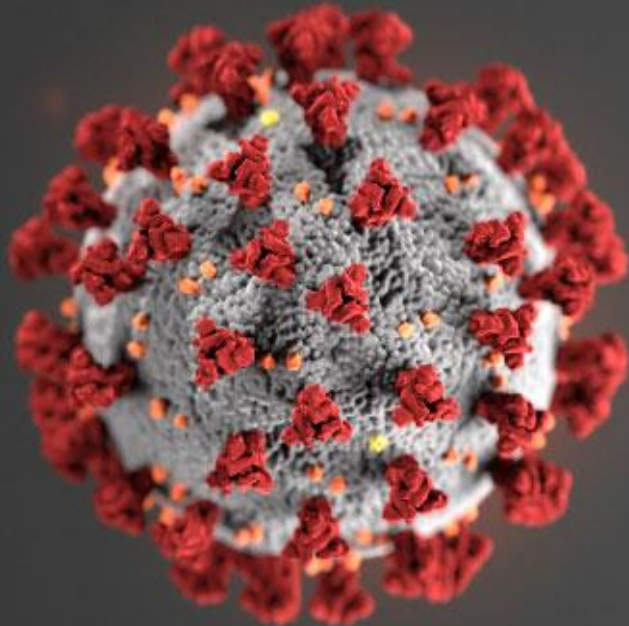


SARS-Cov-2 Report

José Luis Pires

8 September 2020



Contents

SARS-Cov-2

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Symptoms of:

➤ COVID-19

➤ Cold

➤ Flu

COVID-19: IDENTIFYING THE SYMPTOMS

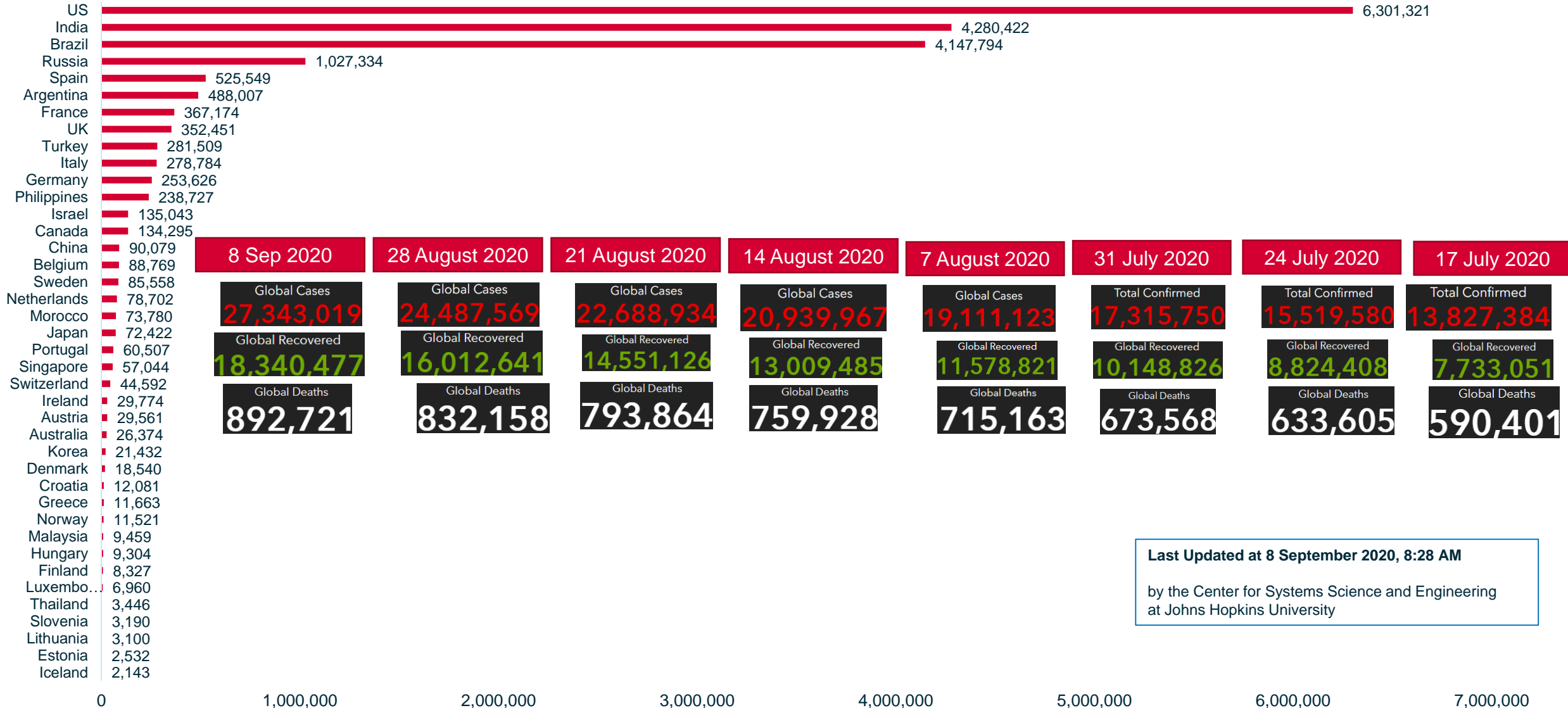
Coronavirus
(COVID-19)

SYMPTOMS	COVID-19	COLD	FLU
	Symptoms range from mild to severe	Gradual onset of symptoms	Abrupt onset of symptoms
Fever 	Common	Rare	Common
Cough 	Common	Common	Common
Sore Throat 	Sometimes	Common	Common
Shortness of Breath 	Sometimes	No	No
Fatigue 	Sometimes	Sometimes	Common
Aches & Pains 	Sometimes	No	Common
Headaches 	Sometimes	Common	Common
Runny or Stuffy Nose 	Sometimes	Common	Sometimes
Diarrhea 	Rare	No	Sometimes, especially for children
Sneezing 	No	Common	No

Adapted from material produced by WHO, Centers for Disease Control and Prevention.

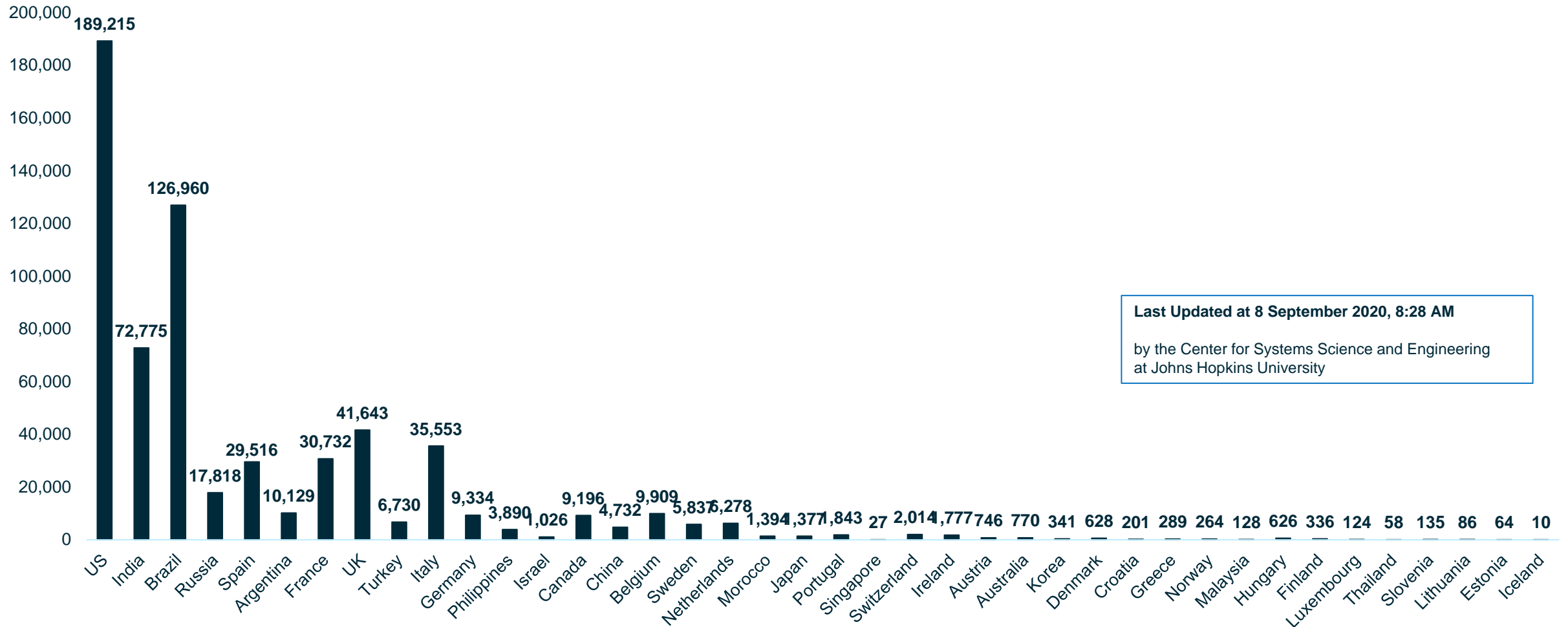
Coronavirus (SARS-CoV-2 / Covid-19) – Confirmed cases by country

Note: Selected Countries, sorted by # of cases



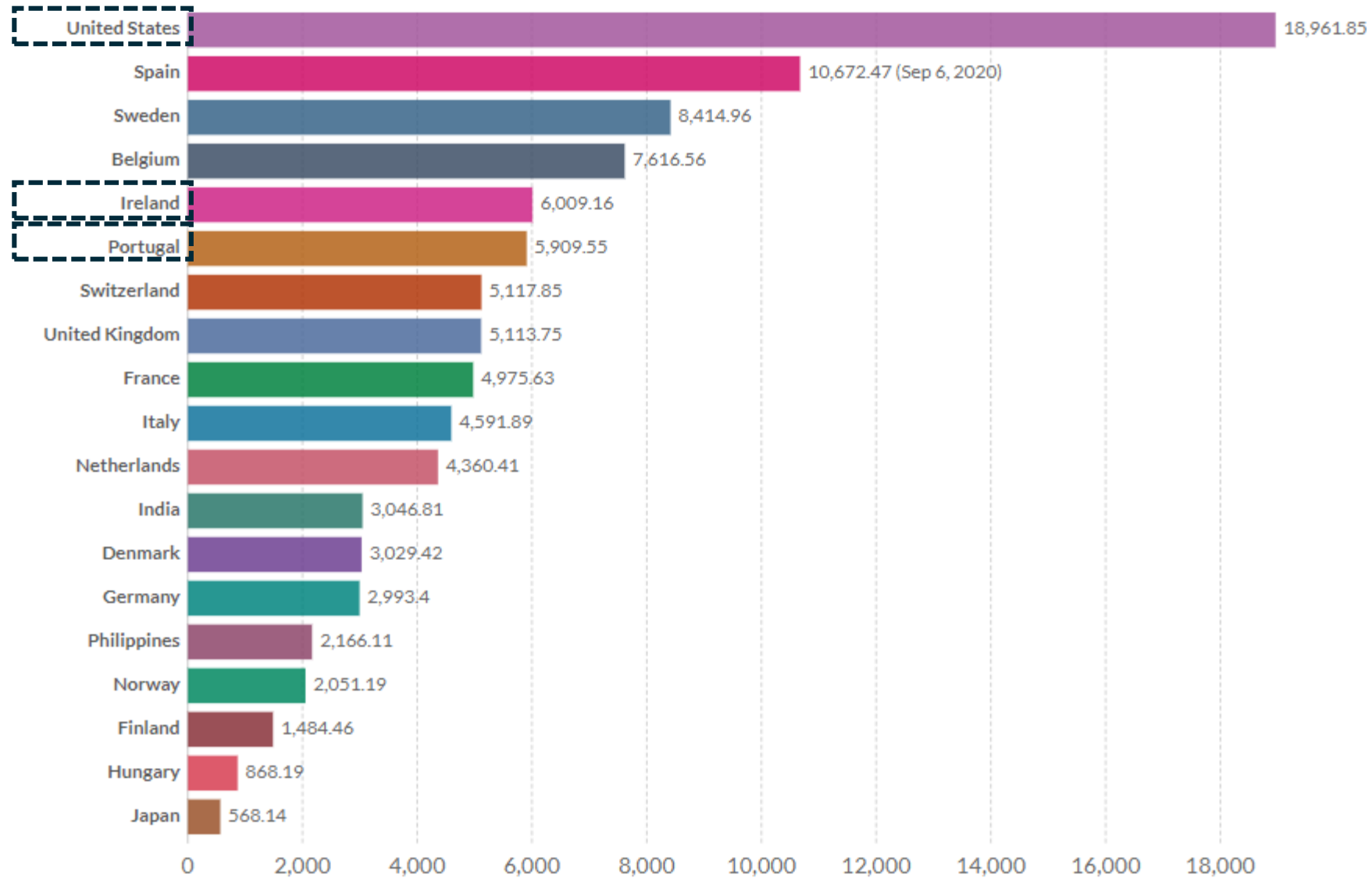
Coronavirus (SARS-CoV-2 / Covid-19) – Deaths by Country

Note: Selected Countries, sorted by # of cases



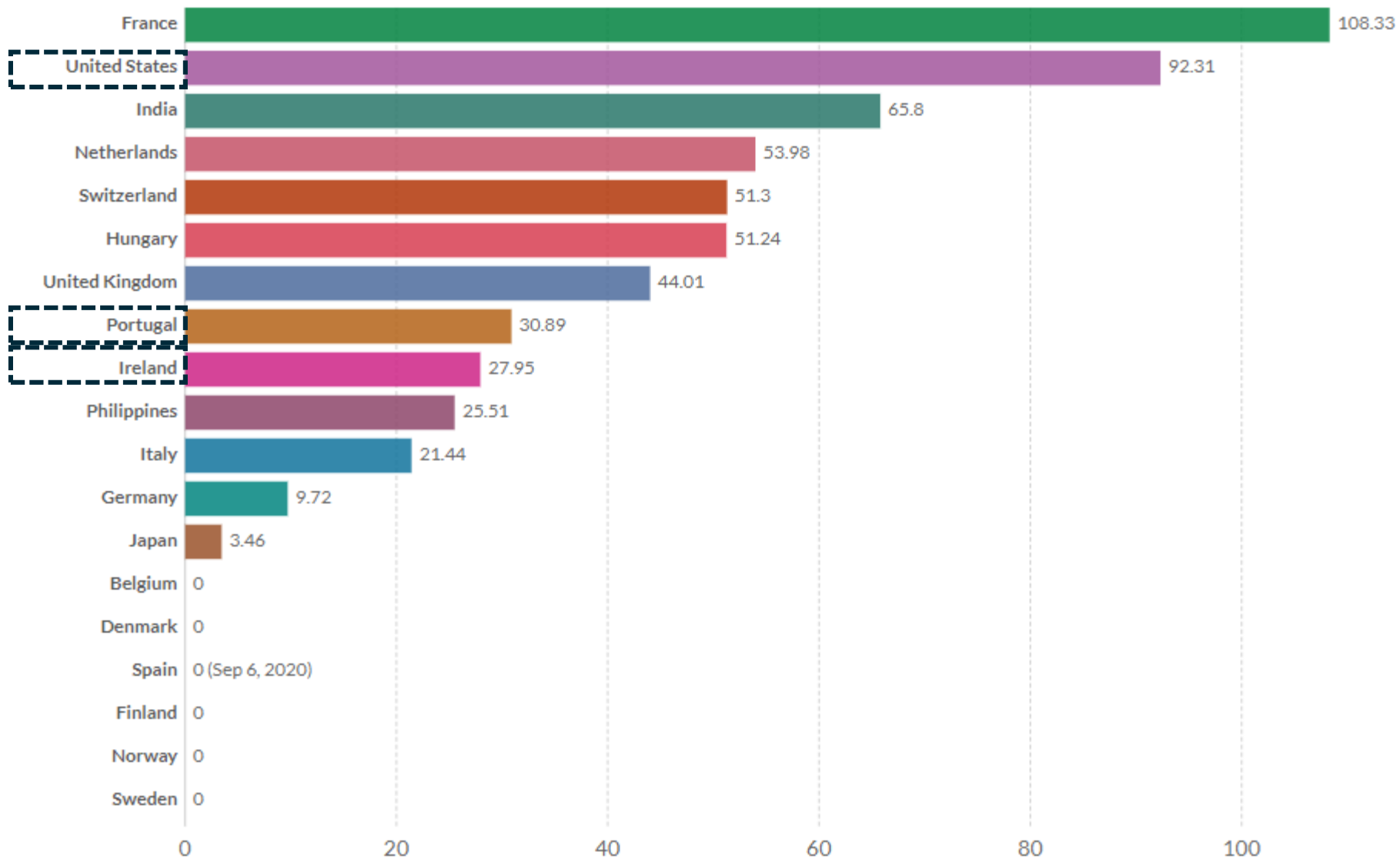
Source: <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>

Total confirmed Covid-19 cases per million people

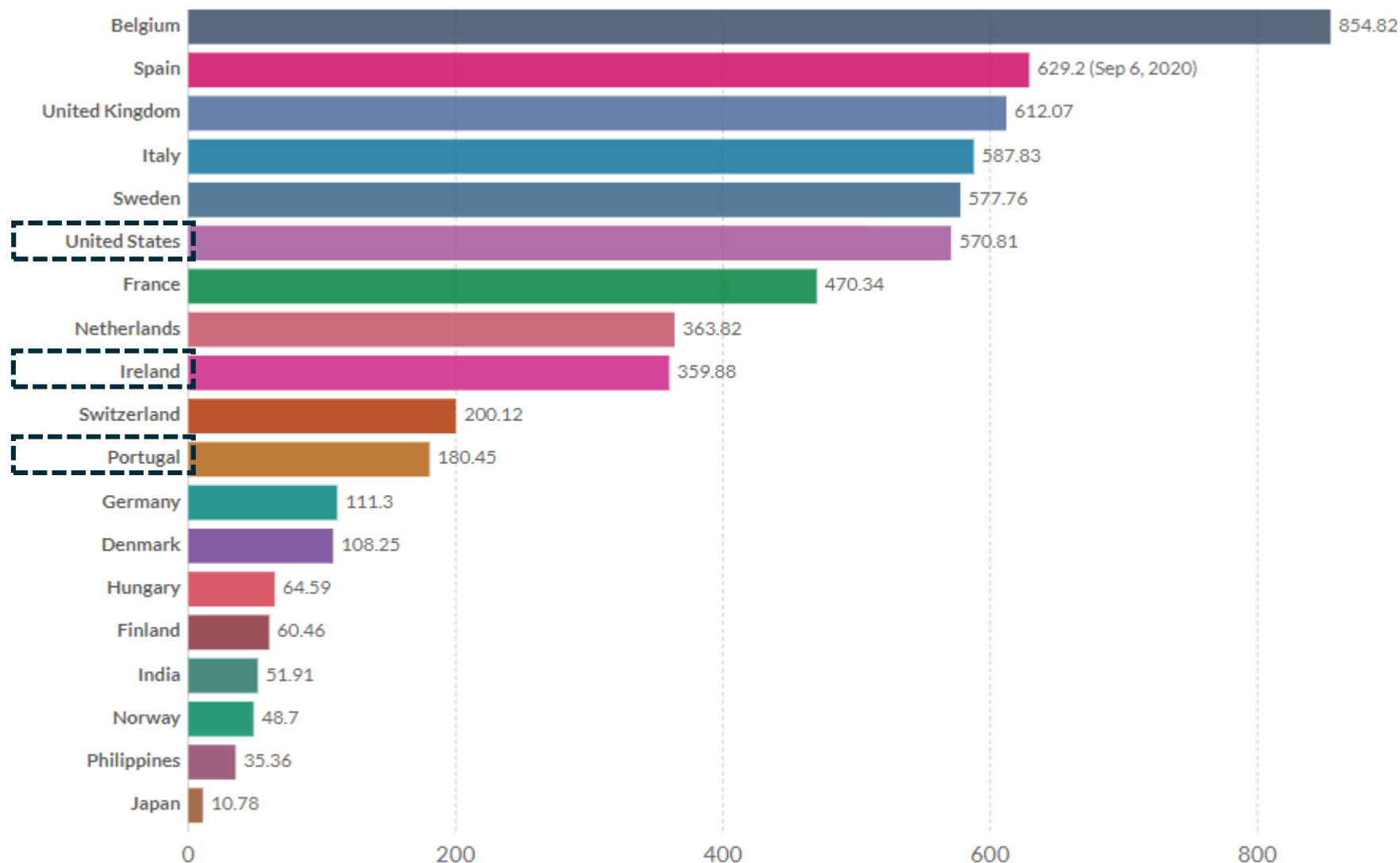


Source: European CDC – Situation Update Worldwide – Last updated 7 September, 09:35 (London time)

Daily new confirmed Covid-19 cases per million people

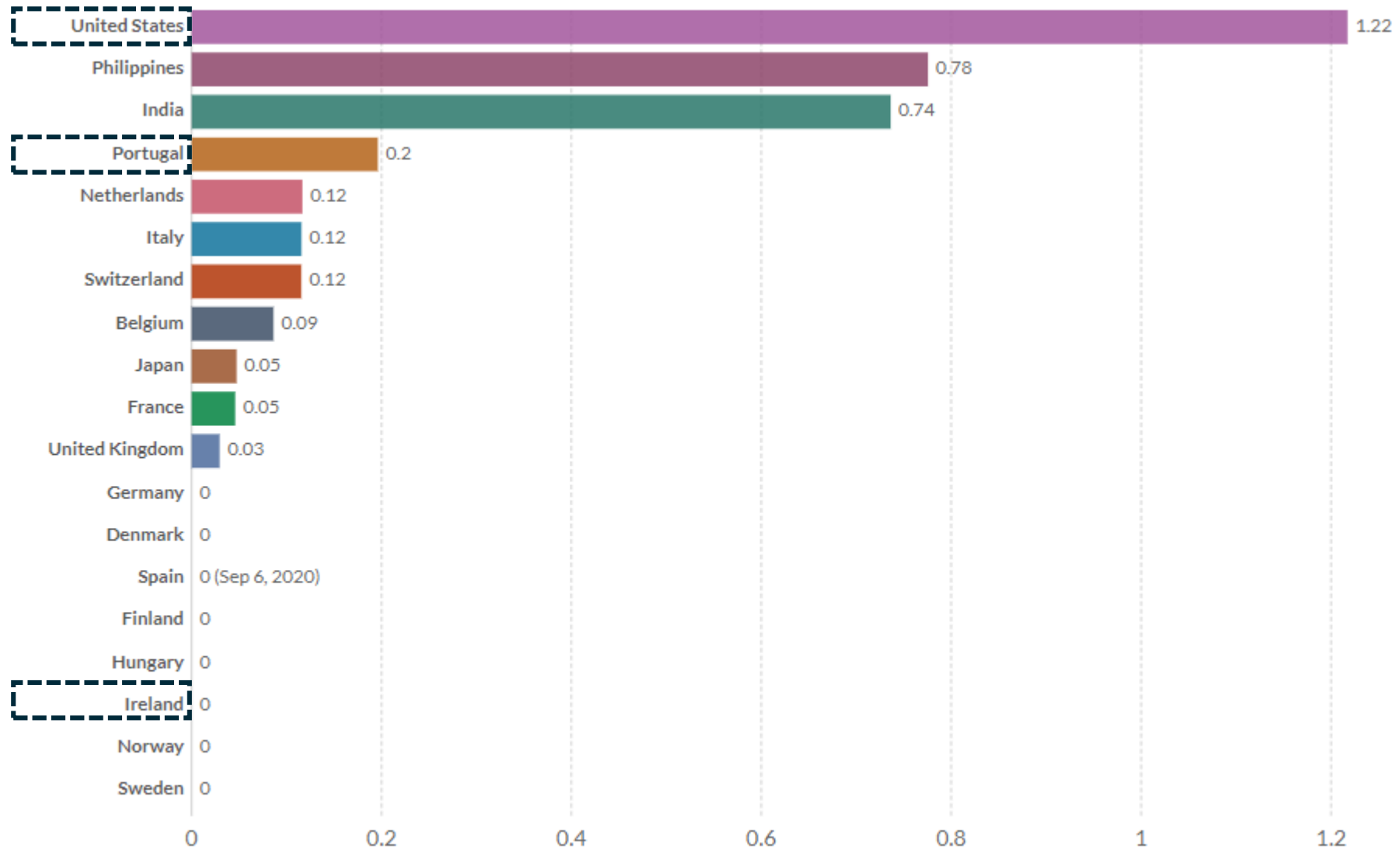


Total confirmed Covid-19 deaths per million people



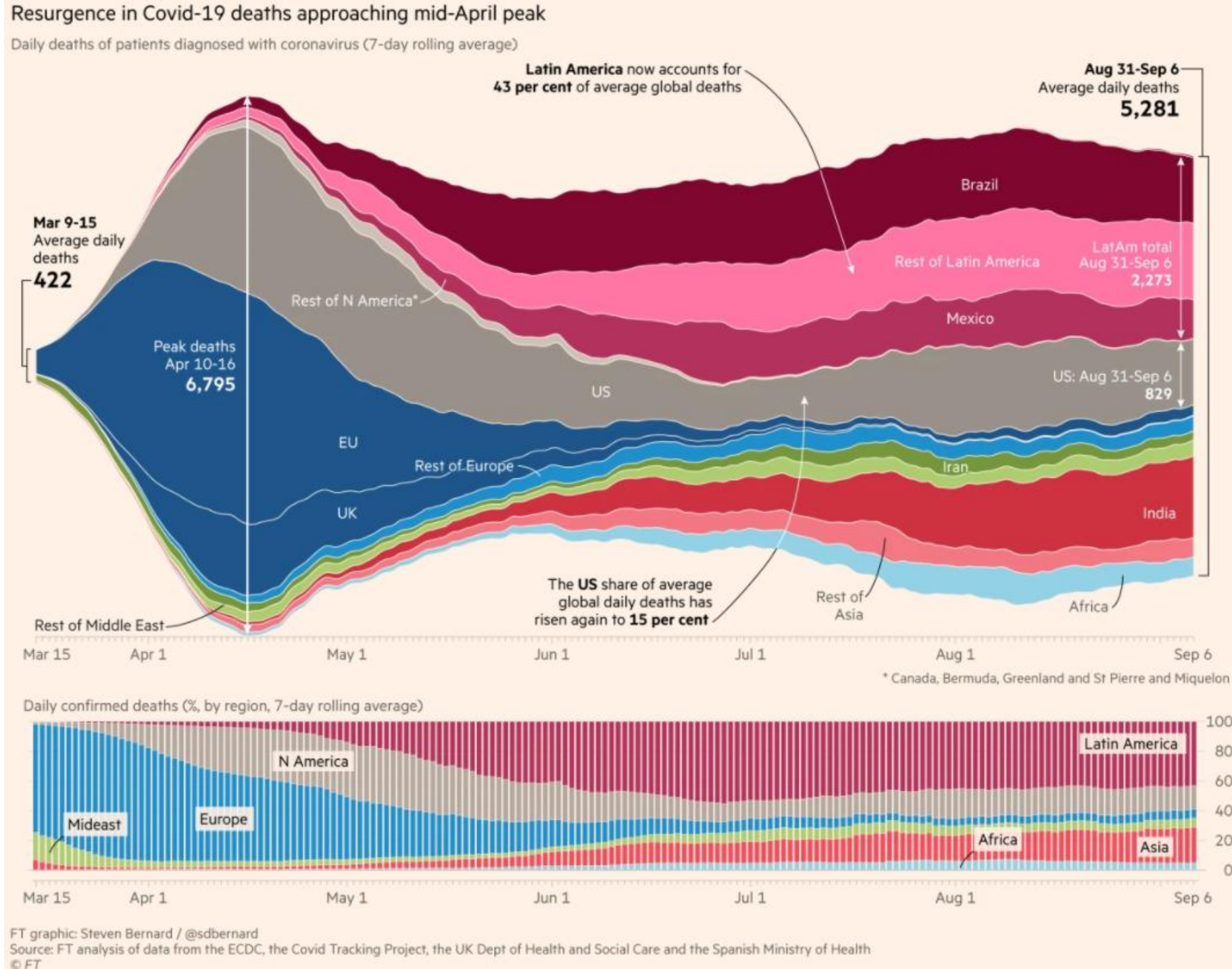
Source: European CDC – Situation Update Worldwide – Last updated 7 September, 09:35 (London time)

Daily new confirmed Covid-19 deaths per million people

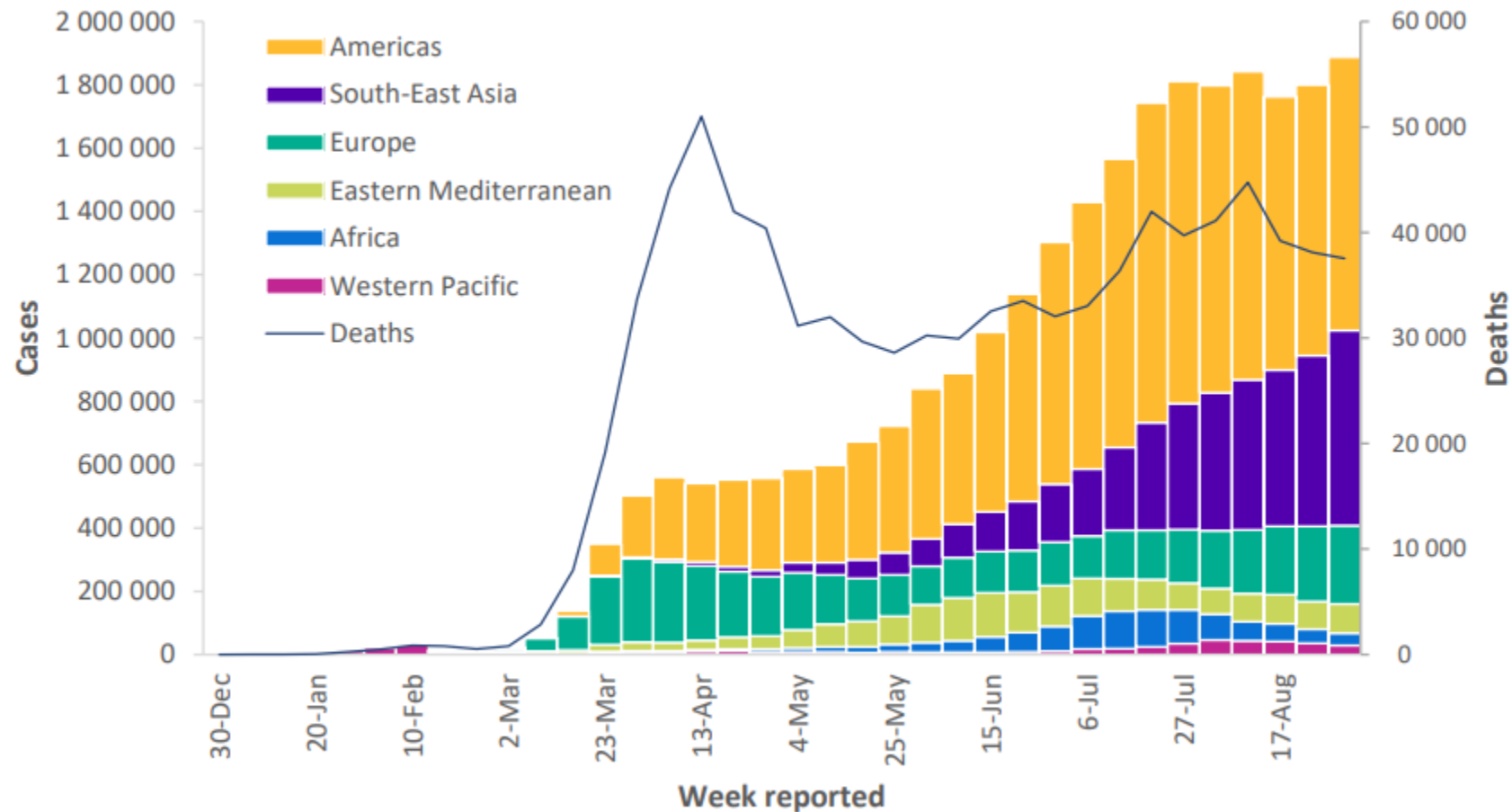


Source: European CDC - Situation Update Worldwide - Last updated 7 September, 09:35 (London time)

Daily deaths of patients diagnosed with coronavirus (7-day average)



Number of COVID-19 cases reported weekly by WHO region, and total deaths, 30 December to 6 September 2020

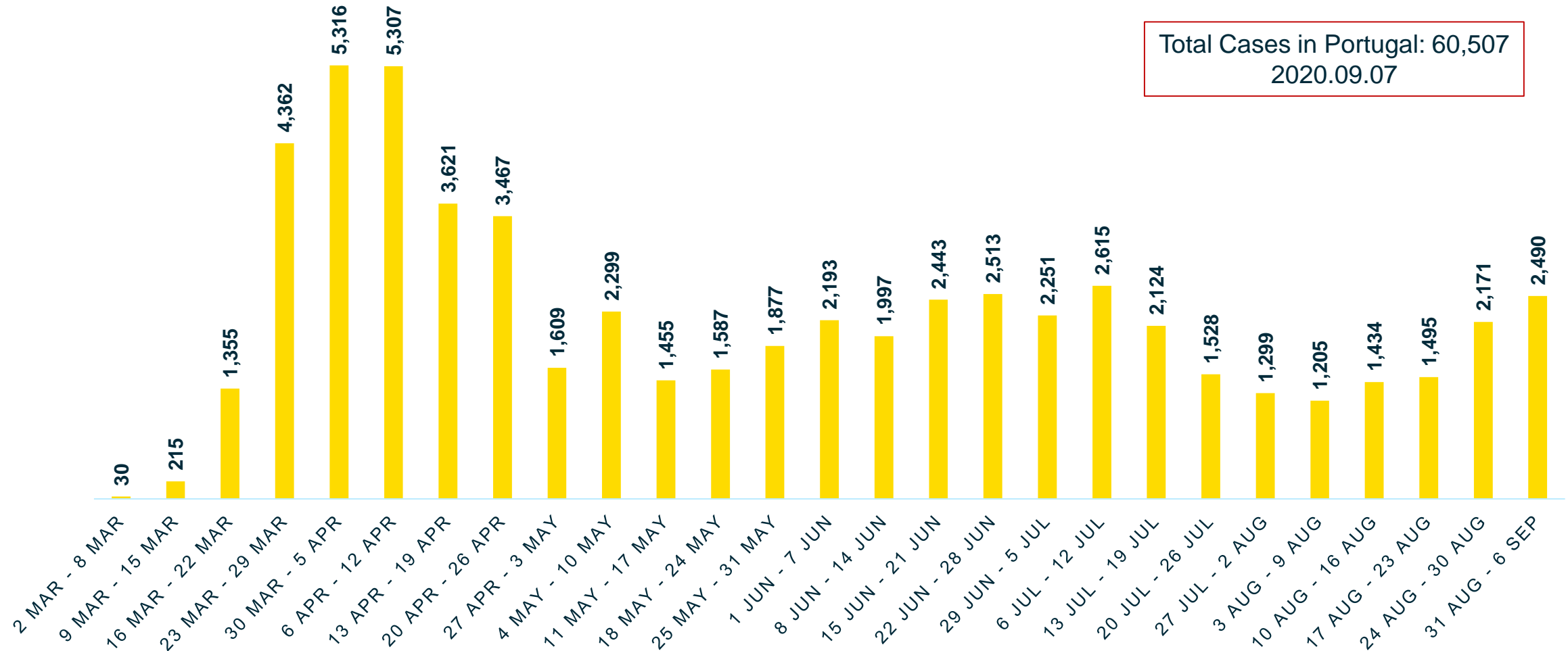


Source: WHO

Country/City	Total cases 6 Sep 2020	Total deaths 6 Sep 2020	New weekly cases: reported on 6 September	New weekly cases: reported on 30 August	Current week vs Last week	Current week vs Last week 30 August 2020	Current week vs Last week 23 August 2020	Current week vs Last week 16 August 2020	Current week vs Last week 9 August 2020
Loures	2,612		73	36	Up	Down	Up	Down	Down
Lisbon	5,295		208	143	Up	Up	Down	Up	Down
Lisbon and Tagus V.	31,048	686	1,179	1,031	Up	Up	Up	Up	Down
LTV vs PT			47%	47%	Up	Down	Down	Down	Down
New Jersey	194,390		2,447	2,117	Up	Up	Down	Up	Down
Cork	1,660		12	29	Down	Up	Up	Up	Up
Argentina	461,882	10,129	69,873	62,966	Up	Up	Down	Up	Up
Australia	26,207	770	660	945	Down	Down	Down	Down	Up
Austria	29,056	746	2,119	1,838	Up	Down	Up	Up	Down
Belgium	87,731	9,909	2,468	2,329	Up	Down	Down	Up	Up
Brazil	4,092,832	126,960	288,029	272,473	Up	Up	Down	Up	Down
Canada	131,124	9,196	3,766	2,986	Up	Up	Up	Down	Down
China	90,517	4,732	166	210	Down	Down	Down	Down	Down
Croatia	11,739	201	1,878	1,961	Down	Up	Up	Up	Down
Denmark	17,547	628	847	573	Up	Down	Down	Up	Up
Estonia	2,491	64	128	98	Up	Up	Up	Down	Up
Finland	8,225	336	176	178	Down	Up	Down	Up	Up
France	300,515	30,732	43,686	33,410	Up	Up	Up	Up	Up
Germany	249,985	9,334	8,214	8,907	Down	Up	Up	Up	Up
Greece	11,386	289	1,409	1,596	Down	Up	Up	Up	Up
Hungary	7,892	626	2,223	536	Up	Up	Up	Up	Up
Iceland	2,136	10	36	42	Down	Down	Up	Down	Up
India	4,113,811	72,775	571,078	497,793	Up	Up	Up	Up	Up
Ireland	29,534	1,777	814	812	Up	Up	Up	Up	Up
Italy	276,338	35,553	9,485	8,717	Up	Up	Up	Up	Up
Japan	71,419	1,377	4,155	5,517	Down	Down	Down	Down	Up
Korea	21,177	341	1,478	2,300	Down	Up	Up	Up	Up
Malaysia	9,391	128	74	60	Up	Down	Down	Up	Down
Netherlands	73,790	6,278	4,227	3,529	Up	Down	Down	Up	Up
Norway	11,120	264	577	346	Up	Down	Down	Up	Up
Philippines	234,570	3,890	21,439	25,882	Down	Down	Down	Up	Up
Portugal	59,943	1,843	2,495	1,996	Up	Up	Down	Up	Down
Russia	1,025,505	17,818	35,179	33,577	Up	Down	Down	Down	Down
Singapore	56,982	27	265	451	Down	Down	Down	Down	Down
Spain	498,989	29,516	40,087	37,308	Up	Up	Up	Up	Up
Sweden	84,985	5,837	802	857	Down	Down	Down	Up	Up
Switzerland	43,849	2,014	2,234	2,089	Up	Up	Up	Up	Down
Thailand	3,444	58	33	16	Up	Down	Down	Down	Up
Turkey	278,228	6,730	11,164	10,032	Up	Up	Up	Up	Up
UK	344,168	41,643	11,412	8,151	Up	Up	Up	Up	Up
US	6,144,138	189,215	288,617	288,304	Up	Down	Down	Down	Down

Portugal

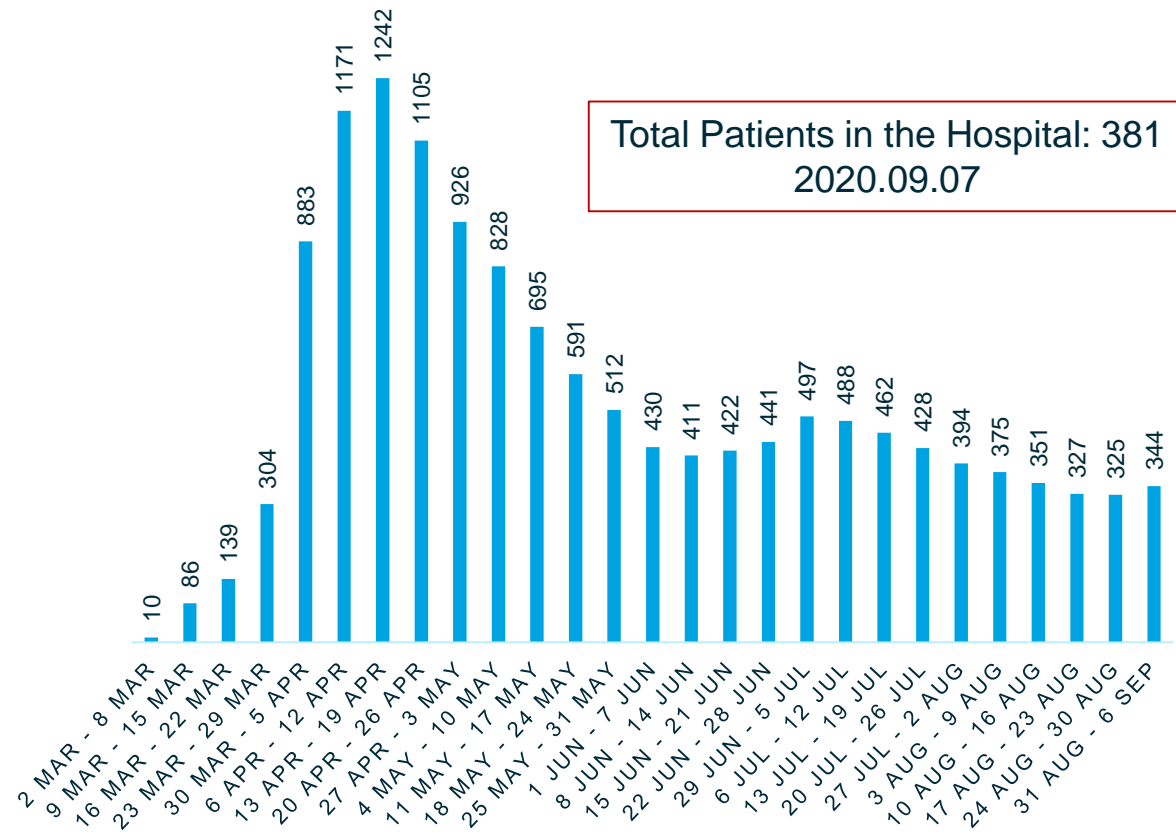
Coronavirus (SARS-CoV-2 / COVID 19) – Portugal – New cases per week



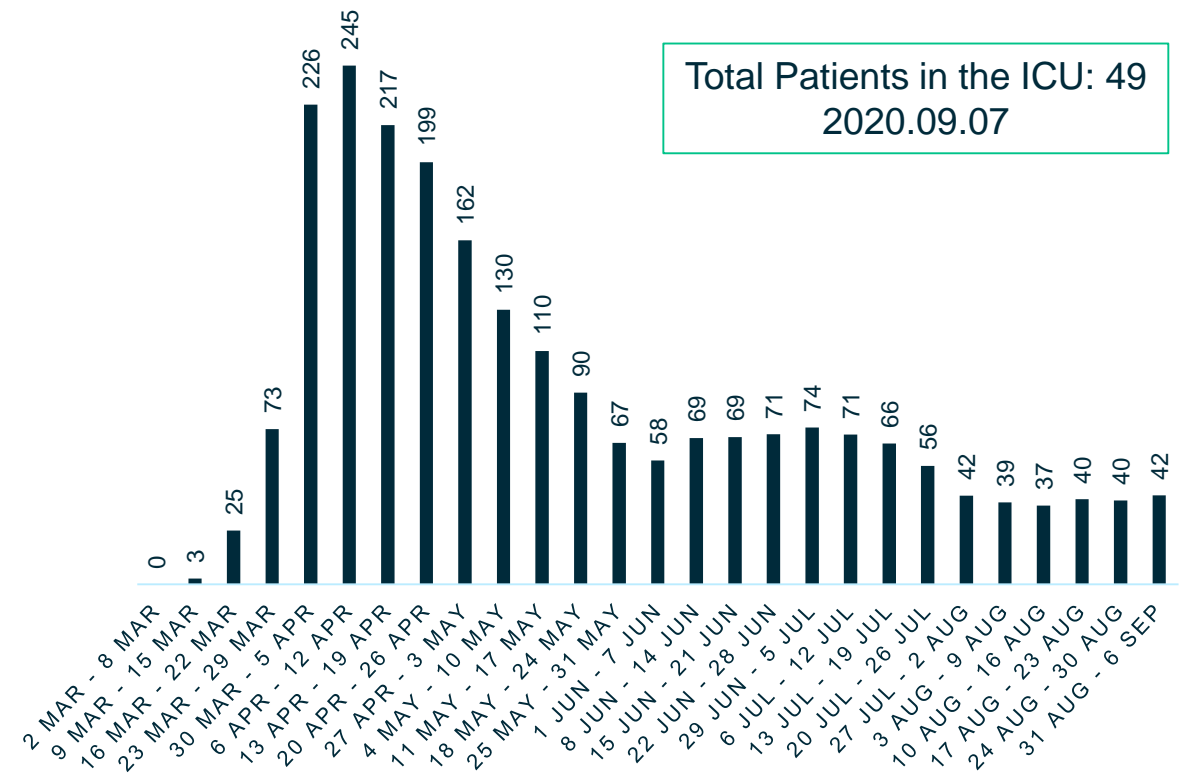
Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

Coronavirus (SARS-CoV-2 / COVID 19) – Portugal – Hospital stable/ICU per week

■ Average # of Patients stable in the Hospital per week

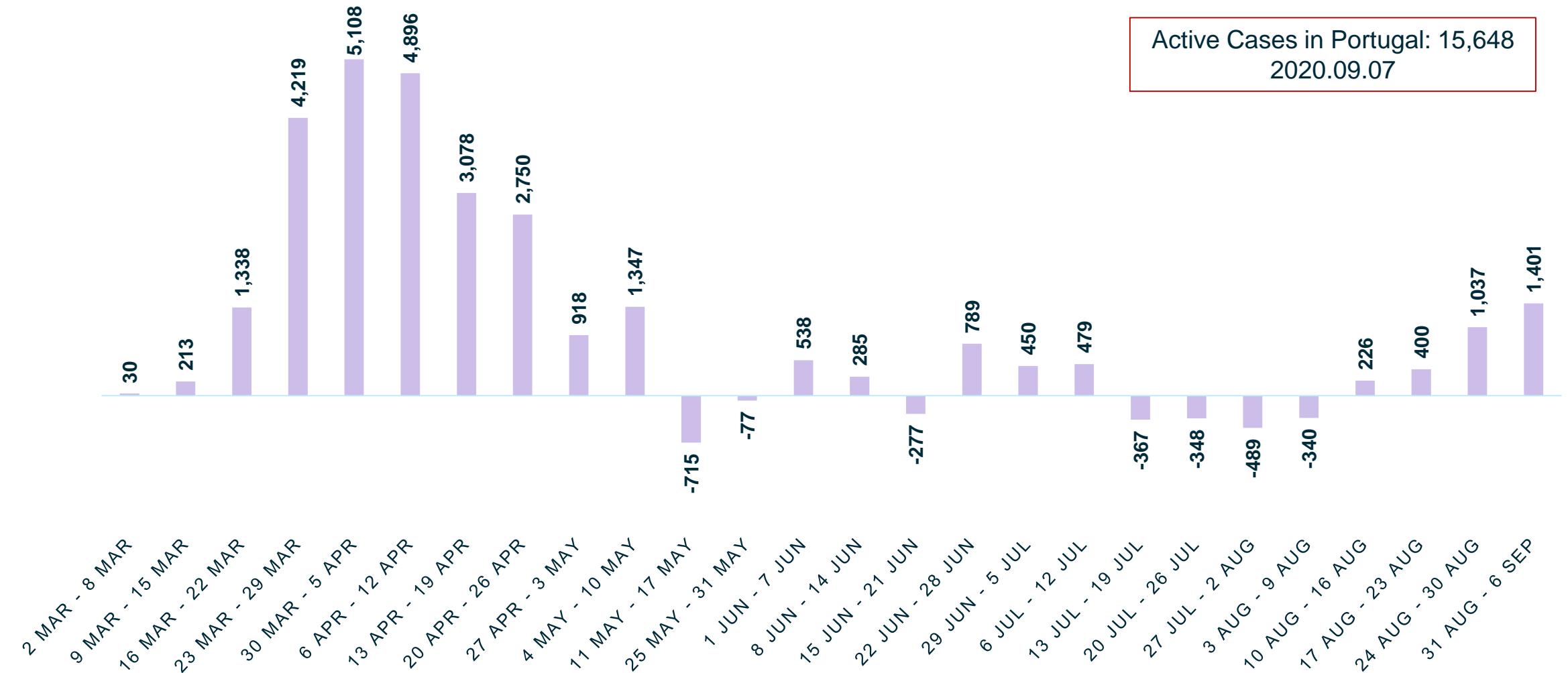


■ Average # of Patients in the ICU per week



Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

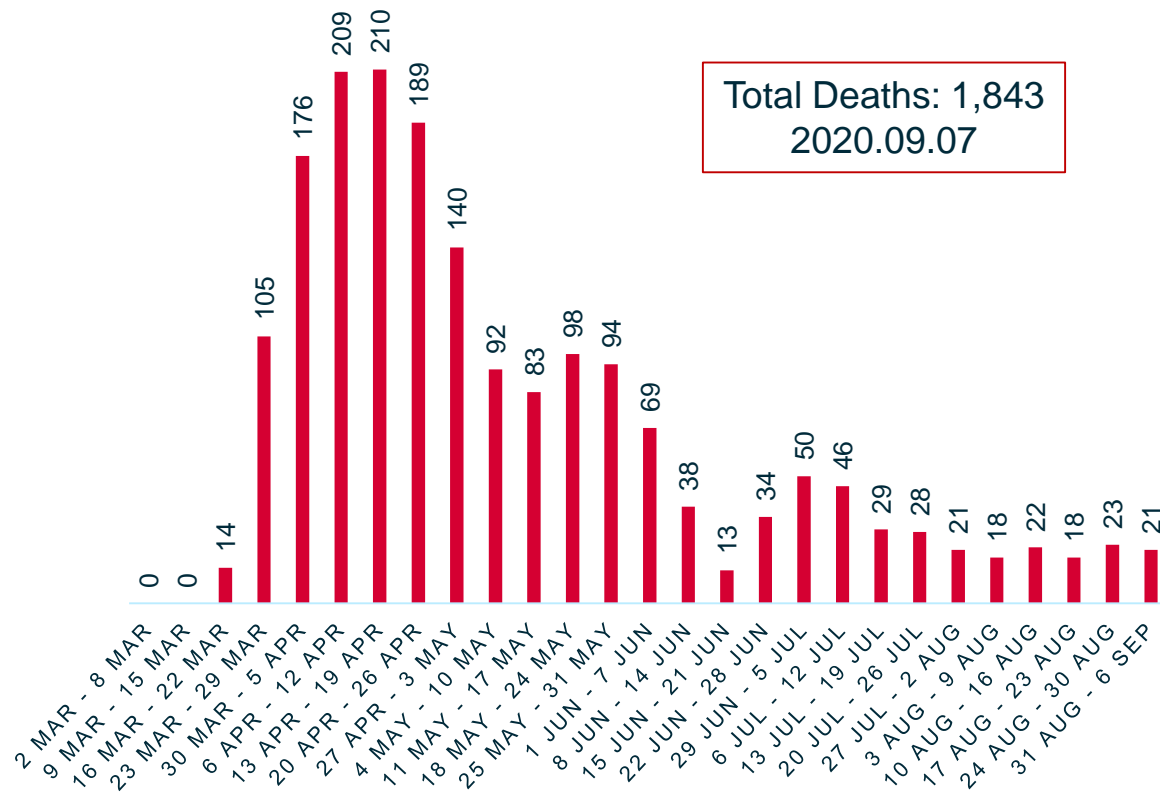
Coronavirus (SARS-CoV-2 / COVID 19) – Portugal – New Active cases per week



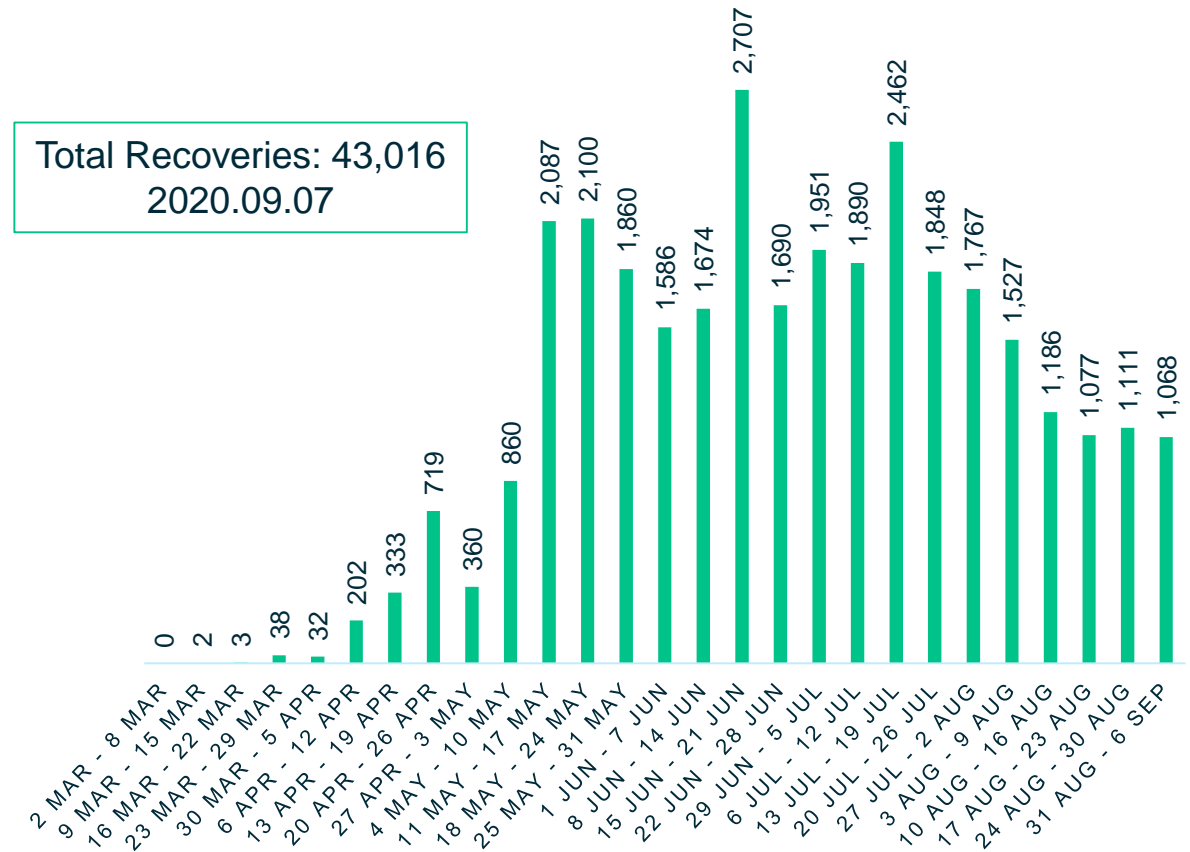
Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

Coronavirus (SARS-CoV-2 / COVID 19) – Portugal – New deaths/recoveries per week

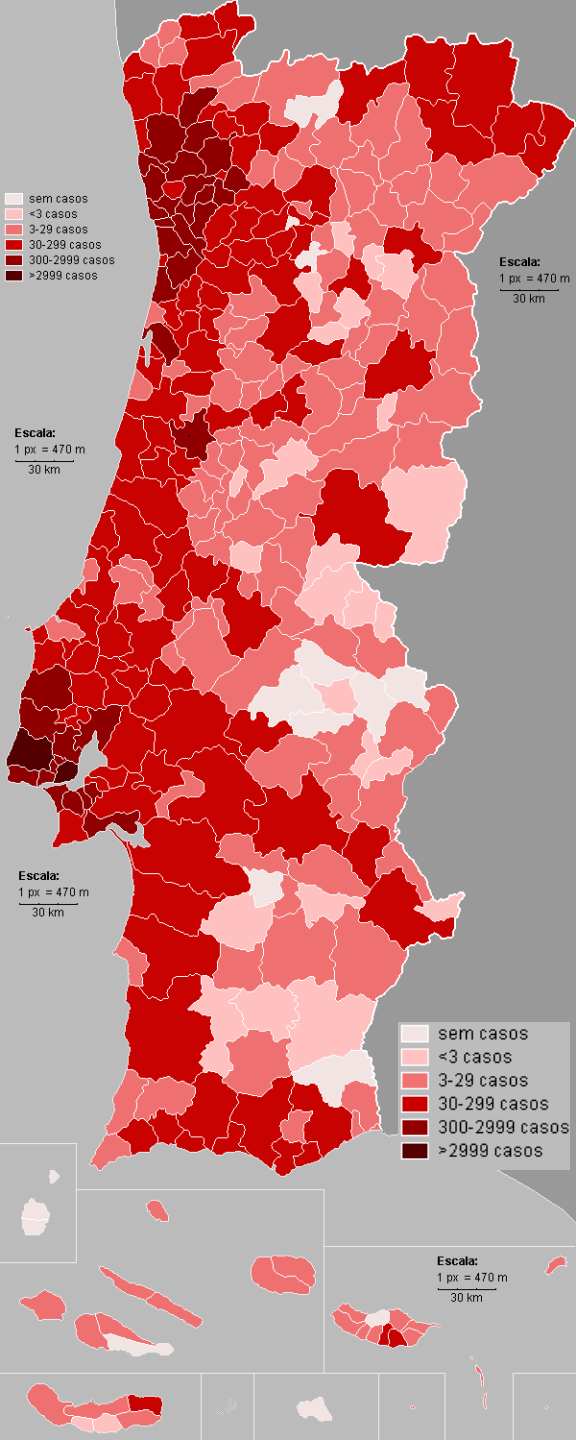
■ # of deaths per week



■ # of recoveries per week



Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>



Coronavirus (SARS-CoV-2 / COVID 19)

Portugal

7 September 2020

SITUAÇÃO EPIDEMIOLÓGICA EM PORTUGAL

TOTAL DE CASOS E VARIAÇÃO

15 648 | + 183

ATIVOS

43 016 | + 63

RECUPERADOS

1 843 | + 3

ÓBITOS

34 336 | + 96

CONTACTOS EM VIGILÂNCIA

60 507 | + 249

CONFIRMADOS

TOTAL DE CASOS, DE ÓBITOS E VARIAÇÃO POR REGIÃO

Açores

224 | + 7
15 | -

Madeira

172 | + 2
0 | -

21 930 | + 133
849 | -

4 978 | + 17
254 | -

31 048 | + 85
686 | + 3

987 | + 2
22 | -

1 168 | + 3
17 | -

Legenda

CASOS CONFIRMADOS
ÓBITOS

DISTRIBUIÇÃO DOS CASOS EM INTERNAMENTO

381 | + 27

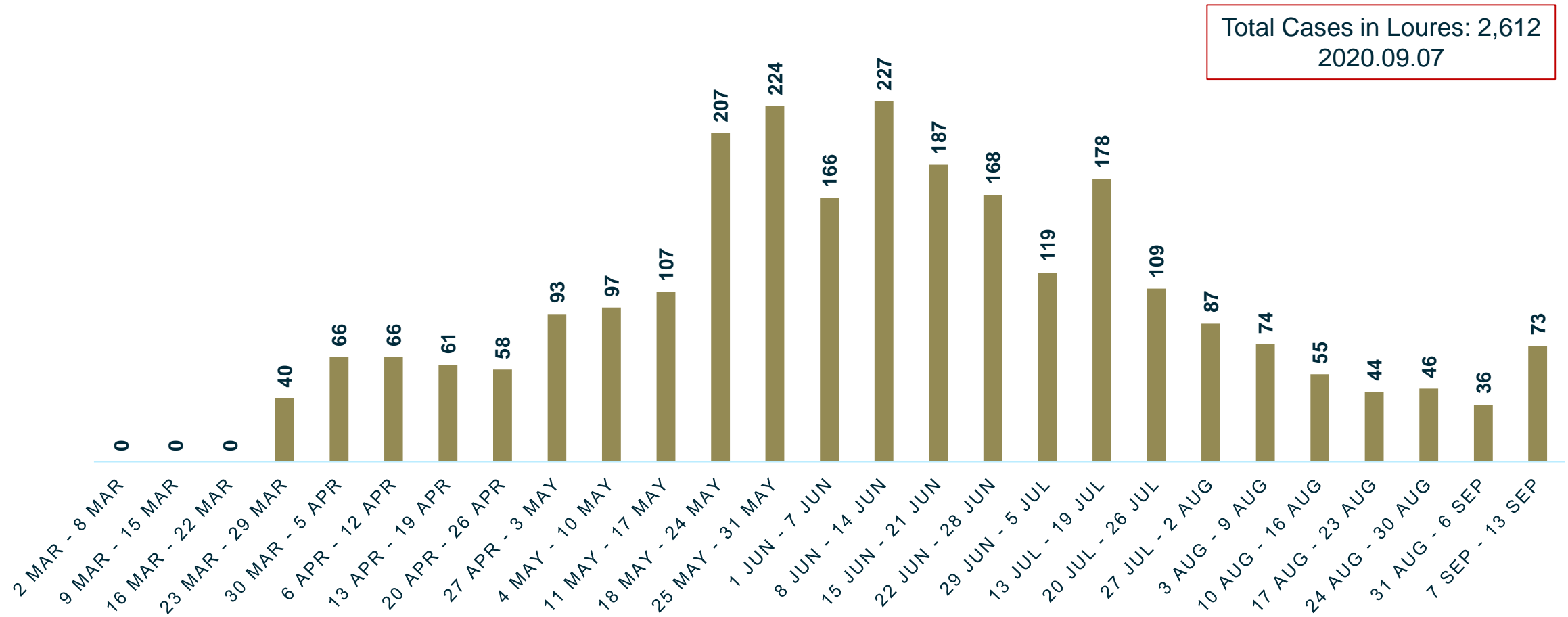
INTERNAMENTO

49 | + 6

INTERNAMENTO
EM UCI

September 2020

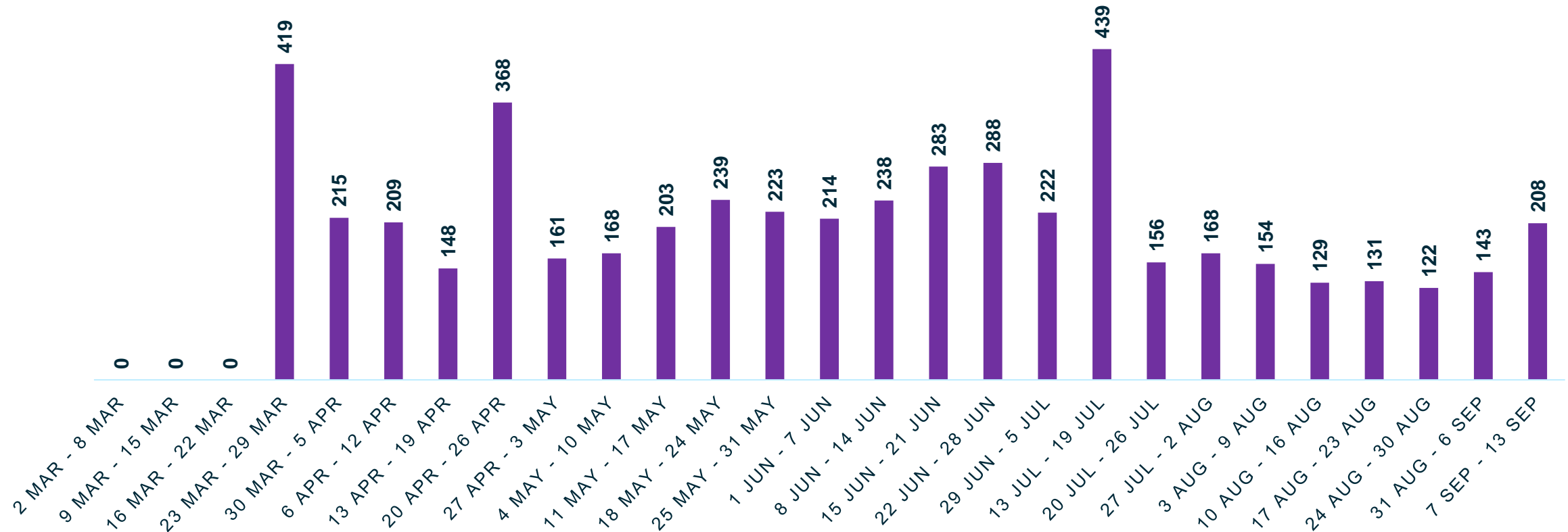
Coronavirus (SARS-CoV-2 / COVID 19)) – Loures - New cases per week



Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

Coronavirus (SARS-CoV-2 / COVID 19) – **Lisbon** - New cases per week

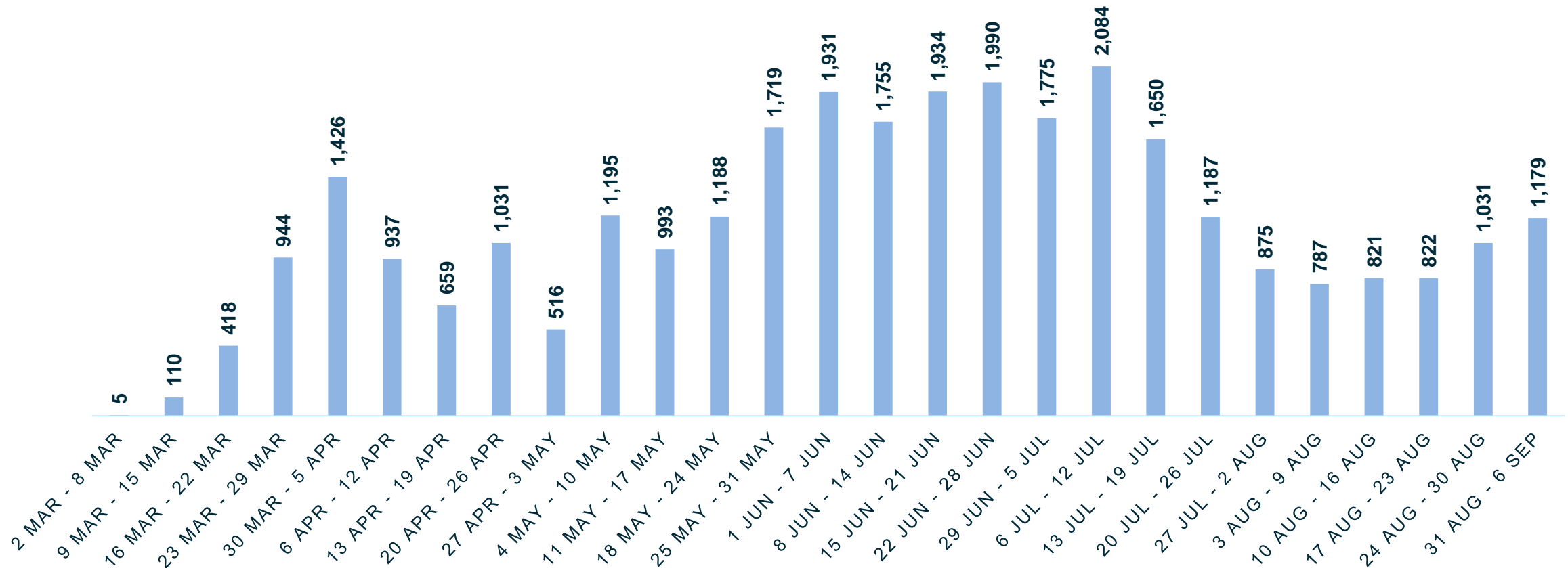
Total Cases in Lisbon: 5,295
2020.09.07



Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

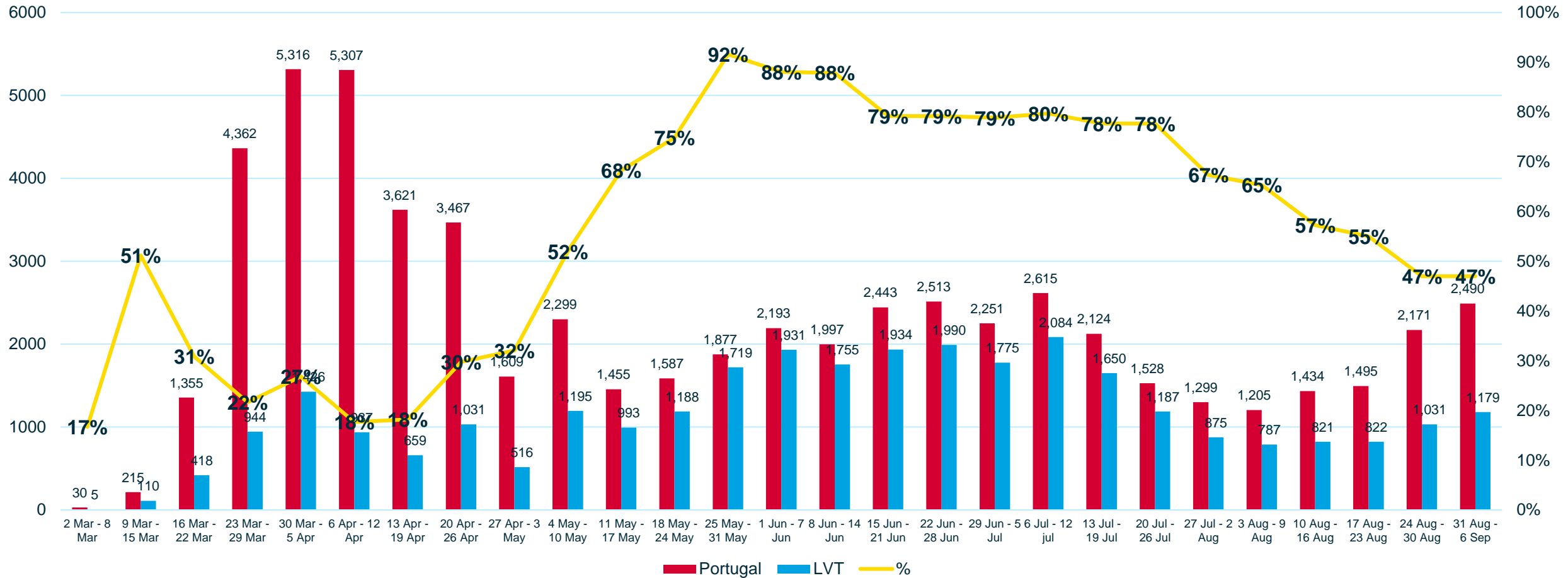
Coronavirus (SARS-CoV-2 / COVID 19) – **Lisbon and Tagus Valley** - New cases per week

Total Cases in Lisbon and Tagus Valley: 31,048
2020.09.07



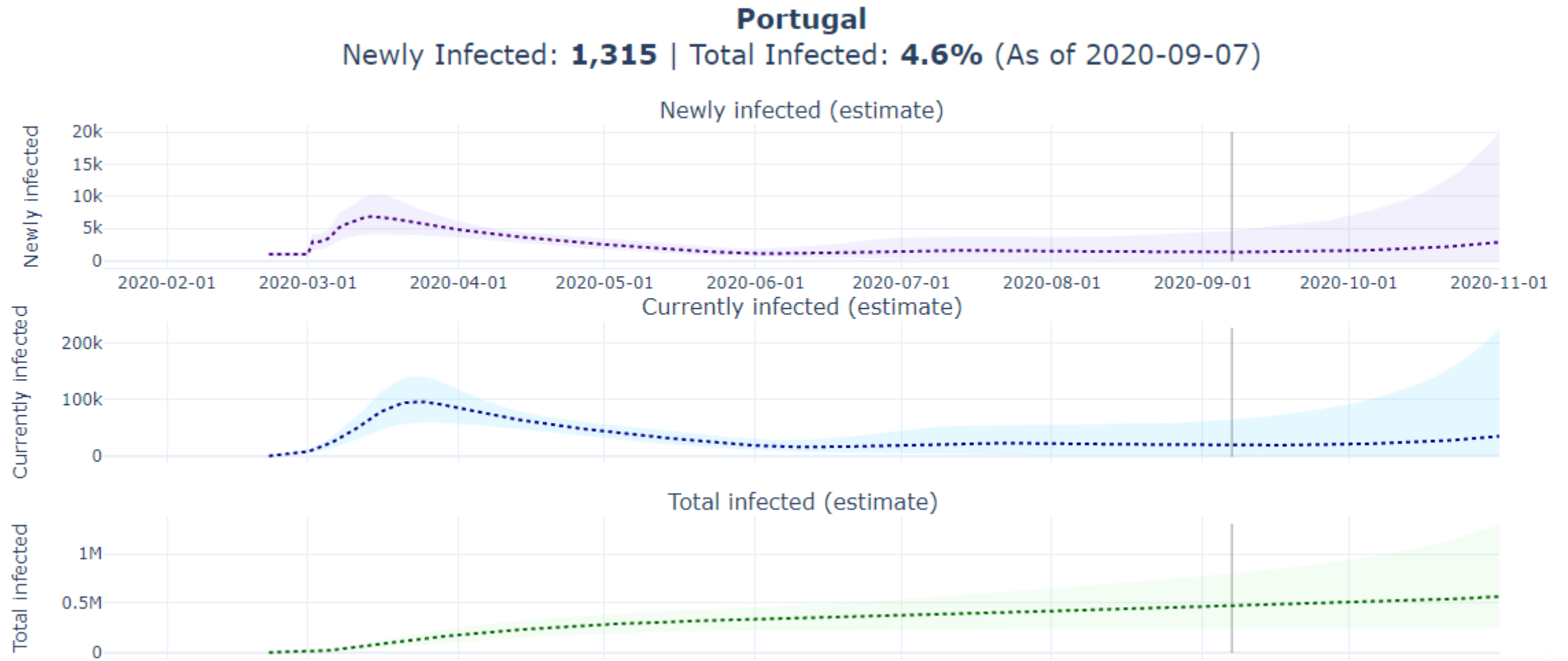
Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

Coronavirus (SARS-CoV-2 / COVID 19) – % of new cases in Lisbon and Tagus Valley - New cases per week



Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

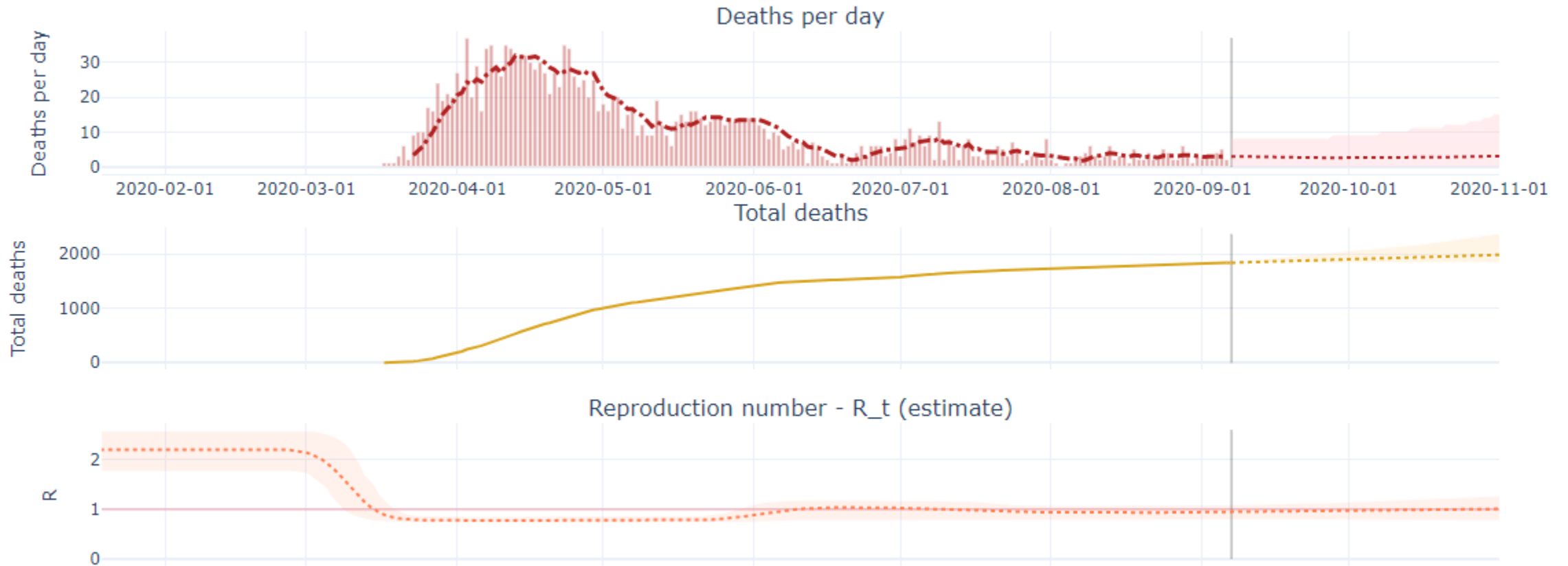
Covid-19 Projections Using Machine Learning – Portugal - Cases



Covid-19 Projections Using Machine Learning – Portugal - Deaths

Portugal

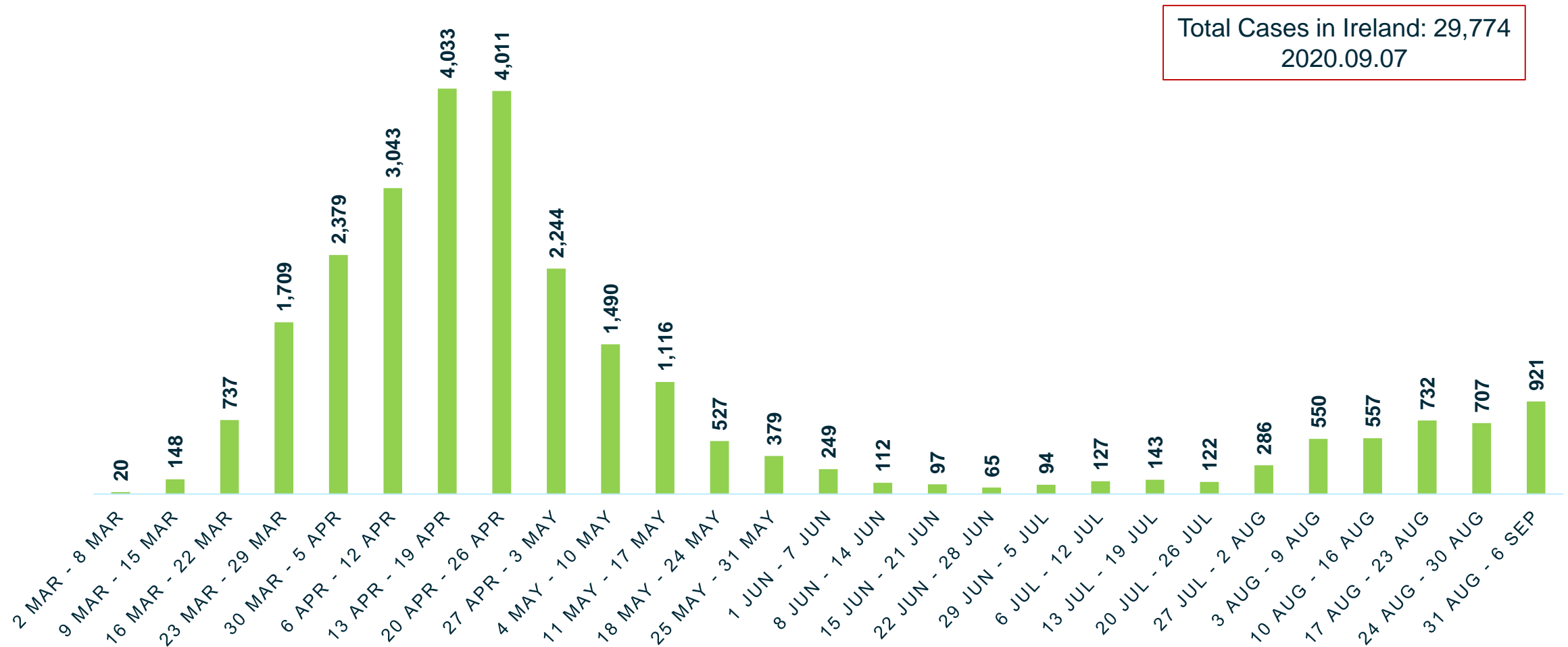
Current deaths: **1,840** | Projected total deaths: **1,989** (by 2020-11-01)



Population: 10,276,617

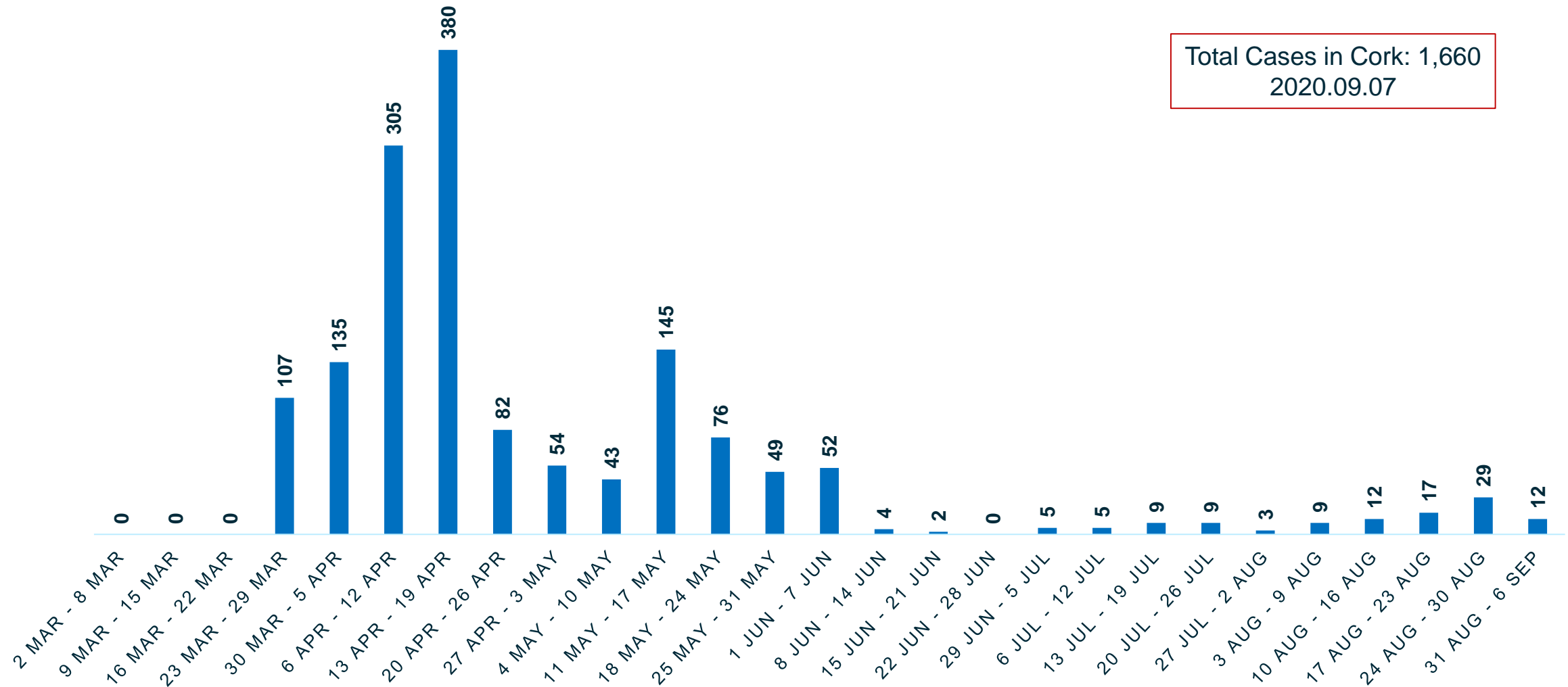
Ireland

Coronavirus (SARS-CoV-2 / COVID 19) – Ireland - New cases per week



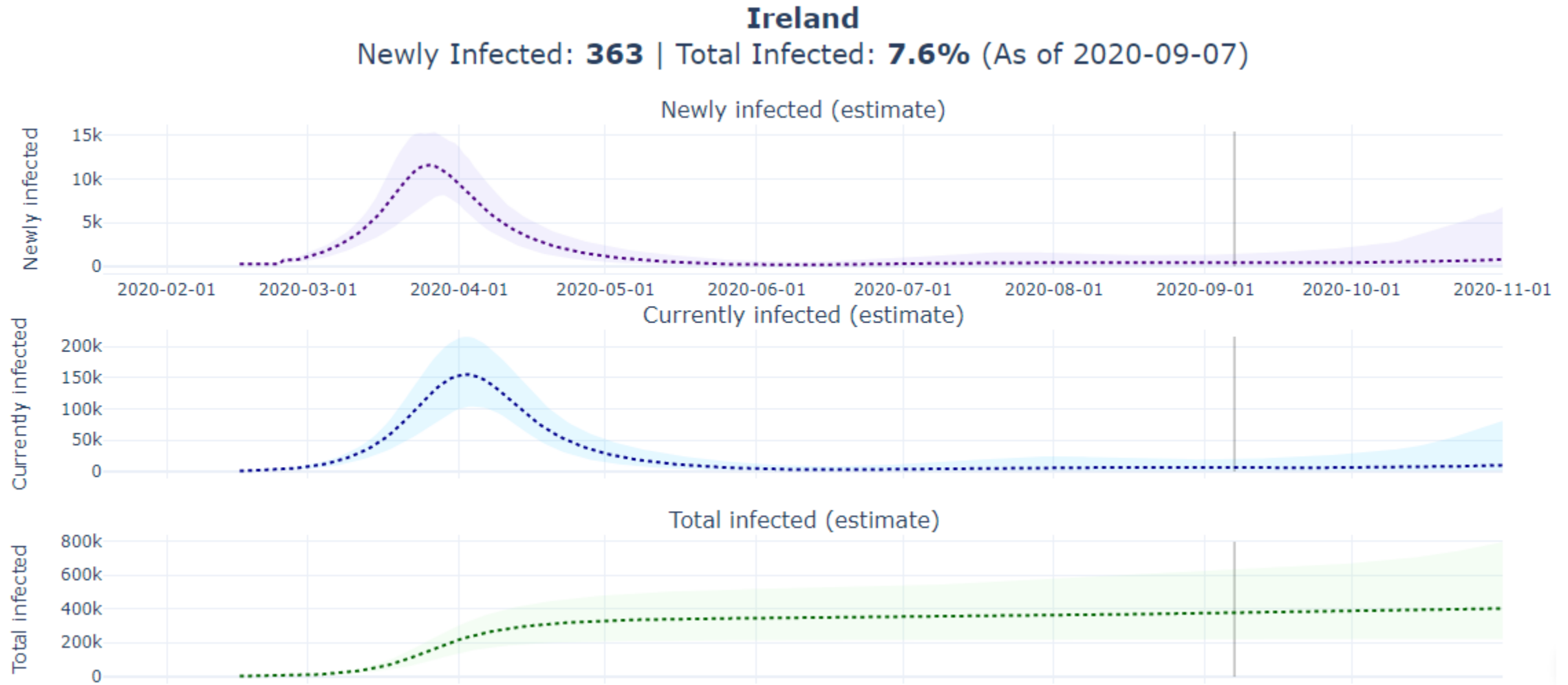
Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

Coronavirus (SARS-CoV-2 / COVID 19) – **Cork** - New cases per week



Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

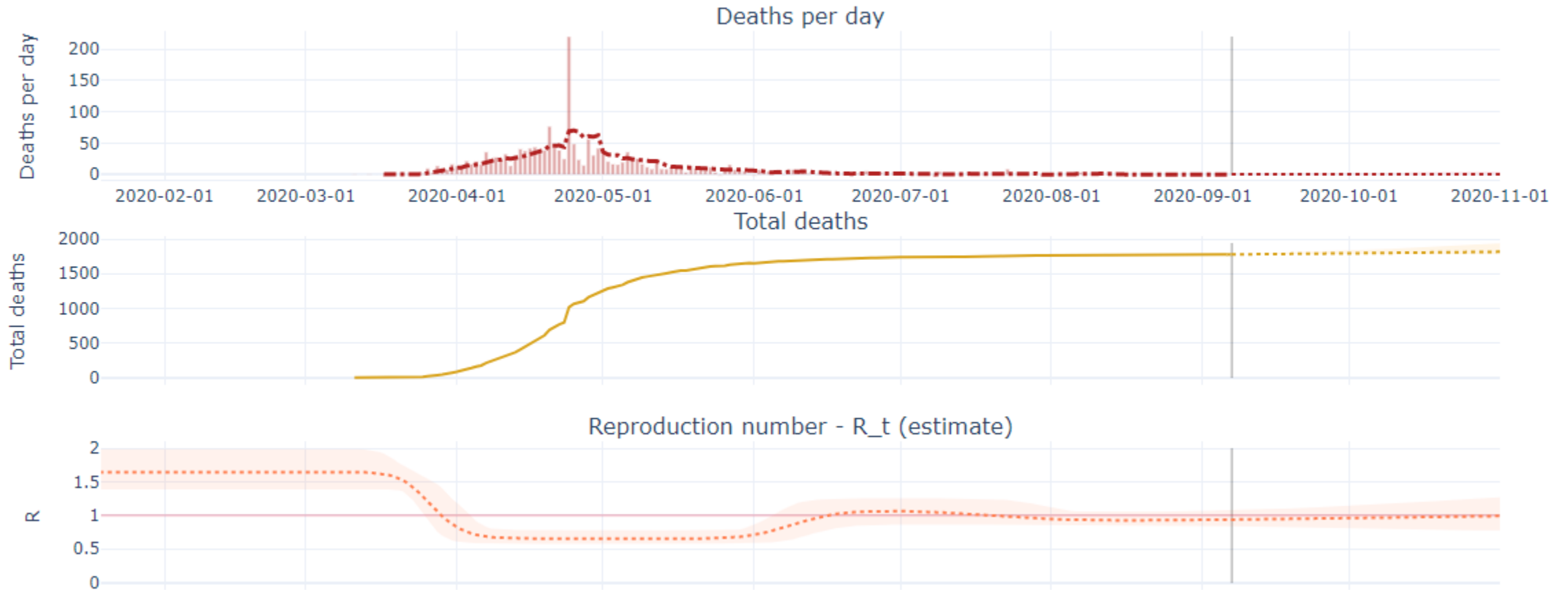
Covid-19 Projections Using Machine Learning – Ireland - Cases



Covid-19 Projections Using Machine Learning – Ireland - Deaths

Ireland

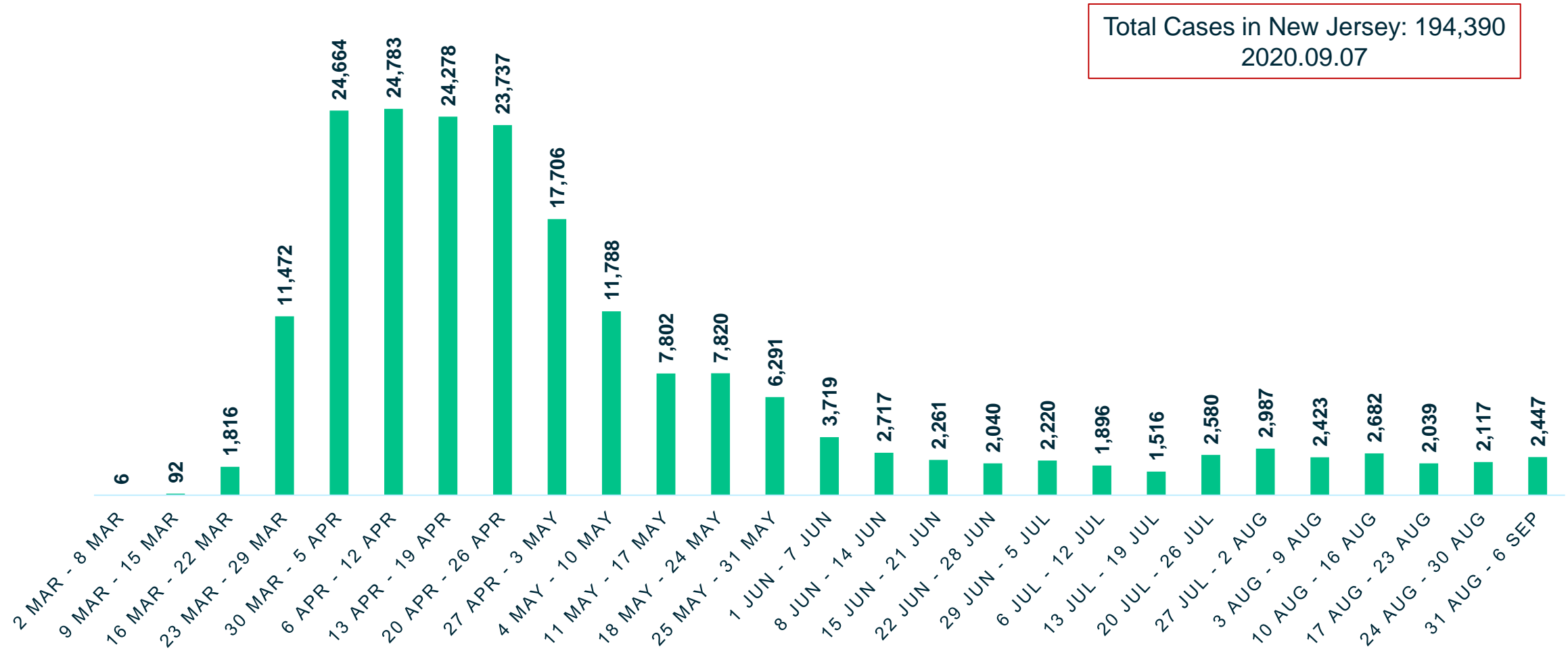
Current deaths: **1,777** | Projected total deaths: **1,816** (by 2020-11-01)



Population: 4,904,240

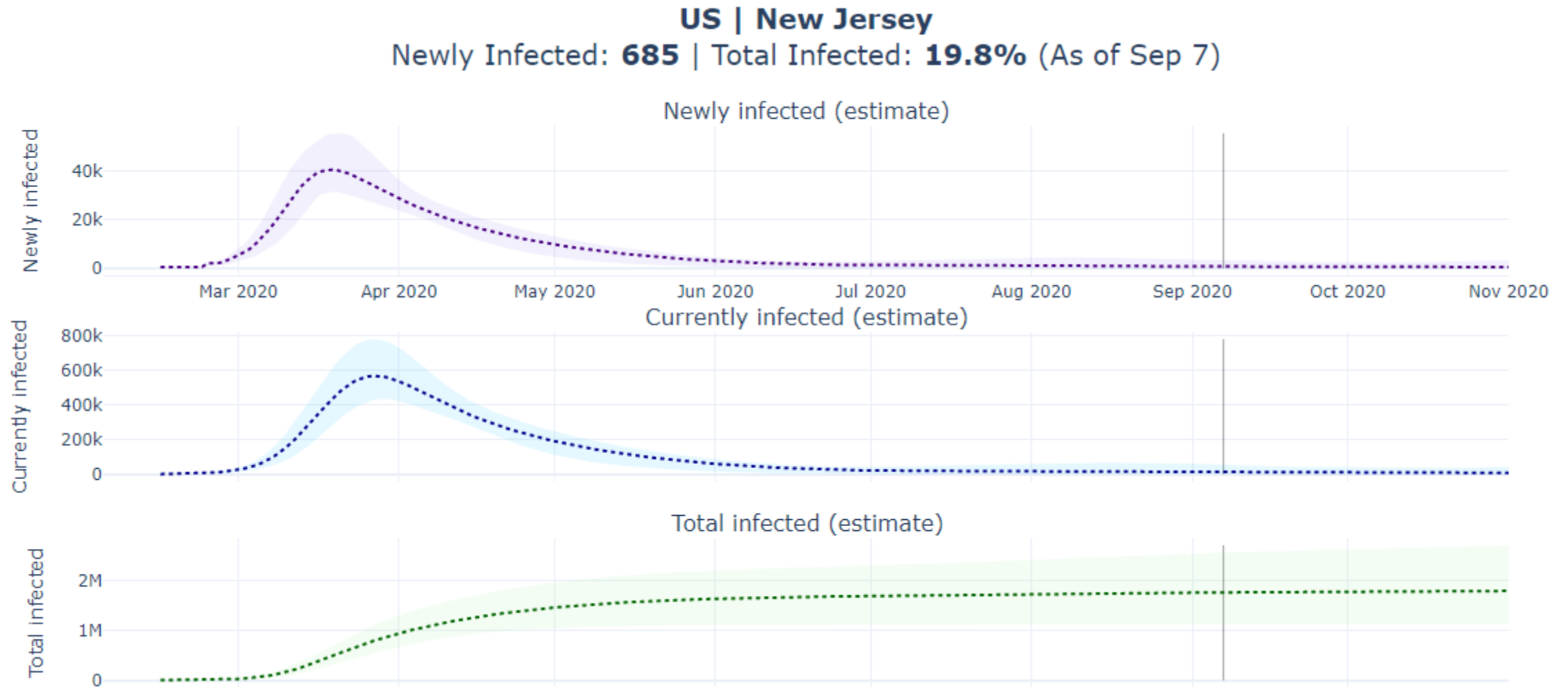
New Jersey

Coronavirus (SARS-CoV-2 / COVID 19)) – **New Jersey** - New cases per week

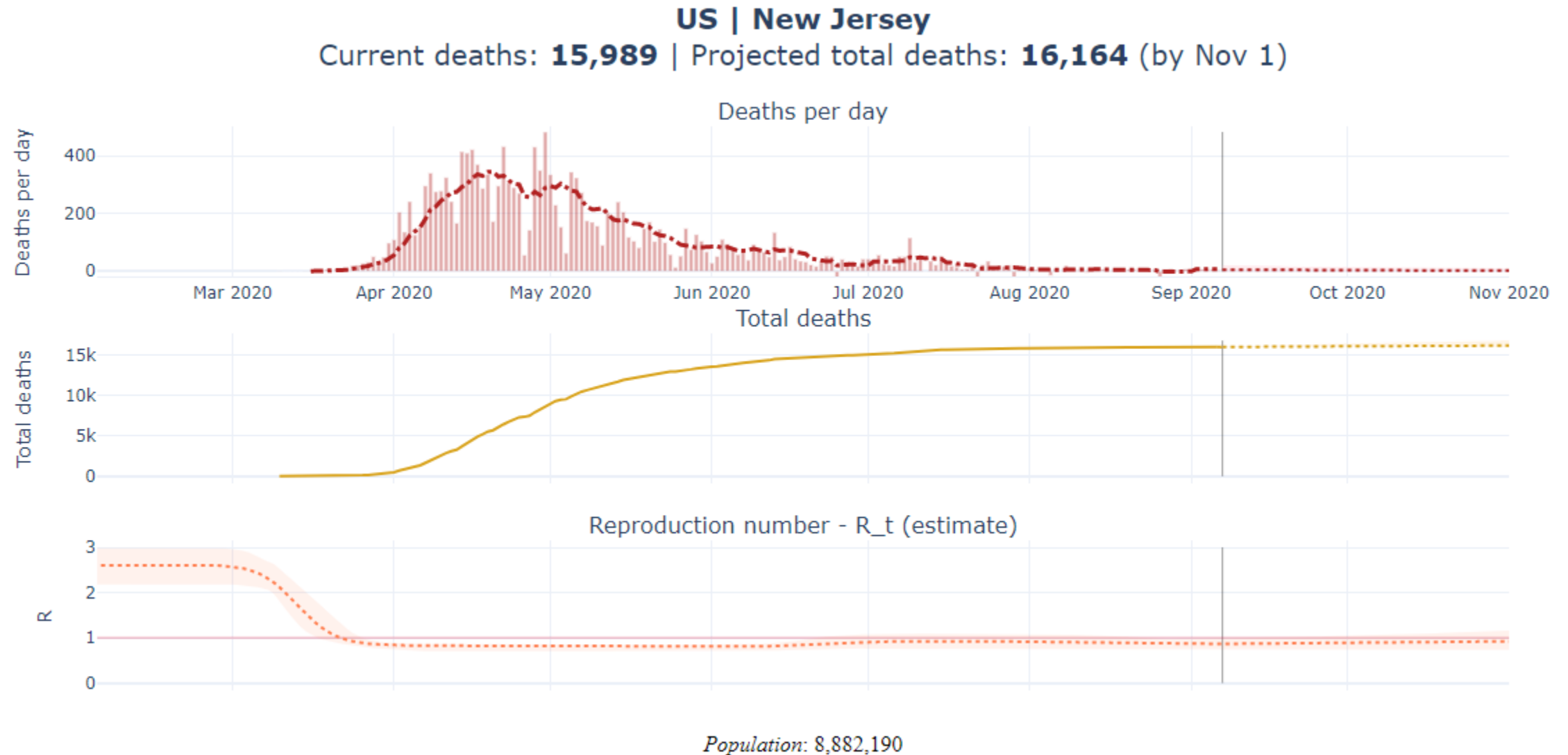


Source: <https://covid19.min-saude.pt/ponto-de-situacao-atual-em-portugal/>

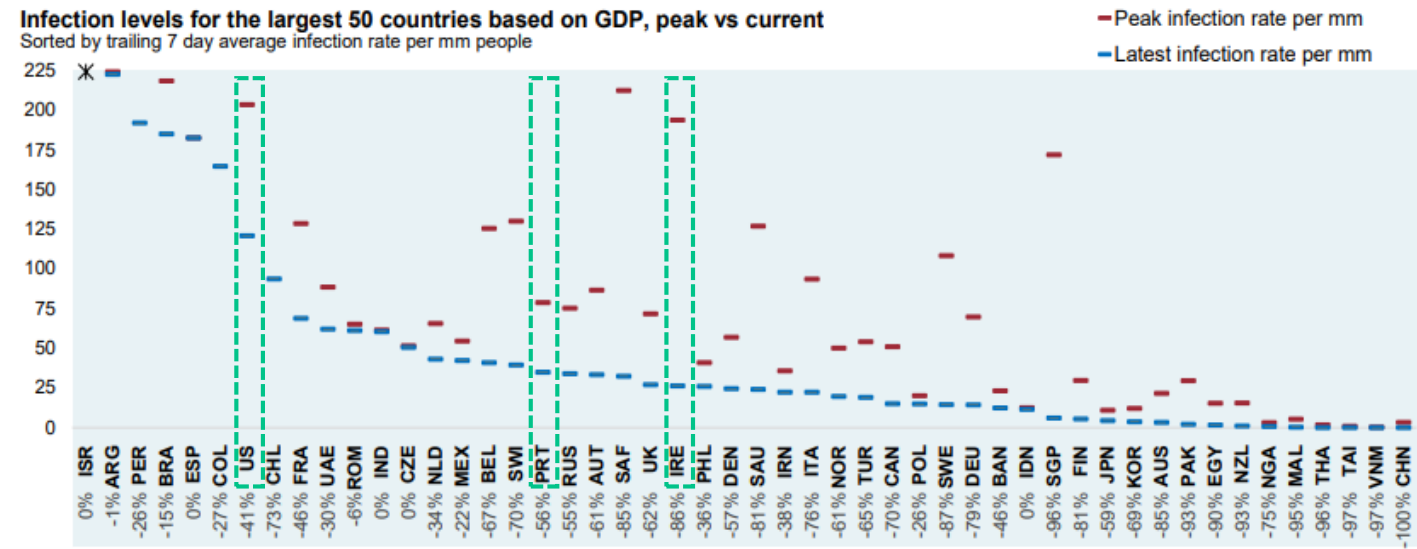
Covid-19 Projections Using Machine Learning – **New Jersey** - Cases



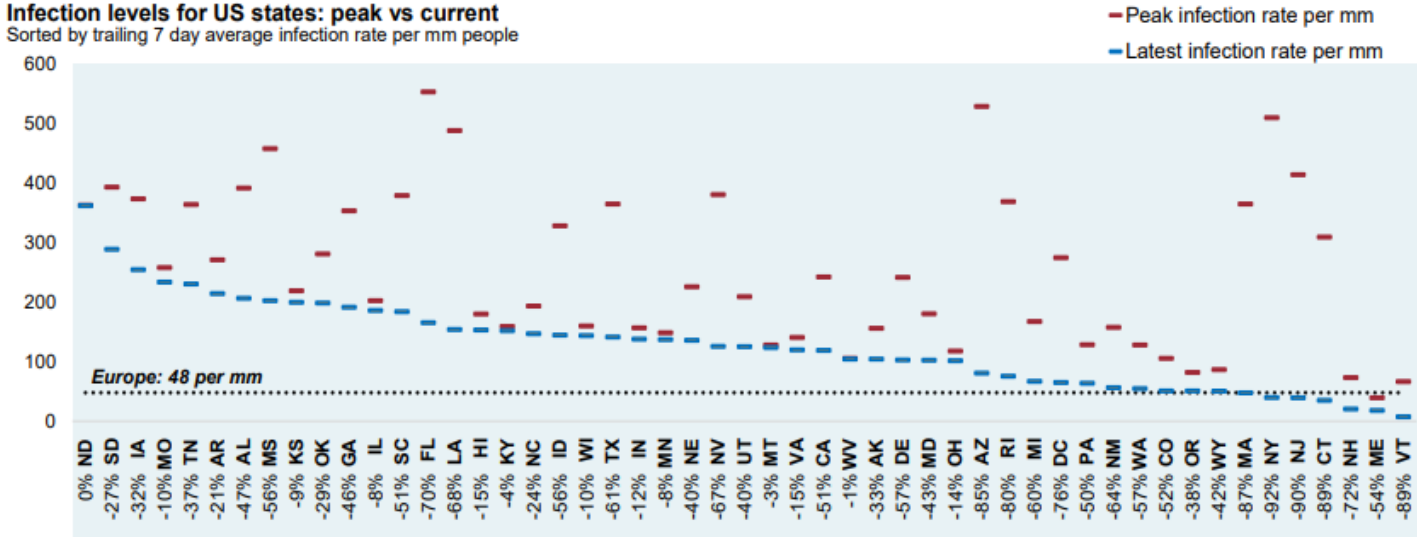
Covid-19 Projections Using Machine Learning – New Jersey - Deaths



Highest levels of infection, global and US

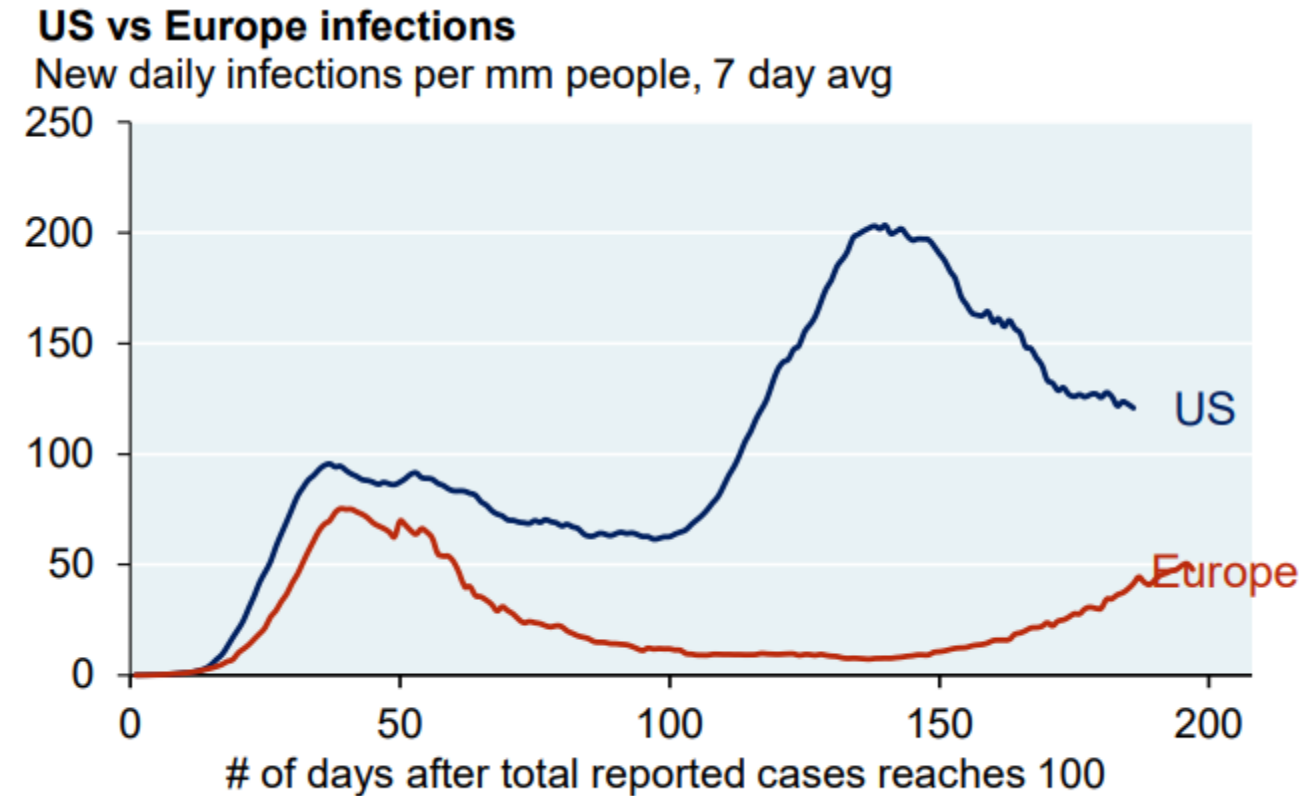


Source: Johns Hopkins University, IMF, JPMAM. Countries shown represent 94% of World GDP. Asterisk denotes countries with infection levels over 225 per mm people. September 06, 2020



Source: Johns Hopkins University, IMF, JPMAM. September 06, 2020

New daily infections per 1 million people



Source: Johns Hopkins University, IMF, JPMAM. September 06, 2020

Recent News

The latest coronavirus updates and developments impacting the global pharmaceutical supply chain...

- **8 September**

- Pfizer and BioNTech have secured regulatory approval from the Paul-Ehrlich-Institut in Germany to conduct a Phase II/III clinical trial of their Covid-19 vaccine candidate, BNT162b2. The trial is part of the global pivotal Phase II/III programme launched by BioNTech and Pfizer in July this year. It is designed to assess the safety and efficacy of the vaccine candidate in up to 30,000 participants aged 18 to 85 years.

- **4 September**

- AstraZeneca has entered into a supply agreement with US-based Albany Molecular Research for the manufacture of its Covid-19 vaccine candidate AZD1222. Albany Molecular will carry out sterile fill/finish of AZD1222 at its facility in Albuquerque, New Mexico. The aim is to leverage the manufacturing capacity at the facility to produce millions of doses of the vaccine per year.
- During a digital event hosted by the International Federation of Pharmaceutical Manufacturers & Associations, Pfizer has said that early efficacy results of its Covid-19 vaccine candidate could be available as early as next month. The company's CEO Albert Bourla noted the enrolment of approximately 23,000 participants for a Phase III trial of the vaccine so far. If positive results are obtained, the company plans to seek regulatory approval immediately.

- **3 September**

- The European Medicines Agency (EMA) is reviewing an application of Dexamethasone Taw, submitted by Taw Pharma, as a potential treatment for hospitalised adults with Covid-19. EMA said that its human medicines committee, CHMP, will assess the benefits and risks of the drug candidate within the shortest possible timeframe.
- An analysis of seven international clinical trials showed that treatment with corticosteroid drugs cuts the risk of death by 20% in critically ill Covid-19 patients. Based on these findings, the World Health Organization (WHO) has updated its treatment guidance, recommending the use of steroids for severe and critical Covid-19.

- **2 September**

- Starpharma has used its DEP drug delivery technology to develop a slow release, soluble nanoparticle formulation of Gilead Sciences' remdesivir, allowing long-term activity and less frequent dosing of the Covid-19 drug candidate. Current formulations of the drug require intravenous administration due to low solubility. The new soluble version could enable subcutaneous use in a non-hospital setting such as aged-care.

The latest coronavirus updates and developments impacting the global pharmaceutical supply chain... (cont.)

• 28 August

- The World Health Organization said it would set up a committee to review the rules on declaring an international health emergency, following criticism of its Covid-19 pandemic response.
- Spain announced schoolchildren aged six and over must wear masks to class, just days before the start of the new academic year.
- In a historic move, the US Federal Reserve announced a new monetary policy strategy aimed at building a strong labour market and stabilising prices.

• 27 August

- Moderna has reported that its Covid-19 vaccine candidate, mRNA-1273, induced immune responses in older adults in a Phase I clinical trial, indicating its potential for use across multiple age groups. The latest results are from an analysis of 20 additional older volunteers who were given an 100µg dose. According to the company, the immune response was similar across age groups of 56 to 70, above 70 and 18 to 55 years.
- The collaboration between the National Research Council of Canada and China-based CanSino Biologics, announced in May for vaccine clinical trials, has been terminated after China had held up vaccine shipments, according to CBC news agency.
- The global economy is gradually showing signs of recovery after a major decline in the first half of the year.
- The growth of the economy is expected to continue from the second half of the year, although the labour market will take a long time to recover.

• 26 August

- Two European patients were confirmed to have been re-infected with coronavirus, raising concerns about immunity. Regional public broadcasters said a patient in the Netherlands and another in Belgium had been re-infected.
- AstraZeneca has started dosing participants in a Phase I clinical trial of monoclonal antibody (mAb) combination therapeutic AZD7442 to prevent and treat Covid-19.

• 25 August

- Moderna has completed advanced exploratory discussions with the European Commission (EC) for the supply of 80 million doses of its Covid-19 vaccine candidate, mRNA-1273. The proposed agreement includes an option for European Union (EU) Member States to acquire an additional 80 million doses. The vaccine candidate is currently in a Phase III clinical trial.
- Catalent has agreed to manufacture drug substance for AstraZeneca/Oxford University's potential Covid-19 vaccine. Catalent Cell & Gene Therapy will produce the drug substance at the company's commercial gene therapy manufacturing facility in Harmans, Maryland, US.

The latest coronavirus updates and developments impacting the global pharmaceutical supply chain... (cont.)

• 21 August

- Japan plans to ease its Covid-19 entry restrictions on foreign nationals with resident visas starting next month, public broadcaster NHK reported. Re-entry will be permitted for visa holders, including permanent residents and exchange students, on condition that they undergo coronavirus testing and quarantine for 14 days, the same policy that applies to Japanese citizens re-entering the country, according to NHK.
- Germany-based CureVac and the European Commission (EC) have concluded exploratory discussions on an Advanced Purchase Agreement (APA) for the company's mRNA-based Covid-19 vaccine candidate.
- Pfizer and BioNTech have reported positive early safety and immunogenicity data from the Phase I clinical trial of their second Covid-19 vaccine candidate, BNT162b2, in the US.
- Russia's Covid-19 vaccine candidate, Sputnik V, will be tested in more than 40,000 participants in a clinical trial that is scheduled to start next week, according to Reuters.

• 20 August

- Roche and Regeneron have partnered to develop, manufacture and distribute the latter's antiviral antibody combination, REGN-COV2, as potential Covid-19 treatment.
- Dr Reddy's Laboratories has launched Avigan (Favipiravir) 200mg Tablets in India to treat Covid-19 as part of its licensing agreement with Fujifilm Toyama Chemical.

• 19 August

- Brazil: Brazil's health regulator has approved final stage trials for Johnson & Johnson's experimental coronavirus vaccine – the fourth to get approval for testing in the country. The vaccine will be tested on 7,000 volunteers across seven states, Anvisa, the health regulator, said in a statement.
- The new CARE (Corona Accelerated R&D in Europe) consortium has launched in Europe to expedite the discovery and development of medicines against Covid-19. It is supported by the Innovative Medicines Initiative (IMI), along with funds from the European Union (EU), eleven European Federation of Pharmaceutical Industries and Associations (EFPIA) companies and three IMI-associated partners. The five-year project brings together 37 teams across academic and non-profit research institutions and pharmaceutical companies globally. It has an initial grant of €77.7m from the European Union, European Federation of Pharmaceutical Industries and Associations (EFPIA) and three IMI-associated partners. The consortium builds on three main pillars – drug repurposing and repositioning, small molecule drug discovery and virus neutralising antibody discovery.

• 18 August

- China's state media is reporting that a potential vaccine being developed by a unit of China National Pharmaceutical Group (Sinopharm), will cost no more than 1,000 yuan (\$144.27) for two shots.

• 17 August

- The European Commission (EC) has concluded an agreement with AstraZeneca for the supply of up to 400 million doses of the potential Covid-19 vaccine, AZD1222.

The latest coronavirus updates and developments impacting the global pharmaceutical supply chain... (cont.)

- **13 August**

- The UK economy is entering recession, having recorded its biggest contraction in history in Q2 due to the Covid-19 pandemic. The lockdown measures implemented due to the Covid-19 pandemic caused the UK GDP to contract by 20.4% in the second quarter of 2020.

- **10 August**

- Moderna says it's on track to recruit a full 30,000 subjects for its vaccine trial by September.
- Gilead submitted Veklury, better known as remdesivir, for an official FDA approval. The drug started its COVID-19 regulatory journey with a rolling new drug application in early April. It landed an FDA emergency use authorization in May, shortly followed by its global-first nod in Japan, as well as a conditional EU go-ahead last month. The filing is based on data from phase 3 clinical studies: One by the National Institute of Allergy and Infectious Diseases showed the med could cut recovery time by 31%, and the other found that a 5-day or 10-day treatment duration led to a similar clinical improvement.

- **7 August**

- With reports of remdesivir scarcity rolling in from U.S. hospitals, Pfizer has stepped up to provide contract manufacturing for Gilead Sciences. Pfizer said the multiyear pact, centered on its plant in McPherson, Kansas, aligns with its stated goal to spur collaboration in the fight against COVID-19. Pfizer is one of several external manufacturers aiding in the remdesivir scale-up, the company said.
- For its part, Gilead says it has shortened manufacturing time on remdesivir to six months and enlisted more than 40 companies in the U.S., Europe and Asia to help shore up supplies of the antiviral. Gilead says it now expects to meet real-time demand starting in October, and it aims to deliver more than 200 million treatment courses by 2020's close.

The latest coronavirus updates and developments impacting the global pharmaceutical supply chain... (cont.)

• 6 August

- Moderna has priced smaller volume agreements for its potential Covid-19 vaccine at between \$32 and \$37 per dose. Larger volume agreements for the vaccine will be priced lower, the company said. The vaccine candidate is currently in a Phase III trial, which is designed to enrol approximately 30,000 participants.
- The NIH launched a phase 3 trial of Gilead Sciences' antiviral remdesivir and Merck KGaA's interferon-based multiple sclerosis drug Rebif. The ACTT 3 trial aims to enroll more than 1,000 adults hospitalized with COVID-19 and test a combination of the two drugs against remdesivir alone. The idea is that Rebif—which dampens MS flares by modulating the immune system—may work alongside remdesivir to help patients recover more quickly.

• 5 August

- Moderna's experimental vaccine protected mice who were exposed to the novel coronavirus, the National Institutes of Health reports.
- Taiwan has granted provisional authorisation to steroid drug dexamethasone as a treatment for Covid-19. The decision comes as the country faces a shortfall of the antiviral drug remdesivir, according to Reuters. Taiwan had ordered for 2,000 doses of remdesivir to arrive by the end of July, but currently only has 78 doses in stock, which were enough to treat 54 seriously-ill patients.
- As leading COVID-19 vaccine players advance their programs, pricing is becoming clearer, the Wall Street Journal reports. AstraZeneca has a deal with the U.S. for \$4 per dose, while J&J's Wednesday agreement is for \$10 per dose. Pfizer's U.S. agreement is for \$19.50 per dose, while Moderna said it'd charge a much higher price.

• 4 August

- A bipartisan coalition of 30 state AGs demanded that U.S. health agencies crack open the market for Gilead Sciences' remdesivir, the only antiviral proven to work against Sars-CoV-2. The government should exercise its "march-in rights" under the Bayh-Dole Act to allow generic versions of the Gilead drug, which is priced at \$250 per vial, the letter argued.
- In Gilead Sciences' portfolio is a drug, GS-441524, that some cat owners buy on the black market to treat feline infectious peritonitis, or FIP. It's also related to the coronavirus drug remdesivir—and its patent expires first. In a letter to the company and four U.S. agencies, Public Citizen urged Gilead to study GS-441524 in humans for COVID-19, saying the treatment, if effective, could be a lower-cost alternative to remdesivir. And it might actually be easier to convert to inhaled or oral form, the organization argued.

• 3 August

- A trio of rival drugmakers kicked off a joint study of three drugs that could combat the extreme immune response seen in severe coronavirus patients. The trial will test Amgen's psoriasis drug Otezla, Takeda's anti-inflammatory Firaqyr and AbbVie's HIV hopeful cenicriviroc, each in combination with Gilead Sciences' remdesivir and the low-cost steroid dexamethasone. Early results could be ready in six weeks, the research alliance said.

Sources

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