COVID-19 infection and mortality tracking in the US and around the world

This section analyzes COVID infections and mortality reported to local, federal and intergovernmental agencies, and are heavily influenced by testing rates and differences in government reporting standards and capabilities. As we explain in Section 5, serology tests suggest that the true number of COVID infections may be much higher than the number of reported infections. However, trends in reported infections are still important to monitor, since they influence government policy and the behavior of citizens and companies.

Table of contents:
1. What’s new: US infection/hospitalization decline, comparisons with Europe ....................................................... 2
2. What’s new: a closer look at Europe ........................................................................................................................ 3
3. What’s new: Asia, MidEast, Eastern Europe and Russia .......................................................................................... 4
4. What’s new: Latin America, India region and South Africa ..................................................................................... 5
5. Summary of global and US infection/mortality trends ............................................................................................ 6
6. COVID at a glance: infections and mortality per mm............................................................................................... 7
7. Infection, mortality and hospitalization snapshots.................................................................................................. 8
8. US at a glance: infection, hospitalization and mortality tracking .......................................................................... 10
9. How lethal is COVID, and for whom?...................................................................................................................... 11

Comments on infection data. Several countries show up with almost no COVID outbreak reported. In cases like New Zealand, Taiwan, Japan, Vietnam and South Korea, we interpret the lack of a material outbreak as possible based on the quality of data reporting and testing. Other countries which report low incidence of COVID include Nigeria, Kenya, Angola, DR Congo, Tanzania and Mozambique. As per various news reports¹, there’s a shortage of reliable data in many of these countries, and the lack of funds to carry out broad testing. On the other hand, while infections can be obscured, it’s harder to obscure a sharp rise in mortality; even when accounting for some under-reporting of deaths, Africa mortality rates are still much lower than expected. The few antibody surveys conducted in Africa reveal COVID prevalence that is similar to other European countries; in other words, COVID is spreading in Africa as it is elsewhere. The most likely explanation for lower relative mortality is age: Africa’s median age is 18, compared to 35 in North America and 42 in Europe. Since those over age 65 experience 80% of COVID mortality, age distributions are the most likely reason for lower African COVID mortality rates.

On data sources. We generally use infection and mortality data from Johns Hopkins, with any exceptions noted in chart sources. While JHU data usually match sources such as covidtracking.com and Worldometers, this is not always the case. Any large differences usually work themselves out over time; even so, such differences are a warning against over-extrapolating any short term trends seen in the data. There are also patterns in some countries in which tests and infections drop over the weekend, only to rise the following week. Other anomalies: countries and US states sometimes make large one-time additions or subtractions to infections or deaths data to reflect over- or underestimations made over the course of the entire pandemic. JHU and other data providers do not amortize such adjustments over time and simply reflect them on the day they are made; we do the same.

What's new: US infection/hospitalization decline, comparisons with Europe

- In the US, infections, hospitalizations and mortality are falling
- Europe and US infection and mortality rates are similar despite very different vaccination rates; both US and European mortality rates still above summer 2020 levels
- In a few hotspots, infections are no longer falling and are flat/rising (mostly Northeast and Michigan)

**US**

**US vs Europe infections**

DAILY INFECTIONS # PER MM (LHS)

DAILY HOSPITALIZATIONS # PER MM (LHS)

DAILY DEATHS # PER MM (RHS)

Source: JHU, IMF, HHS, JPMAM. Mar 24, 2021. 7 day smoothing.

**US vs Europe mortality**

DAILY DEATHS # PER MM, SMOOTHING = 7 DAYS

Source: Johns Hopkins University, IMF, JPMAM. Mar 24, 2021.

**US infection hotspots**

DAILY INFECTIONS, # PER MM, SMOOTHING = 7 DAYS

Source: Johns Hopkins University, IMF, JPMAM. Mar 24, 2021.

**8 highest hospitalization states**

CURRENT HOSPITALIZATIONS, # PER MM, SMOOTHING = 7 DAYS


**NY counties**

DAILY INFECTIONS, # PER MM, SMOOTHING = 7 DAYS

Source: Johns Hopkins University, IMF, JPMAM. Mar 24, 2021.
What’s new: a closer look at Europe

- Infections have declined sharply in UK even though the more infectious B.1.1.7 variant is more than 95% of all new infections. This appears to be a result of stringent lockdowns and vaccinations reaching 40%
- After a decline, infections are now rising in Continental Western Europe. There hasn’t been an increase in hospitalization other than in Italy, but that usually occurs with a lag
- Sweden infections rising (again), and infections are also rising elsewhere in Scandinavia

United Kingdom

Source: JHU, IMF, OWID, JPMAM. Mar 24, 2021. 7 day smoothing.

W Europe

Daily infections, # per mm, smoothing = 7 days

Source: Johns Hopkins University, IMF, JPMAM. Mar 24, 2021.

Scandinavia

Daily infections, # per mm, smoothing = 7 days

Source: Johns Hopkins University, IMF, JPMAM. Mar 24, 2021.

Lockdown stringency index: US, UK and Denmark

Index, 100 = highest level of lockdown strictness


W Europe

Current hospitalizations, # per mm, smoothing = 7 days

Source: various country sources, IMF, JPMAM. Mar 24, 2021.

W Europe

Daily infections, # per mm, smoothing = 7 days

Source: Johns Hopkins University, IMF, JPMAM. Mar 24, 2021.
What's new: Asia, MidEast, Eastern Europe and Russia

- Infections remain low in Developed and EM Asia, other than in the Philippines
- Israel infections plummeting as vaccinations pass 60% of population
- Eastern European infections spiking
- Russia region infections stable other than in the Ukraine

**Developed Asia**
Daily infections, # per mm, smoothing = 7 days

**EM Asia**
Daily infections, # per mm, smoothing = 7 days

**Mideast**
Daily infections, # per mm, smoothing = 7 days

**Israel**
Daily infections # per mm (LHS), Current hospitalizations # per mm (LHS), Daily deaths # per mm (RHS)

**E Europe**
Daily infections, # per mm, smoothing = 7 days

**Russia region**
Daily infections, # per mm, smoothing = 7 days
What’s new: Latin America, India region and South Africa

- Mortality spike in Manaus (Amazon/Brazil) has rolled over but questions remain about whether reinfection took place after high levels of herd immunity were believed to have already occurred in 2020. Brazil mortality trends worsening while other Latin American countries stable or improving modestly
- US and European mortality now below Latin American levels
- One of many COVID mysteries: why does Latin America have such a higher infection and mortality rate than Africa and India; many demographic, weather and socio-economic factors are similar
- India region mortality rates low outside Iran. Seroprevalence testing in India points to 25%-55% levels of prior infection, leading some Indian scientists to believe that herd immunity has been reached
- South Africa variant rolling over across the region
Summary of global and US infection/mortality trends

World

Source: JHU, IMF, JPMAM. Mar 24, 2021. 7 day smoothing.

US

Source: JHU, IMF, HHS, JPMAM. Mar 24, 2021. 7 day smoothing.

Dev World ex-US

Source: JHU, IMF, JPMAM. Mar 24, 2021. 7 day smoothing.

S America

Source: JHU, IMF, JPMAM. Mar 24, 2021. 7 day smoothing.

US vs Europe infections
Infections to date, levels, smoothing = 1 days

Source: Johns Hopkins University, JPMAM. Mar 24, 2021.

US vs Europe mortality
Deaths to date, levels, smoothing = 1 days

Source: Johns Hopkins University, JPMAM. Mar 24, 2021.
COVID at a glance: infections and mortality per mm

COVID at a glance: trailing 7 day infection and mortality per mm

Mortality per mm, 7 day average

States not shown since they are off the chart: KY
Countries not shown since they are off the chart: CZE POL

Source: Johns Hopkins University, IMF, JPMAM. March 24, 2021
Infection, mortality and hospitalization snapshots
The two charts below show peak and current levels of infection (top chart) and mortality (bottom chart) for the 50 largest countries in the world based on GDP. These countries represent 94% of global GDP.

**Infection levels for the largest 50 countries based on GDP, peak vs current**
Sorted by trailing 7 day average infection rate per mm people

**Mortality levels for the largest 50 countries based on GDP, peak vs current**
Sorted by trailing 7 day average mortality rate per mm people

Source: Johns Hopkins University, IMF, JPMAM. Countries shown represent 94% of World GDP. March 24, 2021.
The first two charts below show peak and current levels of infection (first chart) and mortality (second chart) for the 50 US states and DC. The third chart shows current levels of hospitalization by state.

Source: Johns Hopkins University, IMF, JPMAM. March 24, 2021

Source: HHS, IMF, JPMAM. March 24, 2021
US at a glance: infection, hospitalization and mortality tracking

The charts below track infection, hospitalization, testing\(^2\) and mortality data for the US in aggregate. See section 3 for a state-by-state chartpack which covers the full range of infection, hospitalizations and mortality.

\(^2\) 40 states report the total number of “testing encounters” or “testing specimens”; the rest only show the number of people testing each day that have never been tested before. We only compute testing rates for the 40 states that provide encounter or specimen data since “first time tested” is an inaccurate denominator to use with reported infections.
How lethal is COVID, and for whom?

Let’s first compare it to the flu. A key issue to keep in mind: there’s a difference between case fatality rates (deaths as a % of reported cases) and infection fatality rates (deaths as a % of all infected people, whether symptomatic or not). The latter can only be derived through antibody testing and other sampling methods involving molecular assessments of infection. The IFR of the seasonal flu is reported to be well below 0.1% with other estimates ranging from 0.02% to 0.04%. In contrast, the IFR for COVID has been estimated at 0.23% by Stanford’s Metaresearch Innovation Center, and at 0.7%-0.9% by the CDC. Either way, COVID is significantly more lethal than the seasonal flu. Tracking “excess” abnormal death levels is another way to understand the incremental mortality impact of COVID (see second chart). In addition to higher mortality than the flu, COVID also appears to entail more longer-lasting medical complications (see web portal section 5).

Mortality by age in the US

The first section in the table below shows the distribution of US COVID deaths by age bracket. People over the age of 85 represent around 1/3 of all COVID fatalities to-date. However, the number of people over age 85 is much smaller than other age cohorts; as a result, fatality risks are much greater for people in this age group. The second section reflects this by showing deaths to date per mm people in each age bracket (you can divide one number by another to obtain relative mortality probabilities). The third section looks specifically at mortality risk across age brackets relative to older populations. For example, a person aged 55-64 is only around 11% as likely to die from COVID compared to someone over the age of 75, and only around 6% as likely to die as someone over the age of 85. Differences across states are generally minor.

### Flu vs COVID-19 infection fatality rates

% estimated infection fatality rate

<table>
<thead>
<tr>
<th>%</th>
<th>Seasonal influenza</th>
<th>COVID-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2%</td>
<td>WHO, Oxford, CDC</td>
<td>CDC US Seroprevalence Survey</td>
</tr>
<tr>
<td>0.4%</td>
<td>University of Wollongong (global)</td>
<td>Stanford Meta-Research Innovation Center (global)</td>
</tr>
<tr>
<td>0.6%</td>
<td></td>
<td>CDC US Pandemic Planning Scenario</td>
</tr>
<tr>
<td>0.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### Tracking US excess deaths from COVID

Total deaths per week

<table>
<thead>
<tr>
<th>Source: CDC, JHU, JPMAM. March 20, 2021. Dots are estimated using most recent JHU data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/2017</td>
</tr>
<tr>
<td>Actual deaths from all causes</td>
</tr>
<tr>
<td>140,000</td>
</tr>
<tr>
<td>115,000</td>
</tr>
</tbody>
</table>

### DISTRIBUTION OF ACTUAL MORTALITY: Mortality to-date by age group, % of total mortality

<table>
<thead>
<tr>
<th>Age group</th>
<th>&lt; 1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
<th>25-34 yrs</th>
<th>35-44 yrs</th>
<th>45-54 yrs</th>
<th>55-64 yrs</th>
<th>65-74 yrs</th>
<th>75-84 yrs</th>
<th>&gt; 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.6%</td>
<td>1.7%</td>
<td>4.7%</td>
<td>12.1%</td>
<td>21.9%</td>
<td>27.8%</td>
<td>30.9%</td>
</tr>
</tbody>
</table>

### MORTALITY RATES FOR EACH AGE BRACKET: COVID deaths to-date per mm population in each age group

<table>
<thead>
<tr>
<th>Age group</th>
<th>&lt; 1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
<th>25-34 yrs</th>
<th>35-44 yrs</th>
<th>45-54 yrs</th>
<th>55-64 yrs</th>
<th>65-74 yrs</th>
<th>75-84 yrs</th>
<th>&gt; 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>18</td>
<td>75</td>
<td>215</td>
<td>610</td>
<td>1,498</td>
<td>3,685</td>
<td>9,162</td>
<td>24,615</td>
</tr>
</tbody>
</table>

### RELATIVE MORTALITY RISK: risk of dying across age brackets

<table>
<thead>
<tr>
<th>Relative to 85+</th>
<th>&lt; 1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
<th>25-34 yrs</th>
<th>35-44 yrs</th>
<th>45-54 yrs</th>
<th>55-64 yrs</th>
<th>65-74 yrs</th>
<th>75-84 yrs</th>
<th>&gt; 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.3%</td>
<td>0.9%</td>
<td>2.5%</td>
<td>6.1%</td>
<td>14.9%</td>
<td>37.2%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative to 75+</th>
<th>&lt; 1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
<th>25-34 yrs</th>
<th>35-44 yrs</th>
<th>45-54 yrs</th>
<th>55-64 yrs</th>
<th>65-74 yrs</th>
<th>75-84 yrs</th>
<th>&gt; 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.5%</td>
<td>1.6%</td>
<td>4.5%</td>
<td>11.0%</td>
<td>26.9%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>
IMPORTANT INFORMATION

The views, opinions and estimates expressed herein constitute Michael Cembalest’s judgment based on current market conditions and are subject to change without notice. Information herein may differ from those expressed by other areas of J.P. Morgan. This information in no way constitutes J.P. Morgan Research and should not be treated as such.

The views contained herein are not to be taken as advice or a recommendation to buy or sell any investment in any jurisdiction, nor is it a commitment from J.P. Morgan or any of its subsidiaries to participate in any of the transactions mentioned herein. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only, based on certain assumptions and current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of production. This material does not contain sufficient information to support an investment decision and it should not be relied upon by you in evaluating the merits of investing in any securities or products. In addition, users should make an independent assessment of the legal, regulatory, tax, credit and accounting implications and determine, together with their own professional advisers, if any investment mentioned herein is believed to be suitable to their personal goals. Investors should ensure that they obtain all available relevant information before making any investment. It should be noted that investment involves risks, the value of investments and the income from them may fluctuate in accordance with market conditions and taxation agreements and investors may not get back the full amount invested. Both past performance and yields are not reliable indicators of current and future results.

Non-affiliated entities mentioned are for informational purposes only and should not be construed as an endorsement or sponsorship of J.P. Morgan Chase & Co. or its affiliates.

For J.P. Morgan Asset Management Clients:

J.P. Morgan Asset Management is the brand for the asset management business of JPMorgan Chase & Co. and its affiliates worldwide.

To the extent permitted by applicable law, we may record telephone calls and monitor electronic communications to comply with our legal and regulatory obligations and internal policies. Personal data will be collected, stored and processed by J.P. Morgan Asset Management in accordance with our privacy policies at https://am.jpmorgan.com/global/privacy.

ACCESSIBILITY

For U.S. only: If you are a person with a disability and need additional support in viewing the material, please call us at 1-800-343-1113 for assistance. This communication is issued by the following entities:

In the United States, by J.P. Morgan Investment Management Inc. or J.P. Morgan Alternative Asset Management, Inc., both regulated by the Securities and Exchange Commission; in Latin America, for intended recipients’ use only, by local J.P. Morgan entities, as the case may be; in Canada, for institutional clients’ use only, by JPMorgan Asset Management Canada Inc., which is a registered Portfolio Manager and Exempt Market Dealer in all Canadian provinces and territories except the Yukon and is also registered as an Investment Fund Manager in British Columbia, Ontario, Quebec and Newfoundland and Labrador. In the United Kingdom, by JPMorgan Asset Management (UK) Limited, which is authorized and regulated by the Financial Conduct Authority; in other European jurisdictions, by JPMorgan Asset Management (Europe) S.à r.l. in Asia Pacific ("APAC"), by the following issuing entities in and the respective jurisdictions in which they are primarily regulated: JPMorgan Asset Management (Asia Pacific) Limited, or JPMorgan Funds (Asia) Limited, or JPMorgan Asset Management Real Assets (Asia) Limited, each of which is regulated by the Securities and Futures Commission of Hong Kong; JPMorgan Asset Management (Singapore) Limited (Co. Reg. No. 197601586K), which this advertisement or publication has not been reviewed by the Monetary Authority of Singapore; JPMorgan Asset Management (Taiwan) Limited; JPMorgan Asset Management (Japan) Limited, which is a member of the Investment Trusts Association, Japan, the Japan Investment Advisers Association, Type II Financial Instruments Firms Association and the Japan Securities Dealers Association and is regulated by the Financial Services Agency (registration number “Kanto Local Finance Bureau (Financial Instruments Firm) No. 330”); in Australia, to wholesale clients only as defined in section 761A and 761G of the Corporations Act 2001 (Commonwealth), by JPMorgan Asset Management (Australia) Limited (ABN 55143832080) (AFSL 376919). For all other markets in APAC, to intended recipients only.

For J.P. Morgan Private Bank Clients:

ACCESSIBILITY

J.P. Morgan is committed to making our products and services accessible to meet the financial services needs of all our clients. Please direct any accessibility issues to the Private Bank Client Service Center at 1-866-265-1727.

LEGAL ENTITY, BRAND & REGULATORY INFORMATION

In the United States, bank deposit accounts and related services, such as checking, savings and bank lending, are offered by JPMorgan Chase Bank, N.A. Member FDIC. JPMorgan Chase Bank, N.A. and its affiliates (collectively “JPMCB”) offer investment products, which may include bank-managed investment accounts and custody, as part of its trust and fiduciary services. Other investment products and services, such as brokerage and advisory accounts, are offered through J.P. Morgan Securities LLC (“JPM”), a member of FINRA and SIPC. Annuities are made available through Chase Insurance Agency, Inc. (CIA), a licensed insurance agency, doing business as Chase Insurance Agency Services, Inc. in Florida. JPMCB, JPM and CIA are affiliated companies under the common control of JPMorgan Chase & Co. Products not available in all states.

In Luxembourg, this material is issued by J.P. Morgan Bank Luxembourg S.A. (JPMLB), with registered office at European Bank and Business Centre, 6 route de Trèves, L-2633, Senningerberg, Luxembourg, R.C.S. Luxembourg B10.958. Authorised and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg S.A. is authorized as a credit institution in accordance with the Law of 5th April 1993. In the United Kingdom, this material is issued by J.P. Morgan Bank Luxembourg S.A.–London Branch. Prior to Brexit, (Brexit meaning that the UK leaves the European Union under Article 50 of the Treaty on European Union, or, if later, loses its ability to passport financial services between the UK and the remainder of the EEA), J.P. Morgan Bank Luxembourg S.A.–London Branch is subject to limited regulation by the Financial Conduct Authority and the Prudential Regulation Authority. Details about the extent of our regulation by the Financial Conduct Authority and the Prudential Regulation Authority are available from us on request. In the event of Brexit, in the UK, J.P. Morgan Bank Luxembourg S.A.–London Branch is authorised by the Prudential Regulation Authority, subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from us on request. In Spain, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Sucursal en España, with registered office at Paseo de la Castellana, 31, 28046 Madrid, Spain. J.P. Morgan Bank Luxembourg S.A., Sucursal en España is registered under number 1516 within the administrative registry of the Bank of Spain and supervised by the Spanish Securities Market Commission (CNMV). In Germany, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Frankfurt Branch, registered office at TaunusTurm 1 (TaunusTurm), 60310 Frankfurt, Germany, jointly supervised by the Commission de Surveillance du Secteur Financier (CSSF) and the European Central Bank (ECB), and in certain areas also supervised by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). In Italy, this material is distributed by J.P. Morgan Bank Luxembourg S.A.– Milan Branch, registered office at Via Catena Adalberto 4, Milano 20121, Italy and regulated by Bank of Italy and the Commissione Nazionale per le Società e la Borsa (CONSOB). In the Netherlands, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch, with registered office at World Trade Centre, Tower B, Strawinskylaan 1135, 1077 XA, Amsterdam, The Netherlands. J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch is authorised and...
regulated by the Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF in
Luxembourg; J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch is also authorised and supervised by De Nederlandsche Bank (DNB) and the Autoriteit Financiële Markten (AFM) in the Netherlands. Registered with the Kamer van Koophandel as a branch of J.P. Morgan Bank Luxembourg S.A. under registration number 71651845. In Denmark, this material is distributed by J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. with registered office at Kalvebod Brygge 39-41, 1560 København V, Denmark. J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. is authorised and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. is also subject to the supervision of Finanstilsynet (Danish FSA) and registered with Finanstilsynet as a branch of J.P. Morgan Bank Luxembourg S.A. under code 29009. In Sweden, this material is distributed by J.P. Morgan Bank Luxembourg S.A. - Stockholm Bankfilial, with registered office at Hamngatan 15, Stockholm, 11147, Sweden. J.P. Morgan Bank Luxembourg S.A. - Stockholm Bankfilial is authorised and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. - Stockholm Bankfilial is also subject to the supervision of Finansinspektionen (Swedish FSA). Registered with Finansinspektionen as a branch of J.P. Morgan Bank Luxembourg S.A. In France, this material is distributed by JP Morgan Chase Bank, N.A. ("JPMCB"), Paris branch, which is regulated by the French banking authorities Autorité de Contrôle Prudentiel et de Résolution and Autorité des Marchés Financiers. In Switzerland, this material is distributed by J.P. Morgan (Suisse) SA, which is regulated in Switzerland by the Swiss Financial Market Supervisory Authority (FINMA).

In Hong Kong, this material is distributed by JPMCB, Hong Kong branch. JPMCB, Hong Kong branch is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission of Hong Kong. In Hong Kong, we will cease to use your personal data for our marketing purposes without your consent. In Singapore, this material is distributed by JPMCB, Singapore branch. JPMCB, Singapore branch is regulated by the Monetary Authority of Singapore. Dealing and advisory services and discretionary investment management services are provided to you by JPMCB, Hong Kong/Singapore branch (as notified to you). Banking and custody services are provided to you by JPMCB Singapore Branch. The contents of this document have not been reviewed by any regulatory authority in Hong Kong, Singapore or any other jurisdictions. This advertisement has not been reviewed by the Monetary Authority of Singapore. JPMorgan Chase Bank, N.A., a national banking association chartered under the laws of the United States, and as a body corporate, its shareholder’s liability is limited.

JPMorgan Chase Bank, N.A. (JPMCBNA) [ABN 43 074 112 011/AFS Licence No: 238367] is regulated by the Australian Securities and Investment Commission and the Australian Prudential Regulation Authority. Material provided by JPMCBNA in Australia is to “wholesale clients” only. For the purposes of this paragraph the term “wholesale client” has the meaning given in section 761G of the Corporations Act 2001 (Cth). Please inform us if you are not a Wholesale Client now or if you cease to be a Wholesale Client at any time in the future.

JPMorgan Chase Bank, N.A. (JPMCBNA) [ABN 109293610] incorporated in Delaware, U.S.A. Under Australian financial services licensing requirements, carrying on a financial services business in Australia requires a financial service provider, such as J.P. Morgan Securities LLC (JPMS), to hold an Australian Financial Services Licence (AFSL), unless an exemption applies. JPMS is exempt from the requirement to hold an AFSL under the Corporations Act 2001 (Cth) (Act) in respect of financial services it provides to you, and is regulated by the SEC, FINRA and CFTC under US laws, which differ from Australian laws. Material provided by JPMS in Australia is to “wholesale clients” only. The information provided in this material is not intended to be, and must not be, distributed or passed on, directly or indirectly, to any other class of persons in Australia. For the purposes of this paragraph the term “wholesale client” has the meaning given in section 761G of the Act. Please inform us immediately if you are not a Wholesale Client now or if you cease to be a Wholesale Client at any time in the future.

This material has not been prepared specifically for Australian investors. It:

- may contain references to dollar amounts which are not Australian dollars;
- may contain financial information which is not prepared in accordance with Australian law or practices;
- may not address risks associated with investment in foreign currency denominated investments; and
does not address Australian tax issues.

With respect to countries in Latin America, the distribution of this material may be restricted in certain jurisdictions. We may offer and/or sell to you securities or other financial instruments which may not be registered under, and are not the subject of a public offering under, the securities or other financial regulatory laws of your home country. Such securities or instruments are offered and/or sold to you on a private basis only. Any communication by us to you regarding such securities or instruments, including without limitation the delivery of a prospectus, term sheet or other offering document, is not intended by us as an offer to sell or a solicitation of an offer to buy any securities or instruments in any jurisdiction in which such an offer or a solicitation is unlawful. Furthermore, such securities or instruments may be subject to certain regulatory and/or contractual restrictions on subsequent transfer by you, and you are solely responsible for ascertaining and complying with such restrictions. To the extent this content makes reference to a fund, the Fund may not be publicly offered in any Latin American country, without previous registration of such fund’s securities in compliance with the laws of the corresponding jurisdiction. Public offering of any security, including the shares of the Fund, without previous registration at Brazilian Securities and Exchange Commission–CVM is completely prohibited. Some products or services contained in the materials might not be currently provided by the Brazilian and Mexican platforms.

References to “J.P. Morgan” are to JPM, its subsidiaries and affiliates worldwide. “J.P. Morgan Private Bank” is the brand name for the private banking business conducted by JPM.

This material is intended for your personal use and should not be circulated to or used by any other person, or duplicated for non-personal use, without our permission. If you have any questions or no longer wish to receive these communications, please contact your J.P. Morgan representative.

© 2020 JPMorgan Chase & Co. All rights reserved.