks in major cities – but high infections to remain till Feb-March



> The decline of cases will be equally sharp. **By March, it will be almost over**
>
> - *Mahindra Agarwal, professor at IIT Kanpur*

1. 7 day average; 2. Institute for Health Metrics and Evaluation; projection as of 13th January, using the following assumptions: vaccine distribution stays at expected pace, future mask use is the mean of mask use over the last seven days, mobility increases in proportion with vaccine coverage; 80% of those vaccinated get a third dose at six months in countries where available. Sources: WHO, Our World in Data, IIT, University of Washington, Institute for Health Metrics and Evaluation, Independent, NJ, CNN, CNBC, BCG

In the news | Highly transmissible Omicron sets records and causes disruption, but lower hospitalization signals virus evolution toward endemic

Boris Johnson admits Omicron is putting NHS under pressure

Xi'an lockdown tests limits of China's zero-Covid policy

Israel starts giving fourth COVID-19 vaccine dose to the most vulnerable

South Africa says its Omicron wave has passed with no big spike in deaths

Record Covid cases in US and Europe as Omicron variant runs rampant

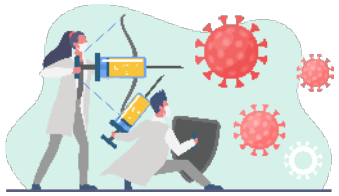
US, EU factories see easing supply strains, but Omicron threatens setbacks

Risk of hospital stay 40% lower with Omicron than Delta, UK data suggests

Omicron may provide 'bridge' to COVID 'endemic': Frydenberg[1]

1. Australia Treasurer Josh Frydenberg; Sources: press releases

2.1 Despite the emergence of new variants, we are better prepared this time



	Two years ago, we operated with limited information and resources	Today, we are more knowledgeable and better equipped
Immunity	Immune-naive global population, vulnerable to the virus	Populations across the world have some form of immunity through recovery or vaccination(s)
Vaccination	No form of preventive treatment available for infections globally	First generation of vaccines (mRNA, viral vectors) rolled out globally
Therapeutics	Limited therapeutics for infection treatment – early success from immune modulators[1]	First highly effective oral antiviral, complementing infusion therapies
Diagnostic infrastructure	Poor diagnostic infrastructure and testing capabilities, with overburdened health systems	Multiple testing equipment (e.g., rapid PCR tests) – but some supply constraints during Omicron wave
Information on virus	Limited information on virus mechanics (e.g., mutations, mode and rate of transmission)	Reliable information on transmission modes and variants (through improved sequencing)

But we continue to fall behind in ensuring global equity and access to resources for LMICs[2]

1. Dexamethasone, for example; 2; Low- and middle-income countries; Source: BCG research and analyses

2.2 Two potential scenarios for 2022 - transition toward endemicity more likely

	BULL CASE: TRANSITION TO ENDEMICITY Multispeed recovery, divergence based on different immunity walls[1]	BEAR CASE: PROLONGED PANDEMIC Prolonged pandemic as new variants continue to emerge
 Variant outlook	**Milder variants spread globally** (e.g., Omicron - less severe, high transmission), outcompeting more virulent Delta variant	**New variants evade immune response** from previous waves and vaccinations **– causing long-term health risks** in infected individuals
 Vaccines, therapeutics, & immunity	More transmissible **but milder variant add to population immunity** **Vaccines and therapeutics** remain effective **COVID-19 treated as other endemics,** e.g., with annual or biannual booster vaccine (like flu)	**Variant evades vaccines and renders therapeutics largely ineffective,** requiring new formulations **Increasing vaccine inequity globally** and likelihood of new, **more dangerous[3] variants** mutating in areas of low immunity and high immunocompromise (e.g., sub-Saharan Africa)
 Social impact	Nations with **strong booster adoption of mRNA vaccines[2] return to normal** **Nations with poor booster adoption** or ineffective vaccines against new variants **witness virus hotspots**	**Increased restrictions** used to maintain health system capacity, but limited results because of higher transmissibility **Significant economic and social drag**

Current estimate of most likely outcome (Jan 2022)

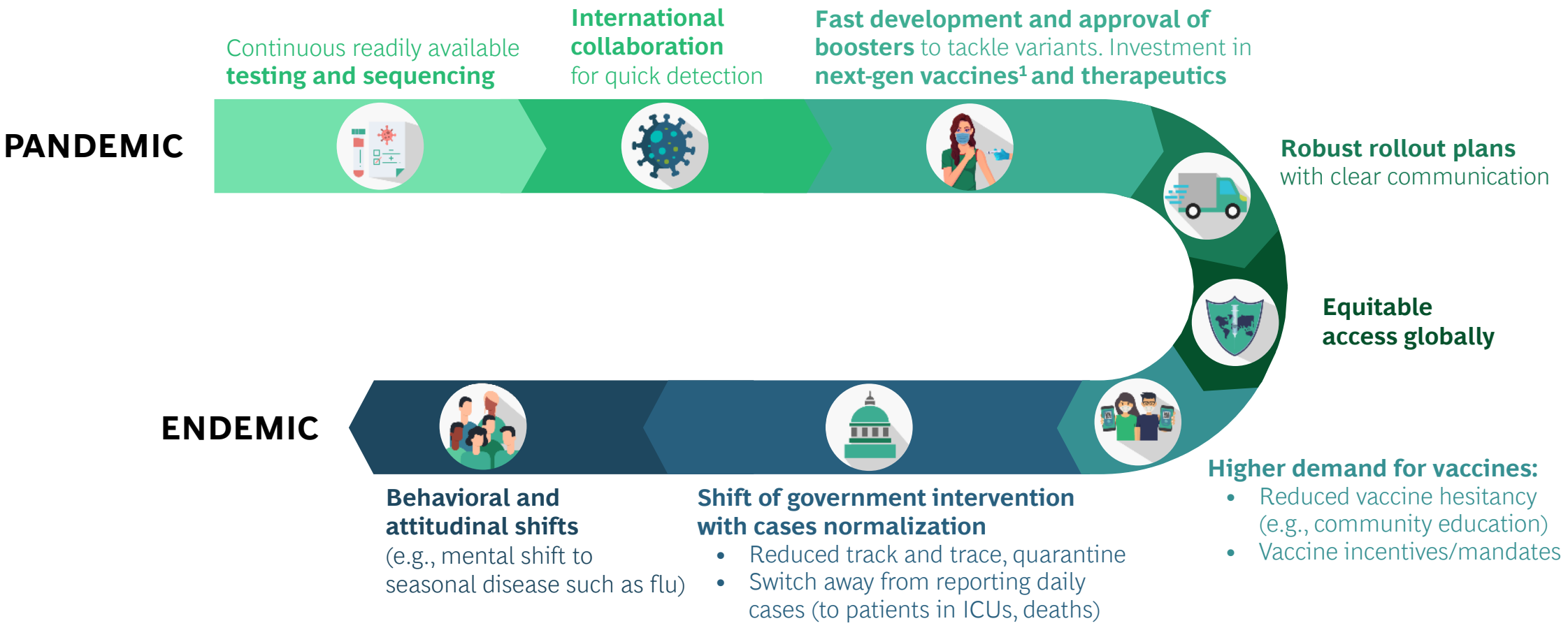
1 Built from vaccination regimen and type, boosters, and country's latest wave of infection; 2. And/or high naturally obtained immunity; 3. More transmissible, higher antibody resistance; Source: BCG research and analyses

2.3 Endemic state: COVID-19 will continue to be present, with normalized infection rates, localized flare-ups, and limited disruptions to social life

Pandemic: Full vulnerability	Pandemic: Some immunity	Endemic[5]
No immunity, no vaccines, exponential growth in infections, with spikes in cases if uncontrolled	**Some immunity** and medical advancements (therapeutics, antiviral[2]). Yet still unpredictable spikes in cases	Consistently present (seasonal) disease with **predictable normalized spread and growth rates**
Many hospitalizations and deaths; very strained health care system – strict "circuit breaker" measures (e.g., lockdowns) to control spread	**More stable hospitalizations and death rates**, especially in countries with a strong immunity wall. **Better testing, diagnosis, and ICU infrastructure**	**Fewer COVID-19-related hospitalizations** due to high immune protection (from vaccines, natural infection). No strain on health care system
Quick spread of COVID-19 globally, with continued outbreaks. Some ability to contain via strict measures (e.g., China, Australia)	Continued outbreaks in most countries – with infections **spreading fast across borders** (owing to higher-transmissibility variants)	**Few occasional localized flare-ups** limited to a particular region[4]
Varied government responses with different level of preparedness.[1] No/very limited international cooperation. Poor communication	**Archetypes** of government responses emerging[3]. **Improved collaboration**, but still significant gaps. Improving, yet often unclear, messaging	**Structured response** plan with clear communication. **Strong international collaboration** for equitable response
Large-scale social and economic disruption, with limited predictability	**Limited disruptions (mainly in winter),** with adjustments made to business activity to adapt	**Return to normality:** Manageable threats, with no disruption to social life and economy
YET, VIRUS IS ALSO EVOLVING		
Lower transmissibility, high severity (no immunity)	**Higher transmissibility,** lower severity (built immunity)	**Continued vigilance required** to variant evolution, but seasonal strains unlikely to cause strain on the population

1. For example, East Asia's preparedness as a result of it experience with SARS in 2003; 2. Pfizer's Paxlovid showed almost 90% efficacy in preventing hospitalization and death in high-risk patients (*Guardian*, 14th Dec 2021). 3. Examples: US/UK – vaccination & boosters, China/Australia – trace & contain. 4. Especially where low vaccination rates; 5. Examples: malaria, chickenpox, typhoid; Source: BCG research and analyses

3.1 Transition to endemic state is rooted in equitable booster rollout and increased demand for vaccines – supporting shifts in government intervention and behaviors



Speed of shift to endemic also depends on: immune escape due to mutating virus, waning immunity (e.g., against severe illness)

1. Pan COVID-19 vaccination applicable to all variants, intranasal vaccines, etc. Sources: *The Atlantic*, Healthline, *Wall Street Journal*, *Nature*, BCG research and analyses

3.2 Public sector: Prepare for emerging new variants and support global equity while positioning for endemic

Deal with emerging new variants

Facilitate speed at scale

1 IMPROVE INFRASTRUCTURE
Support **capacity** unlock & **delivery** infrastructure at scale. Invest in **sequencing** for variant identification.

2 ACCELERATE APPROVALS
Establish accelerated **regulatory** approvals for upcoming modified vaccines and boosters

3 USE TARGETED MITIGATION
Keep mitigation measures on (e.g., masks, distancing) to allow ramp-up, especially for the **unvaccinated**

Position for endemic

Enable medical developments

4 ENABLE ANTIVIRALS
Work to make treatments more economical[1]. Invest in diagnostics to ensure **vulnerable population** gets antivirals on time[2]

5 SUPPORT AND PIONEER R&D
Fund ongoing R&D efforts (high ROI). Invest in **pan-COVID-19 vaccine research** (across variants)

Increase adoption

6 PROVIDE UPDATED EDUCATION
Provide ongoing communication of booster's importance, keep statistics in perspective but **go beyond them** (e.g., personal stories)

7 MANDATE VACCINES AS POSSIBLE
Explore societal sentiment, work with companies, venues, etc., to devise realistic mandate plans. **Clearly define mandates** (e.g., 2 doses, boosters)

Normalize response

8 BUILD PROACTIVE RAPID RESPONSE PLAN
Leverage predictive analytics based on global data to project scenarios and prepare response plan for each one. Set and follow thresholds for intervention

9 COMMUNICATE CLEARLY AND IN TIME
Provide clarity around and stick to roadmap, including targets, thresholds, and response plan. Explain rationale. Address (social media) disinformation[3]

.

Support equitable access globally and minimize resurgence of new variants

Collaborate across borders

10 DONATE VACCINES
Support **COVAX**, collaborate with other nations to drive global donation to low- to middle-income countries

11 SUPPORT DISTRIBUTION
Build/improve **infrastructure** for delivery and administering of tests, vaccines, and therapeutics. Work on broader legal and regulatory issues.

12 SHARE AND COLLABORATE
Continue global sharing of **info and resources**. Create formal frameworks for collaboration. Build out monitoring of variants for rapid identification

1. Currently antivirals in the US around $700 vs. $30 for vaccine; 2. 3- to 5-day window to prevent health risks e.g., lung scarring; 3. Unless new thresholds reached; Source: BCG research and analyses

3.3 Private sector: Localize COVID-19 requirements, support easy diagnosis and access, and build flexibility in your operating model

As countries diverge on their path to endemic, companies should:

Deploy clear localized requirements

Depending on jurisdiction:

- **Clearly define mandate for vaccines,** and what "vaccinated" means (2 doses, booster timing requirements, etc.)
- **Educate and incentivize** vaccination: share scientific evidence, restrict travel and events without vaccine, etc.
- **Require testing** to come to the office, join corporate events and workshops, etc.

Follow government recommendations on **social distancing, face coverings,** etc.

Clearly communicate any company policies in addition to those by the government

Support easy diagnosis and access

Provide onsite testing kits, vaccinations, and antiviral drugs (when available) at no/sponsored cost

Support access to boosters and antiviral drugs (when available), especially in geographic areas where there are shortages and additional costs for employees

Scale own virus monitoring and reporting systems (e.g., employees self-flagging interactions, room-booking flags)

Build flexibility in working model

Co-create hybrid working models with employees. **Offer flexibility**, especially to those more vulnerable to the virus

Communicate direction and rationale early on

Launch channel for voicing (anonymous) **feedback and concerns**

Ensure readiness: Factor in work location preferences and increased sick leave in **work allocation and capacity planning**

Source: BCG research and analyses

BCG Executive Perspectives

AGENDA

Our Dec 2021 Executives Perspectives edition focused on early insights into the Omicron variant

COVID-19 | UPDATES AND FUTURE SCENARIOS

- Latest developments on Omicron
- Scenarios for 2022 and potential move to endemic COVID-19
- Implications for public and private sector leaders

UPDATED ANALYSES AND IMPACT

- COVID-19 economic and business impact

Summary dashboard

As of 17 Jan 2022

To be updated in forthcoming editions

Epidemic Progression

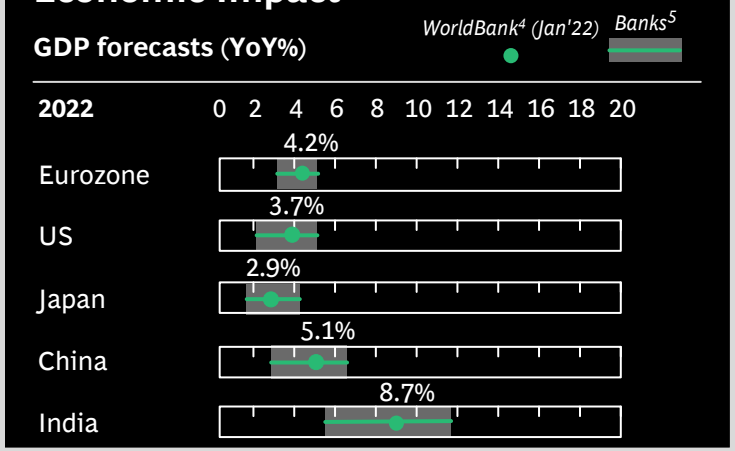
Global epidemic snapshot

329M	56M	5.6M	9.7B
# of cases	# of active cases[1]	# of fatalities	Vaccine doses administered

Month-on-month growth of new cases[2]	Sep	Oct	Nov	Dec
Americas	0.9x	0.6x	1.0x	2.2x
Europe	1.0x	1.4x	1.7x	1.5x
Asia[3]	0.7x	0.6x	0.8x	0.9x

Economic Impact

GDP forecasts (YoY%)



Consumer Activity

Mobility

		Sep	Oct	Nov	Dec
Mobility[6] *(month vs. Jan '20)*	US	-12%	-11%	-12%	-13%
	Europe	-2%	-5%	-7%	-10%
	Japan	-14%	-8%	-6%	-5%
Domestic air travel tickets booking[7,8] (YoY)	US	72%	81%	90%	
	UK	116%	133%	76%	
	China	-9%	-9%	-35%	

Sales

Retail goods sales[9] (excl. auto & fuel, YoY)	US	13%	15%		
	Europe[10]	3%	2%	7%	
	China[11]	7%	6%	7%	
Passenger vehicle sales[12](YoY)	US	-25%	-22%	-15%	
	Germany	-26%	-35%	-32%	
	China	-17%	-6%	-6%	

Business Impact

Stock market performance

02 Jan '20 vs Month end	Sep	Oct	Nov	Dec
S&P500	32%	41%	40%	46%
FTSE100	-7%	-5%	-7%	-3%
CHN SSE	16%	15%	16%	18%
Volatility Index (S&P500)[13]	1.9x	1.3x	2.2x	1.4x

International trade

Trade value[14] (YoY)	US	18%	18%	23%	
	France	12%	9%		
	China	23%	24%	26%	

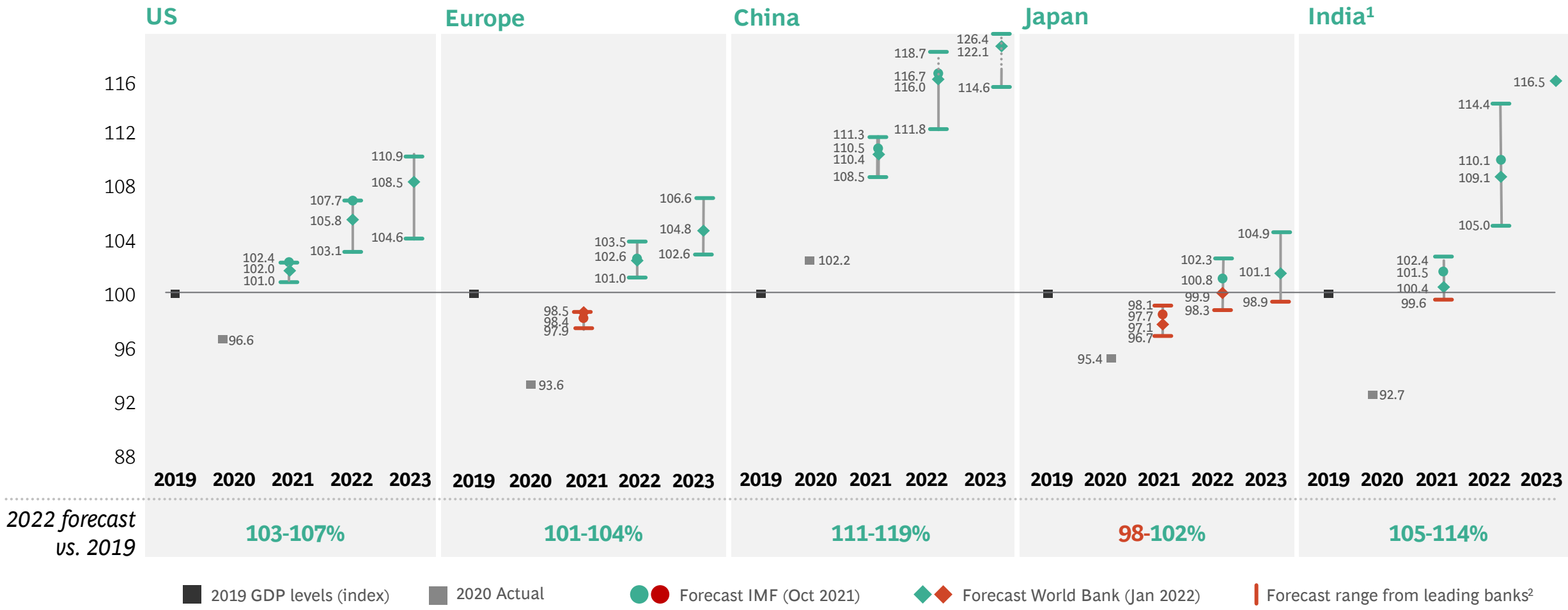
Industrial production

Purchasing manager's index[15] (base = 50)	US	61	58	58	58
	Germany	58	58	57	57
	China	50	49	50	50
Steel production (YoY)[16]		-9%	-11%	-10%	

1. Total cases less deaths and recovery; 2. Calculated as monthly average of daily cases vs. previous month; 3. Includes Middle East and Oceania; 4. World Bank Jan 2022 forecast; 5. For India, forecast is for financial year; for others, it is for calendar year; YoY forecasts; range from forecasts (where available) of World Bank, International Monetary Fund, JP Morgan Chase; Morgan Stanley; Bank of America; Fitch Solutions; Credit Suisse; Danske Bank; ING Group; HSBC; as of reports dated Sep and Oct 2021; 6. Mobility values are calculated as the average of mean monthly mobilities in workplace, public transit, retail and recreation, and grocery and pharmacy and compared with a baseline from 03 Jan – 06 Feb 2020; Europe mobility values are calculated as the average of Germany, France, UK, Spain, and Italy; 7. Calculated as change in last 14 days rolling average value as compared with same period last year; 8. Domestic tickets by ticketing; 9. Retail goods sales include online and offline sales and comprise food and beverages, apparel, cosmetics and personal care, home appliances, general merchandise, building material; do not include auto, fuel, and food services; 10. Europe includes 27 countries currently in EU; 11. For China, total retail sales displayed (including automobiles and petroleum and related products) and compares 2021 to 2019. 12. Figures represent passenger vehicle (including sedan, hatchback, SUV, MPV, van and pickup) sales data for over same month in previous year; Europe value calculated as cumulative sales in Germany, France, UK, Spain, and Italy; 13. Underlying data is from Chicago Board Options Exchange Volatility Index (VIX); Volatility Index is a real-time market index that represents the market's expectation of 30-day forward-looking volatility and provides a measure of market risk and investors' sentiments; 14. Calculated as sum of imports and exports, measured in USD and compared with previous year period; EU trade values between EU and all outside countries 15. PMI (Purchasing Manager's Index) is a diffusion index that summarizes whether market conditions, as viewed by purchasing managers, are expanding (>50), staying the same (50), or contracting (<50); 16. Data corresponds to G-20 countries (minus Indonesia). Sources: JHU CSSE, Our World in Data, WHO, World Bank, IMF, Bloomberg, Google Mobility, US Census Bureau, Eurostat, PRC National Bureau of Statistics, ACEA actuals, Marklines, ARC ticketing data, STR, Statista, CBOE, OECD, BEA, GACC (customs) China, ONS, BCG.

Many large economies expected to continue recovery and surpass 2019 GDP levels in 2022

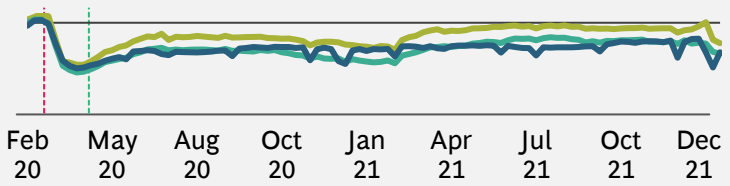
GDP forecast levels indexed to 2019 value (base: 100)



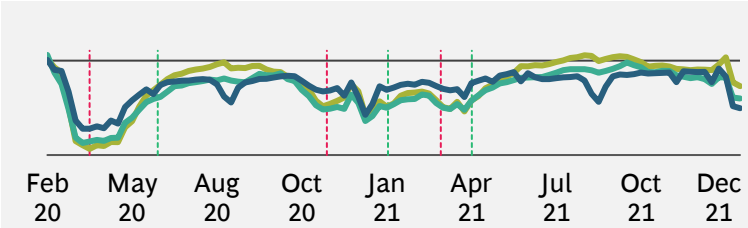
1. For India, forecast is for financial year; for other countries, the forecast is for calendar year; unavailable data for 2023 from most resources apart from World Bank; 2. Range from forecasts (where available) of JPMorgan Chase; Morgan Stanley; Bank of America; Fitch Solutions; Credit Suisse; Danske Bank; ING Group; HSBC. Note: IMF issues report on 20th January 2022, hence not included in the above; YoY forecasted 2020 values are estimated actual GDP. Sources: Bloomberg; World Bank; IMF; BCG

Mobility | Mobility declined in December 2021 – driven by Omicron wave and new restrictions; variations will continue based on mitigation measures

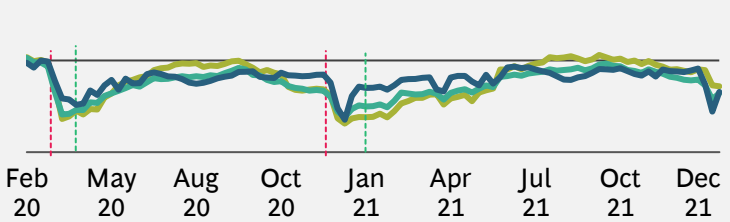
US



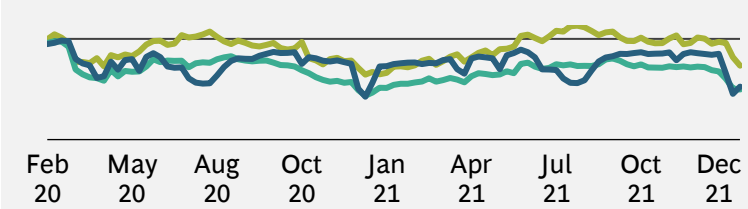
Italy



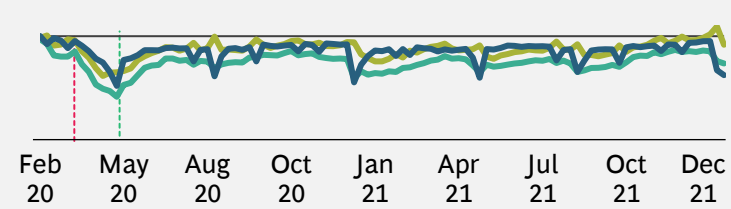
Germany



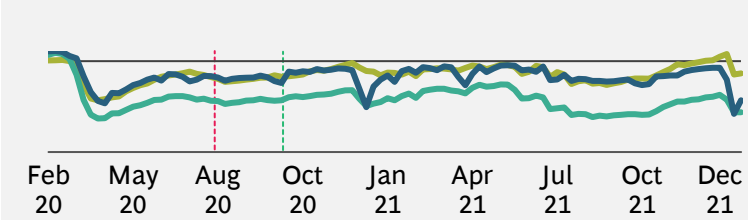
Sweden



Japan



Australia



- Workplace mobility[1]
- Public transit mobility[2]
- Retail and recreation mobility[3]
- Lockdown easing[4]
- Lockdown started[4]

Impact

Mobility impact will continue to vary by region based on COVID-19 mitigation measures and restrictions

Retail and recreation mobility had rebounded across most locations prior to the Omicron wave in December. Likely continued temporary disruptions in some regions, but positive trend expected to return

Workplace and public transit mobility will be impacted based on local outbreaks. Potential for structural impact from COVID-19 to persist as hybrid-work and working-from-home models persist

1. Tracked as changes in visits to workplaces. 2. Tracked as changes in visits to public transport hubs, such as underground, bus and train stations. 3. Tracked as changes for restaurants, cafés, shopping centers, theme parks, museums, libraries, and cinemas. 4. Refers to average lockdown start and easing dates for larger lockdowns. Note: Data taken as weekly average compared with baseline (average of all daily values of respective weeks during Feb 15 2020–Feb 28 2021). Sources: Google LLC "Google COVID-19 Community Mobility Reports." https://www.google.com/covid19/mobility/; press search; BCG.

Retail | Rebound across most countries and categories expected to continue, but inflationary pressures likely to slow retail spending in 2022

Retail store sales breakdown by category, % change vs. same month in 2019

Food and beverage stores

	Apr '21	May '21	Jun '21	Jul '21	Aug'21	Sep'21	Oct '21	Nov'21
US	15%	16%	16%	14%	17%	18%	19%	
UK	10%	4%	8%	3%	2%	2%	2%	3%
Spain	0%	-3%	-1%	0%	-3%	-1%	1%	1%
Sweden	0%	5%	6%	3%	4%	5%	4%	5%
France	8%	8%	5%	7%	7%	9%	8%	8%
China[1]	20%	18%	23%	15%	11%	15%	15%	21%
Japan	-2%	0%	1%	2%	-1%	2%	5%	

Personal care and cosmetics stores

	Apr '21	May '21	Jun '21	Jul '21	Aug'21	Sep'21	Oct '21	Nov'21
US	14%	15%	14%	14%	15%	14%	11%	
UK[2]	-6%	-7%	-7%	-19%	-16%	-10%	-4%	-9%
Spain	1%	-1%	2%	1%	1%	0%	1%	6%
Sweden	4%	10%	13%	10%	11%	12%	9%	10%
France	7%	10%	15%	24%	15%	20%	17%	
China[1]	30%	36%	43%	18%	27%	24%	32%	73%
Japan	42%	38%	46%	42%	43%	32%	47%	

Apparel stores[3]

	Apr '21	May '21	Jun '21	Jul '21	Aug'21	Sep'21	Oct '21	Nov'21
US	10%	13%	18%	14%	15%	17%	18%	
UK	-5%	-2%	-6%	-11%	-8%	-7%	-1%	3%
Spain	-23%	-21%	-14%	-19%	-17%	-11%	-5%	-5%
Sweden	-27%	-15%	-11%	-14%	-11%	-17%	-9%	-4%
France	-63%	-17%	-3%	-8%	-7%	-5%	-2%	
China[1]	3%	8%	8%	1%	-5%	0%	6%	4%
Japan	-30%	-29%	-23%	-22%	-33%	-28%	-12%	

Home appliance stores[4]

	Apr '21	May '21	Jun '21	Jul '21	Aug'21	Sep'21	Oct '21	Nov'21
US	13%	8%	14%	11%	7%	7%	13%	
UK	30%	30%	19%	12%	13%	-2%	12%	2%
Spain	7%	17%	10%	8%	9%	10%	8%	10%
Sweden	18%	27%	22%	18%	16%	16%	15%	15%
France	4%	11%	22%	10%	11%	12%	13%	
China[1]	-7%	3%	15%	4%	-1%	1%	8%	9%
Japan	5%	11%	1%	11%	-15%	-36%	43%	18%

≤ -30% | -29% to -15% | -14% to 0% | > 0%

To be updated in forthcoming editions

1. For China, Jan and Feb 2021 are reported together due to national holidays; food and beverages category includes only food and grains; 2. UK data set switched over from Eurostat to Office for National Statistics following Brexit. 3. Includes clothing accessories, shoes, etc. 4. Includes audio video and home appliances stores. Note: For US, share in retail store sales in Q4 2019: F&B ~25%, personal care and cosmetics ~12%, apparel ~6%, home appliances ~3%, general merchandising ~25%, and building material and gardening equipment ~13%. Sector classification and mix may be different across countries. Sources: US Census Bureau; PRC National Bureau of Statistics; Eurostat; Office for National Statistics United Kingdom; Ministry of Economy Japan.

Impact

Across categories and countries, retail store sales have **continued to rebound compared with the earlier months of the pandemic**

Across majority of categories, **store sales returned or even surpassing** pre-pandemic sales

Apparel store sales are lower compared with 2019 levels everywhere apart from the US and China. But there are signs of recovery (e.g.,, UK)

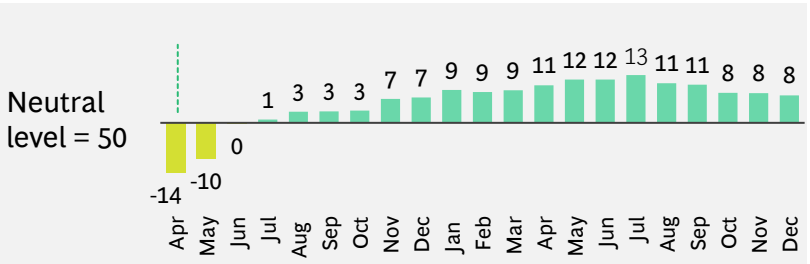
In 2022, retail sales are expected to **continue their rebound;** however, increasing **inflationary pressure might** hinder expected growth

The pandemic accelerated shift to e-commerce – consumer behavior we expect to stick in 2022 and onward

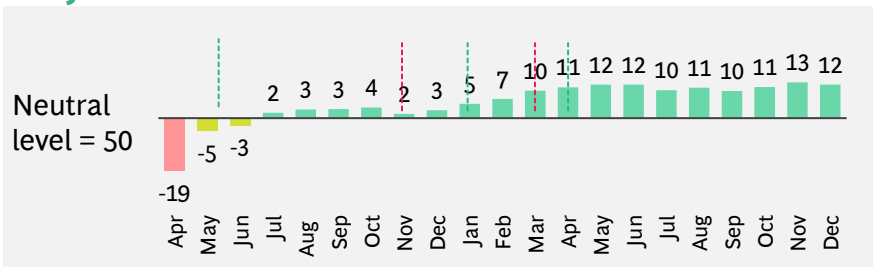
Manufacturing | Positive momentum with signs of slowdown in Q4 2021; supply disruptions might restrict output in certain industries in 2022

Manufacturing PMI

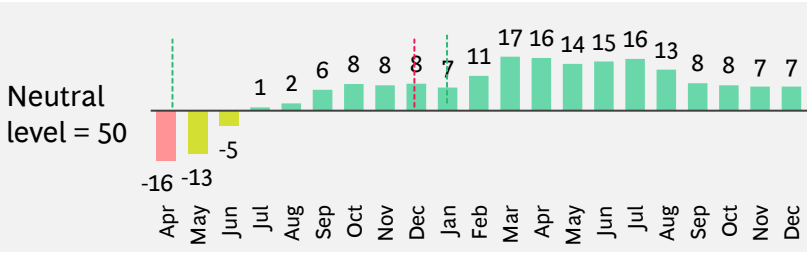
US



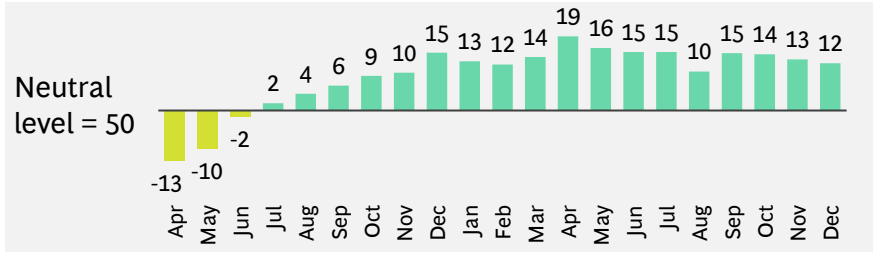
Italy



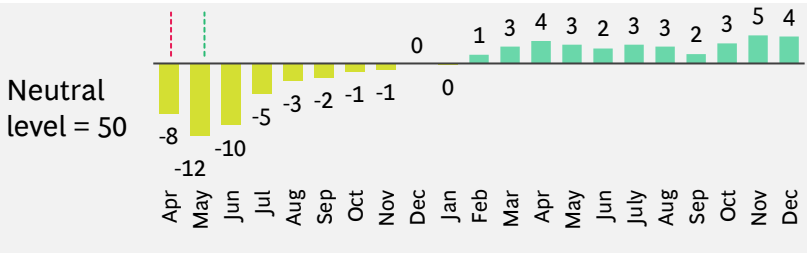
Germany



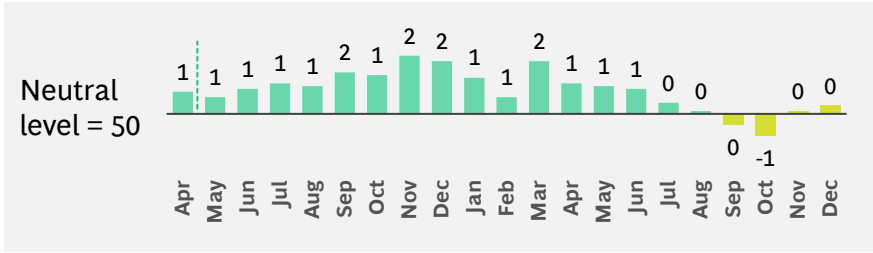
Sweden



Japan



China[1]



≤ -30 | -29 to -15 | -14 to 0 | > 0 | Lockdown started | Lockdown easing

Impact

Manufacturing rebounded strongly in 2021 (especially in the US and Europe) and this trend expected to continue

As restrictions ease after Omicron wave, consumer demand will continue to rise (yet more moderately given inflationary pressures), which will increase **pressure on manufacturing**

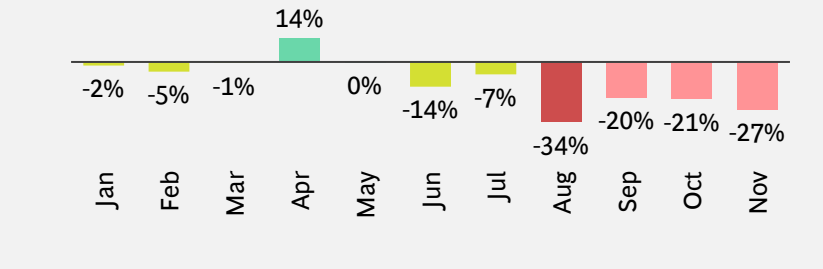
But **supply chain bottlenecks**, labor shortages, and short-term workforce impact from new COVID-19 waves[2] could restrict total output in 2022, and thus need to be closely managed

1. Lockdown dates are pertaining only to Hubei province. 2. Requirements to self-isolate if test positive for COVID or if pinged as someone who has been in contact with COVID-infected individual. Note: PMI (Purchasing Manager's Index) is a diffusion index that summarizes whether market conditions, as viewed by purchasing managers, are expanding, staying the same, or contracting. 50 is neutral, >50 is considered to be positive sentiment, and <50 is considered to be negative sentiment. Sources: Markit South Korea Manufacturing PMI SA; Jibun Bank Japan Manufacturing PMI SA; China Manufacturing PMI SA; Swedbank Sweden PMI SA; Markit/BME Germany Manufacturing PMI SA; Markit Italy Manufacturing PMI SA; Markit US Manufacturing PMI SA; EIKON.

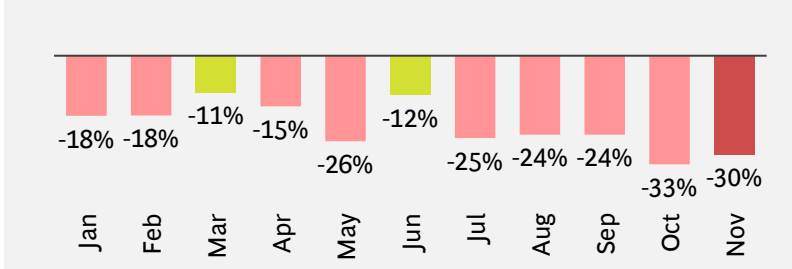
Passenger vehicle sales | Supply chain bottlenecks will continue to limit performance in 2022, with likely 2023 spillover

2021 monthly passenger vehicle[1] sales, % change vs. same month in 2019

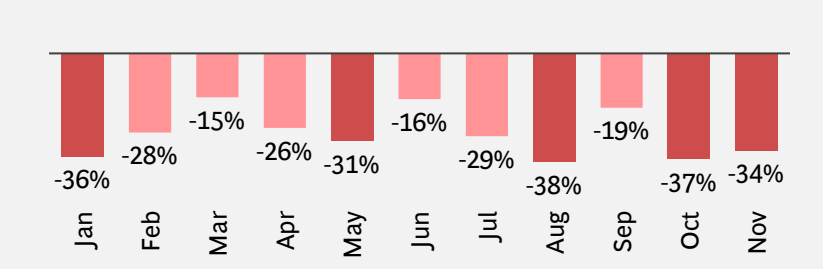
US



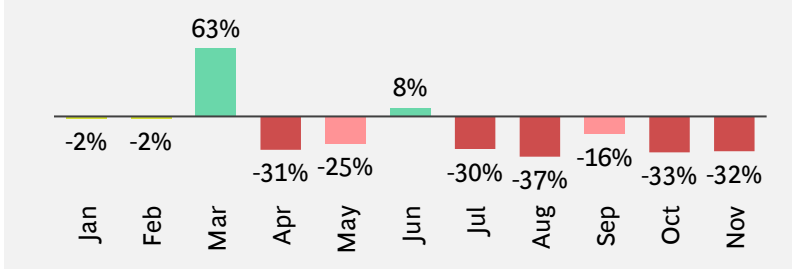
Italy



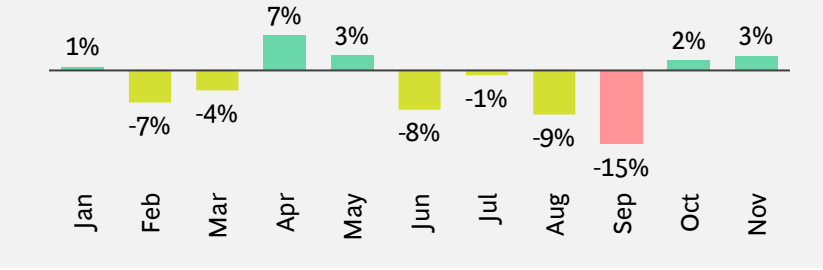
Germany



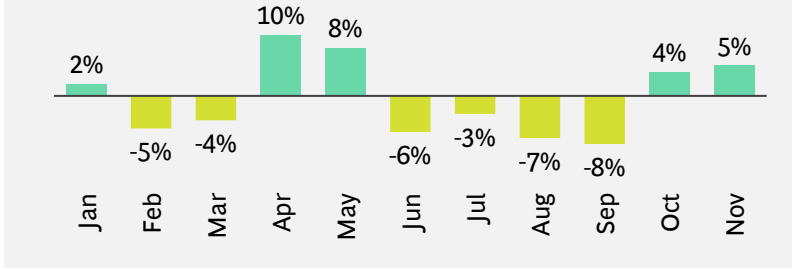
Sweden



Japan



China[2]



≤ -30% | -29% to -15% | -14% to 0% | > 0%

1. Passenger vehicle sales include data on, where available, hatchback, MPV, pickup, sedan, SUV, mini trucks, light trucks, and vans. 2. Stimulus policies: Launched subsidies for car purchases in 10 cities, lessened purchase restriction in high-tier cities, and extended NEV subsidies; Sources: Marklines; BCG.

Impact

Supply constraints expected to continue in 2022, with some easing over time

Main bottlenecks in **semiconductors**: demand likely to continue to outstrip supply by **~10% in 2022**

Sales volumes expected to improve but will remain lower than expected demand in 2022 and 2023

We will continue to see greater **penetration of electric and zero-emission vehicles** as cost parity achieved (further propped up by increase in oil and gas prices)

Critical to focus on **resolving supply shortages** by building supply chain resilience, capabilities to absorb disruptions and recover quickly (e.g., dual sourcing, flexible contracts)

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