# What is the near-term outlook for COVID-19?

| Stan Miranda, Rob Skelton |

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**Experts at the World Health Organisation believe that the ultimate endgame for COVID-19 is that the virus will likely become endemic. Endemic is a broad term but it means that despite vaccinations, COVID-19 is going to be in circulation, at least in some regions, for the foreseeable future. The long term implications of this could range from continued small regional outbreaks to global seasonal vaccination campaigns and the possibility of children being vaccinated as part of the routine childhood immunisation schedule. The exact path depends on the extent of future mutations in the virus, the degree to which the world becomes successfully vaccinated and the duration of immunity derived from infection or vaccination. The current vaccine campaign and therapeutics being utilised and developed at present will likely do most of the heavy lifting and reduce the main threat posed by COVID-19. This should mean that draconian lockdowns become a distant memory, but the virus' footprint will leave a lasting impression on the world. Importantly, this will not prevent the western world from returning to a state that is close to normality. It will mean that travel and border security will be more restrictive in the coming years though.**

Vaccination of those most vulnerable should facilitate a controlled reopening of developed economies and a return close to normality in Q2 2021. Our base case outlook is for the US to have vaccinated c.70% of the population by mid-June, with the UK achieving this level about a month earlier and Europe about two months later. Assuming the vulnerable get priority access to vaccines, deaths associated with the virus will drop to near-zero by April. This will allow a phased removal of restrictions starting in early March, with something resembling normal activity levels achieved by the end of the second quarter. Experts believe this will lead to a consumption driven growth spurt in Q2 and Q3. Risks to this scenario could arise from more resistant variants or logistical issues in vaccine rollout. However, at this point in time, vaccine producers believe that a combination of existing vaccines and boosters currently in development will reduce the prevalence of COVID-19 and its variants to a few regional outbreaks with low levels of resulting mortality.

## a. Vaccination Roll-out

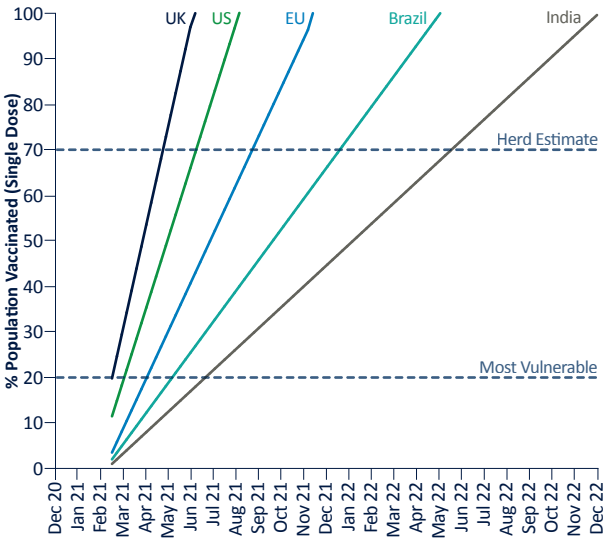
**Vaccination of those most vulnerable should facilitate a controlled reopening of developed economies and a return close to normality in Q2 2021.** Most western government targets suggest that vaccinations of over 70s and those most vulnerable should be completed by 31 March 2021 (at least at a single dose regimen). For most developing countries this will take quite a bit longer, but current projections for Brazil and India are relatively optimistic, suggesting they will have vaccinated those most vulnerable between May and June 2021 as shown in Figure 1.

Figure 1 takes the current expected rate of vaccination in five countries or regions and estimates the date by which the most vulnerable 20% should be vaccinated[1]. The UK reached this milestone in mid-February with the US expected to reach the same level by mid March as of the time of writing.

By prioritising the vaccination of the 20% of the population that are most vulnerable, experts estimate that this should have the effect of reducing deaths as a result of COVID-19 by approximately 90% and hospitalisations as a result of COVID-19 by over 70% as illustrated in Figure 2.

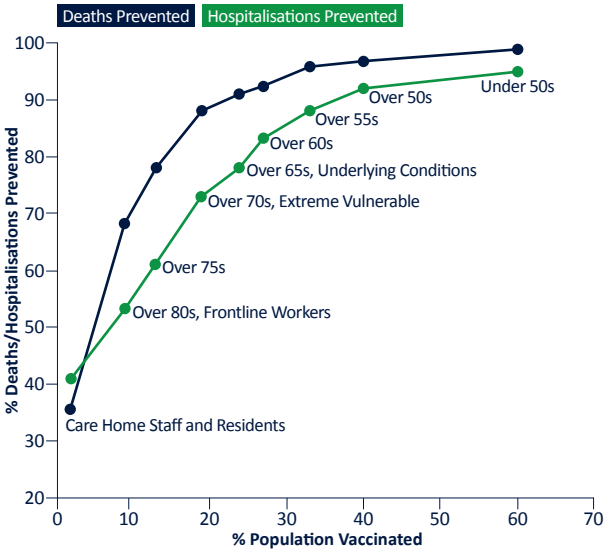
[1] Vaccination pace (% of population/day); UK 0.7%, US 0.5%, EU (est. 0.35%), Brazil 0.2%, India 0.15%

**Figure 1: Projected rate of vaccination by region/country**




Source: Bloomberg

**Figure 2: Vaccination of those most vulnerable should mitigate the worst effects of COVID-19**




Source: COVID Actuaries Response Group

With vaccination of those most vulnerable significantly reducing the risk of hospitalisation and mortality, it is expected that a phased lifting of restrictions can begin once community transmission rates are at an acceptable level. While explicit guidance on case rates has not been provided, Germany has suggested that a significant easing of restrictions would be possible when the seven-day case rate per 100k is below 50. Based on current case rates and projections using R-0 estimates, a weekly case rate below 50 should be observable for most of Europe by late March as illustrated in Figure 2. The US will take slightly longer to reach this level of transmission but, given that most states have already begun to ease restrictions, this criterion appears be less relevant for the US. Easing will begin with the reopening of schools (where currently

[2] Taken from government websites and Covidactnow.org

**Figure 3: Restrictions are already beginning to be lifted across Europe and the US**

| | Germany | Italy | Spain | UK | New York | California |
|---|---|---|---|---|---|---|
| R-0 Estimate[2] | 0.9 | 0.9 | 0.8 | 0.8 | 0.85 | 0.8 |
| Current 7 Day Case Rate/100k | 60 | 140 | 133 | 105 | 250 | 100 |
| 7 Day Case Rate/100k Late-March Projection | 36 | 59 | 49 | 48 | 130 | 47 |
| Schools Open | Late Feb | Open | Open | Early March | Late Feb | Open |
| Non-Essential Retail Open | Early March | Open | Partially Open | Late March | Open | Open |
| Hospitality Open | Review on March 3rd | Open with 6pm curfew | Most closed open in some regions | Outdoor April | Open with limits | Open with limits |
| Travel Begins | Early summer with PCR | Early summer with PCR | Early summer with PCR | Early summer with PCR | Domestic with PCR | Domestic with PCR |
| Sports/Concerts Open | Potentially in the summer | Potentially in the summer | Potentially in the summer | June | Late Feb with limits | Open with limits |

Source: BBC, Financial Times, Bloomberg

closed), followed by non-essential retail and then hospitality. Regional travel could resume by early summer, but this will likely be facilitated with PCR testing or vaccine passports. Intercontinental travel will still likely be restricted to a large degree in 2021, specifically ring-fencing areas that have made little progress with vaccinations which will include over 70 countries as we move into 2022.

## b. New variants present the biggest risk

**The biggest risk at present is a significant mutation in the virus, a process known as antigenic drift[3], which could render the current vaccines and prior immunity to the virus ineffective. This could result in rolling lockdowns becoming the modus operandi for the remainder of the year. Experts view the risk of a variant completely evading the immunity provided by vaccines in the near term as quite low.** All viruses mutate naturally. When a virus infects a host's cell it begins a process of replication to allow the virus to spread. Errors in this replication process over time lead to mutations in the virus. Coronaviruses mutate more slowly than other viruses due to their specialised "proofreading mechanism"[4] which reduces the number of errors that are observed during replication. Analysis from the University of Basel suggests that SARS COV-2 mutates at about half of the rate of the influenza viruses in circulation[5]. While this should reduce the risk that vaccines are rendered obsolete another important consideration is that viruses tend to mutate at a higher frequency when viral fitness levels are lower[6]. Viral fitness refers to how easily a virus can transmit or spread between hosts. Viral fitness levels tend to drop when medical intervention (inoculations) or natural immunity starts to rise. Throughout the summer of 2020, it was commonplace to see small changes in the viral genome but in Q4 2020 some more concerning variants emerged. The UK variant of the virus (501.V1), showed more than a dozen mutations. The South African (501.V2) and Brazilian (501.V3) variants showed significant mutations around the spike protein, which many of the vaccines are explicitly targeting for their antibody response. The key question is whether these mutations or future mutations will be enough to prevent an immune response? Studies so far have shown the UK variant to have a very marginal impact on vaccine efficacy. The real risk comes from the South African variant, and others with similar mutations around the spike protein, which appear to be partially impairing the efficacy of the existing vaccines in emerging studies.

When we refer to vaccine efficacy it is important to understand that there are degrees of immunity and different parts of the human immune response that are being targeted by a vaccine. Antibodies are the fastest acting part of the adaptive immune system and serve to prevent the virus from entering cells and infecting the host in the first place. They achieve this by binding to the spike proteins on the surface of the virus. Antibodies can become less effective if they do not recognise the proteins on the surface of the virus due to mutations. T-Cells, the other key element of the adaptive immune response triggered by a vaccine, target the virus in a much broader fashion. They can be triggered to kill any cells that become infected with the virus as they recognise a broader number of epitopes (parts) of the virus antigen[7]. This can mean that if the antibodies are not effective against the virus a vaccinated person could become infected. T-Cells would then become active, given their broader recognition of the virus, resulting in a short-lived, mild or asymptomatic infection. The viral load would likely be far lower from a mild or asymptomatic infection and this would reduce the risk of further transmission from that host given that viral load and transmissibility are positively correlated. This effect was illustrated in a study published by The Lancet in February 2021[8].

We can see a real-world example of this with the Johnson and Johnson phase 3 trial results against the South African variant, shown in Figure 4. The vaccine was 100% effective against deaths and hospitalisations (the influenza vaccine is 40% effective against hospitalisation), 85% effective against moderate to severe infection and c. 60% effective against mild infection. The level of

[3] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2603026/
[4] https://www.asbmb.org/asbmb-today/science/041020/slipping-past-the-proofreader
[5] https://www.nature.com/articles/d41586-020-02544-6#:~:text=A%20typical%20SARS%2DCoV%2D2,the%20University%20of%20Basel%2C%20Switzerland.
[6] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5908228/
[7] https://www.cell.com/cell/fulltext/S0092-8674(21)000076?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0092867421000076%3Fshowall%3Dtrue
[8] https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00005-0/fulltext#coronavirus-linkback-header

**Figure 4: Vaccine efficacy against the South African strain (501.V2) is diminished but vaccines remain highly effective**

| Producer | Efficacy overall | Efficacy vs 501.V2 | 501. V2 Test Details | Effective against Deaths/ Hospitalisations | Effective against Moderate – Severe Infection | Effective against transmission |
|---|---|---|---|---|---|---|
| Pfizer | 95% | Reduction in antibodies but no evidence of a drop in effectiveness. | Lab based testing | 100% | 100% | 81% |
| AstraZeneca | 76% | Small study suggests just 22% protection against mild infection | University of Witwatersrand study with < 2000 subjects (not peer reviewed) | 100% | 100% | 67% |
| Moderna | 95% | Reduction in antibodies but no evidence of a drop in effectiveness. | Lab based testing | 100% | 100% | n/a |
| J&J | 66% | 57% | SA phase 3 trial results, 6,500 subjects | 100% | 85% | n/a |
| Novavax | 90% | 60%[9] | SA phase 3 trial results, 4,400 subjects | 100% | 87% | n/a |

Source: Vaccine Producers

neutralising antibodies generated was lower relative to the broader trial, which allowed for some mild or asymptomatic infection. This suggests that while there may be some evasion of antibodies, T-Cells are still very effective against the virus and the vaccine is still a very effective tool.

All of the major vaccine producers are preparing vaccine boosters which are expected to be ready before the autumn if necessary. Traditional vaccine boosters are intended to increase the durability of immunity to a virus after immune memory has declined through time. In the case of these specific boosters, they will be providing the immune system with updated information to allow for broader recognition of the virus and a higher degree of protection against current and future mutations. Nadhim Zahawi, the UK minister in charge of vaccine rollout, stated that new versions of COVID-19 vaccines could be made to deal with future variants in less than six weeks. He confirmed that the tweaked jabs would not need to undergo months-long clinical trials as long as they were based on previously approved vaccines[10]. In the US, the FDA is actively designing guidelines for modifications and boosters to ensure "an efficient process for authorisation"[11]. To put the regulatory component of the development timeline into perspective, both Moderna and Pfizer had designed their vaccines in late January and had produced enough vaccines to begin trials by March. The vaccine only received approval in December by regulators. Professor Andrew Pollard, a senior researcher involved in the development of the Oxford/AstraZeneca vaccine, has said a booster that can handle the new variants should be ready by the autumn. Philip Dormitzer who led Pfizer's COVID vaccine research stated that "the work to tailor vaccines against variants started well before these variants had emerged … we are now at the point where we are routinely making the DNA templates for variants. And we are having discussions, internally and with regulators, about how far we progress each of these."

It is important to note that there are no real signs yet that the South African variant is becoming the

[9] Excludes participants that were HIV positive
[10] https://inews.co.uk/news/politics/new-vaccines-battle-covid-19-mutations-finalised-within-days-858555
[11] https://www.foxnews.com/health/coronavirus-variants-fda-guidance

dominant strain of the virus globally. This is in stark contrast to the UK variant. The UK variant (501.V1) represented c. 1% of global infections in November 2020 and as of February 2021, it represents over 30% of all infections. The South African variant (501.V2) represented 2% of global infections in November 2020 and by February 2021 represents just 6% of infections, displaying nowhere near the same growth as the UK variant as shown in Figure 5 below. The vast majority of the observed cases of the South African variant have occurred in Africa and Australasia with a limited number in Europe and the US. Speaking in late February, Matt Hancock, the UK Health Secretary, stated that the UK was utilising enhanced tracking and tracing for cases of the South African variant. He noted that while there had been 300 cases of the variant in total, the majority of these had occurred over a month ago and that there were, at present, just 12 cases being monitored. There is a clear consensus among experts that the UK variant will become the most prevalent global strain of the virus in the coming months.

The bottom line is that existing vaccines are still highly effective against the existing strains of the virus. However, as part of the natural evolutionary process, the virus will seek to adopt variants that can avoid immunity over time, allowing it to propagate in newly susceptible hosts. High levels of community transmission provide this opportunity for the virus. Governments are therefore employing caution about lifting restrictions until transmission rates are low enough to reduce this risk of mutation and those most vulnerable have been protected. A paper published by the La Jolla Institute of Immunology at the start of February 2021 stated the following; "Although it is important to track SARS-CoV-2 evolution, it is highly unlikely that the virus will be able to evolve escape variants[12] that avoid the majority of humoral[13] and cellular immune memory in COVID-19 cases or COVID-19 vaccine recipients any time soon"[14].

[12] Escape Variants: Mutations in the virus which evade the immune system
[13] Humoral: Part of the immune system that utilises antibodies
[14] https://www.cell.com/cell/fulltext/S0092-8674(21)000076?returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0092867421000076%3Fshowall%3Dtrue

**Figure 5: Neither the South African nor the Brazilian variant have shown signs of becoming the dominant global strain of the virus, unlike the UK variant**

| Variant[12] | Origin | First Identified | % of global cases as at Nov 1st 2020 | % of global cases at present | Change in prevalence (Nov - Present) | Change in R-0 | Mortality Risk | Immune Evasion |
|---|---|---|---|---|---|---|---|---|
| 20A | China | Jan 2020 | 33% | 19% | -14% | | | No evidence |
| 20B | China | Jan 2020 | 34% | 13% | -21% | | | No evidence |
| 20C | China | Feb 2020 | 12% | 7% | -5% | | | No evidence |
| 20D | China | March 2020 | 4% | 1% | -3% | | | No evidence |
| 20E | China | May 2020 | 7% | 5% | -2% | | | No evidence |
| 20F | China | May 2020 | 0% | 0% | 0% | | | No evidence |
| 20G | China | June 2020 | 7% | 12% | 5% | | | No evidence |
| 501.V1 | UK | Sep 2020 | 1% | 33% | 33% | +56% (NERVTAG) | Potentially 30% higher | Very mild impact |
| 501.V2 | South Africa | Sep 2020 | 2% | 6% | 4% | +50% (ECDC) | No evidence | Some impact on antibodies |
| 501.V3 | Brazil | Oct 2020 | 1% | 4% | 4% | Likely +30% (CDC) | No evidence | Not enough data |

Note: Nomenclature taken from nextstrain.com
Source: https://nextstrain.org/ncov/europe

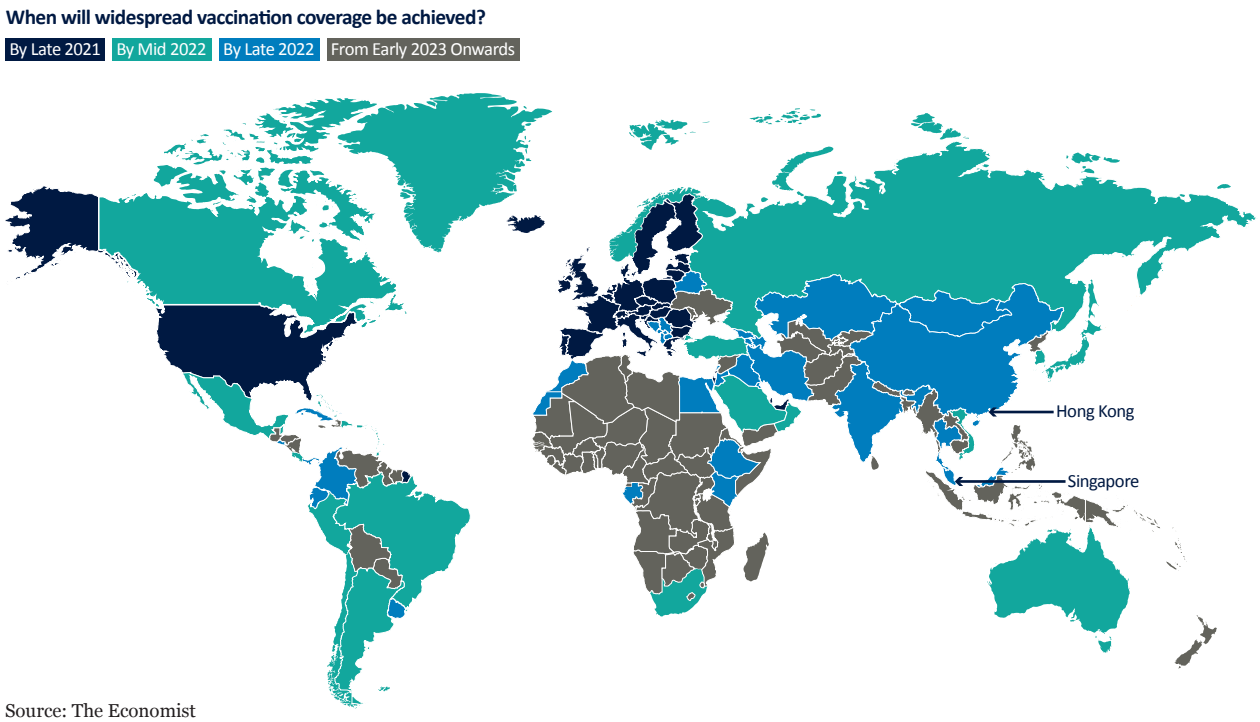
## c. The virus will likely become endemic

**Vaccine distribution will not be equitable around the globe and this, along with mutations, will mean that the virus becomes endemic.** A study by the British Medical Journal suggested that it could take until 2022 for one-quarter of the world to receive vaccines and at least 90% of people in the 67 lowest-income countries stand little chance of getting vaccinated against COVID-19 in 2021. Figure 6 from the Economist magazine suggests that it may take until the end of 2023 for many of the world's poorest countries to be fully vaccinated. This is primarily because wealthy nations have reserved more vaccines than they need and developers will not share their intellectual property, according to the People's Vaccine Alliance. To put this into perspective, countries that have only 14% of the world's population have reserved 53% of the supply of the eight most promising vaccines including all of the Moderna vaccine and 96% of the Pfizer vaccine.

This means the ultimate endgame for COVID-19 is that the virus will become endemic according to David Heymann of the World Health Organisation[15]. This is not surprising as smallpox remains the only virus that humans have successfully eradicated to date. Endemic is a broad term but it means that despite vaccinations, COVID-19 is going to be in circulation, at least in some regions, for the foreseeable future. The long term implications of this could range from continued small regional outbreaks to global seasonal vaccination campaigns and the possibility of children being vaccinated as part of the routine childhood immunisation schedule. The path depends on the extent of future mutations in the virus, the degree to which the world becomes successfully vaccinated and the duration of immunity derived from infection or vaccination. Figure 6 provides examples of other endemic viruses in circulation, their key characteristics and the risk measures which have been implemented to mange them.

[15] https://www.healio.com/news/infectious-disease/20210104/qa-will-COVID19-become-endemic

**Figure 6: The world's poorest countries won't have widespread distribution of vaccines until 2023.**




Source: The Economist

**Figure 7: Endemic viruses are managed in different ways**

| Endemic Viruses | Ro | Mortality Risk | Outbreak | Risk Management |
|---|---|---|---|---|
| Measles | 14 | 0.15% | Global Rare | Childhood vaccination schedule |
| Rhinovirus (Coronavirus) | 6 | Near 0 | Global Seasonal | Anti-viral medication/rest/isolate |
| Ebola | 2 | 90% | Regional (Africa) | Tracking, tracing, isolation/developing a vaccine |
| Influenza | 1.5 | 0.10% | Global Seasonal | Seasonal vaccination of those most vulnerable |
| COVID-19 | 2.5 | 0.30% | Global | Dependent on evolution |

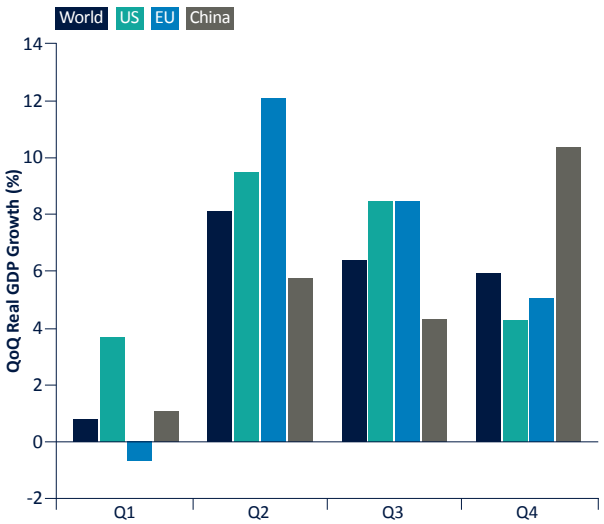
Source: CDC

It is too early to speculate which of these paths is most likely but most experts agree that the current vaccine campaign and therapeutics being utilised and developed at present will likely do most of the heavy lifting and reduce the main threat posed by COVID-19. This should mean that draconian lockdowns become a distant memory, but the virus' footprint will leave a lasting impression on the world. Importantly, this will not prevent the western world from returning to a state that is close to normality but will mean that travel and border security will be more restrictive in the coming years.

## d. Evidence suggests there will be a surge in consumption

**A lifting of restrictions is expected to lead to a consumption-driven growth spurt, the key question is when this will occur rather than if it will occur.** As the western world reopens and consumer confidence returns, experts expect a surge in growth driven by pent-up demand from consumers, particularly given the elevated levels of personal savings that have been built up. The services sector has been particularly hard hit. The bounce-back will therefore likely emphasise those businesses, particularly the ones that have a communal element, such as restaurants and entertainment venues. China provides some evidence of this potential consumption surge. Singles Day in China, November 11th, saw a record level of sales at an overall level and for the country's two largest online retailers.[16] Manufacturing in China had recovered to pre-pandemic levels by Q2 and retail sales as a whole had recovered by September 2020. The only exception to this trend was international air travel, outside of this, Chinese consumers have begun to act and spend largely as they had done in pre-pandemic times. Australia also offers hope. With the pandemic largely contained, household spending fuelled a faster than expected 3.3 % growth rate in the third quarter of 2020 with year on year retail sales rising over 13%, the largest acceleration on record. Experts believe we will see a growth spurt in Europe and the US once restrictions are lifted and consumer confidence returns with GDP growth of over 8% a quarter in both Q2 and Q3 of 2021 as illustrated in Figure 8.

**Figure 8: A growth surge is expected in the western world in Q2/Q3 2021**




Source: GS, JPM and Capital Economics

The key risks to this view are associated with timing with the rise of new variants threatening efficacy, vaccine supply issues and to a lesser extent consumer retrenchment. Goldman Sachs estimate that a new vaccine-resistant strain could knock over 2.5% from their base case forecast for US growth in 2021 as shown in Figure 9.

The global vaccination campaign should mean that draconian lockdowns eventually become a distant memory. The lifting of restrictions in developed economies should lead to a sharp acceleration in growth driven by consumption and pent-up savings in Q2/Q3 2021. The key risk to this view is the emergence of new variants that evade vaccines. However, experts suggest that it is unlikely that a new variant will render existing vaccines ineffective in the near term. The inequitable distribution of vaccines and evolution of the virus will mean that COVID-19 will become endemic, remaining with us in some form for the foreseeable future.

**Figure 9: Goldman Sachs see a vaccine resistant strain as the biggest risk to growth in 2021**

| | Goldman Sachs 2021 GDP Growth Forecasts | | | | |
|---|---|---|---|---|---|
| Forecast/ Scenario | Q1 | Q2 | Q3 | Q4 | Annual |
| Baseline | 5.0% | 10.0% | 9.0% | 6.0% | 6.6% |
| Consensus | 2.3% | 4.0% | 4.7% | 3.8% | 4.1% |
| Greater Consumer Caution | 4.5% | 8.2% | 7.4% | 5.2% | 5.9% |
| Highly Infectious Strain | 3.4% | 4.8% | 7.3% | 6.4% | 5.1% |
| Vaccine-Resistant Strain | 5.0% | 0.7% | 2.9% | 4.0% | 4.0% |

Source: Goldman Sachs

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