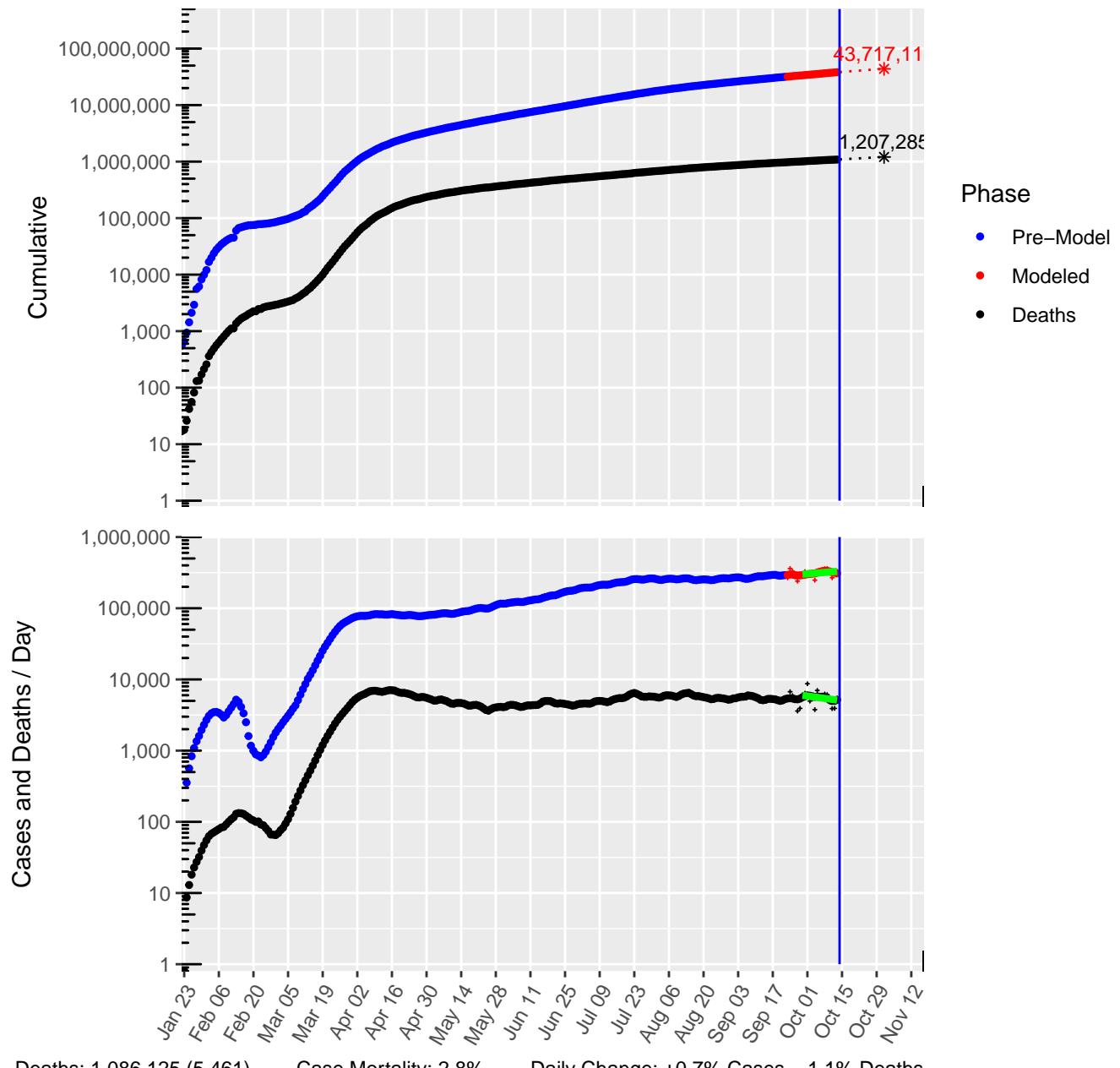
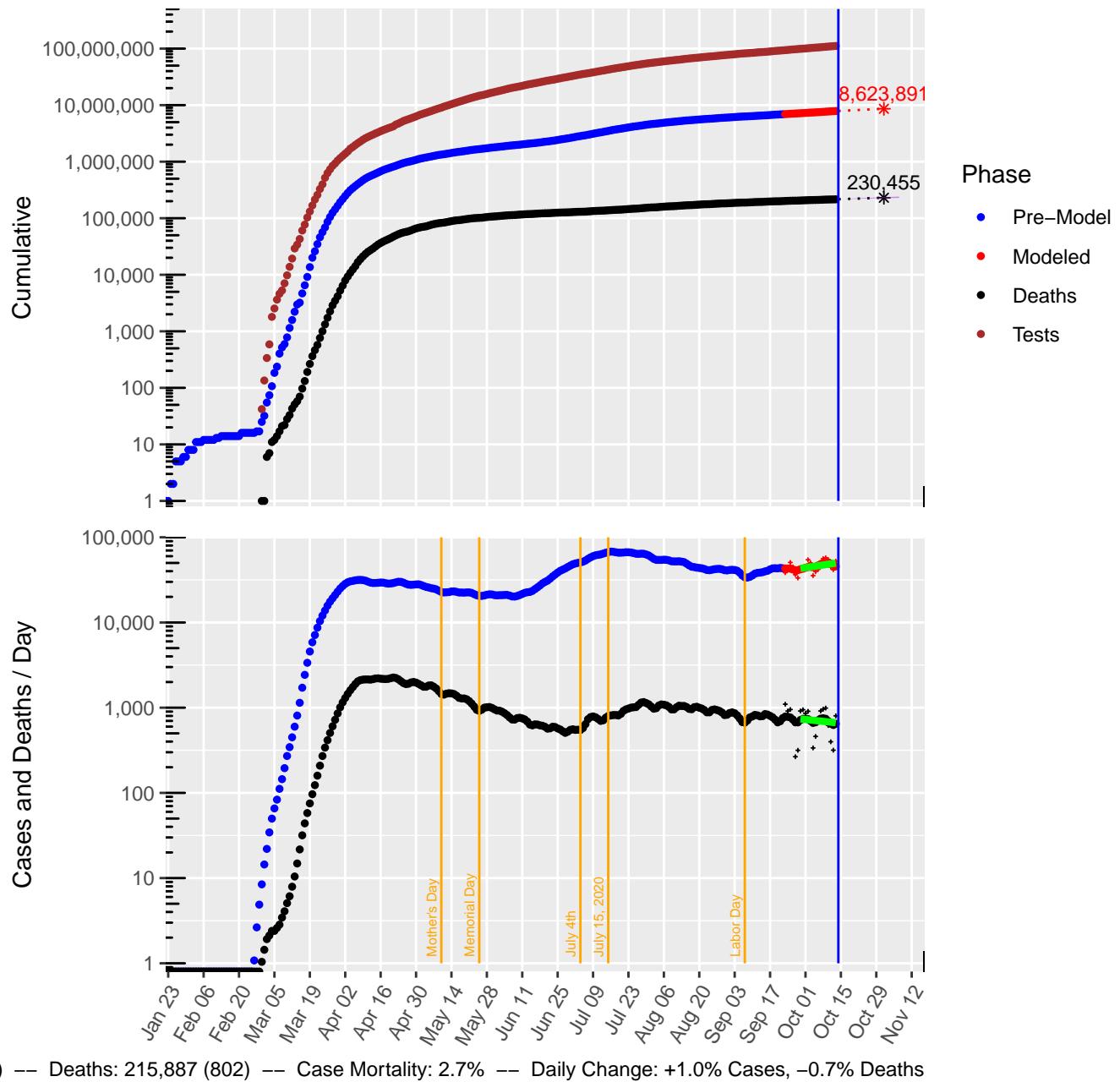


Worldwide projection as of 2020-10-14

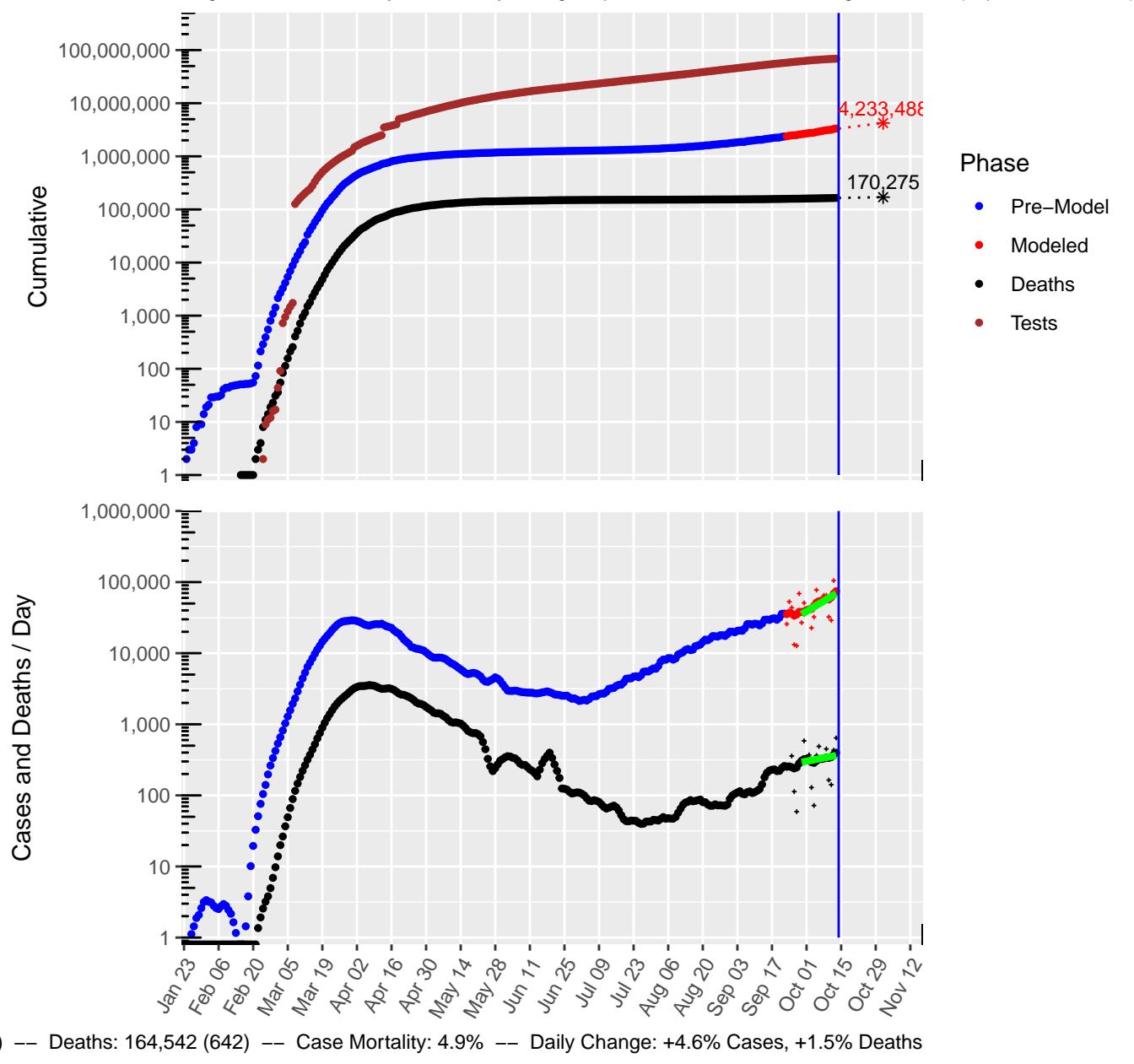


USA projection as of 2020-10-14



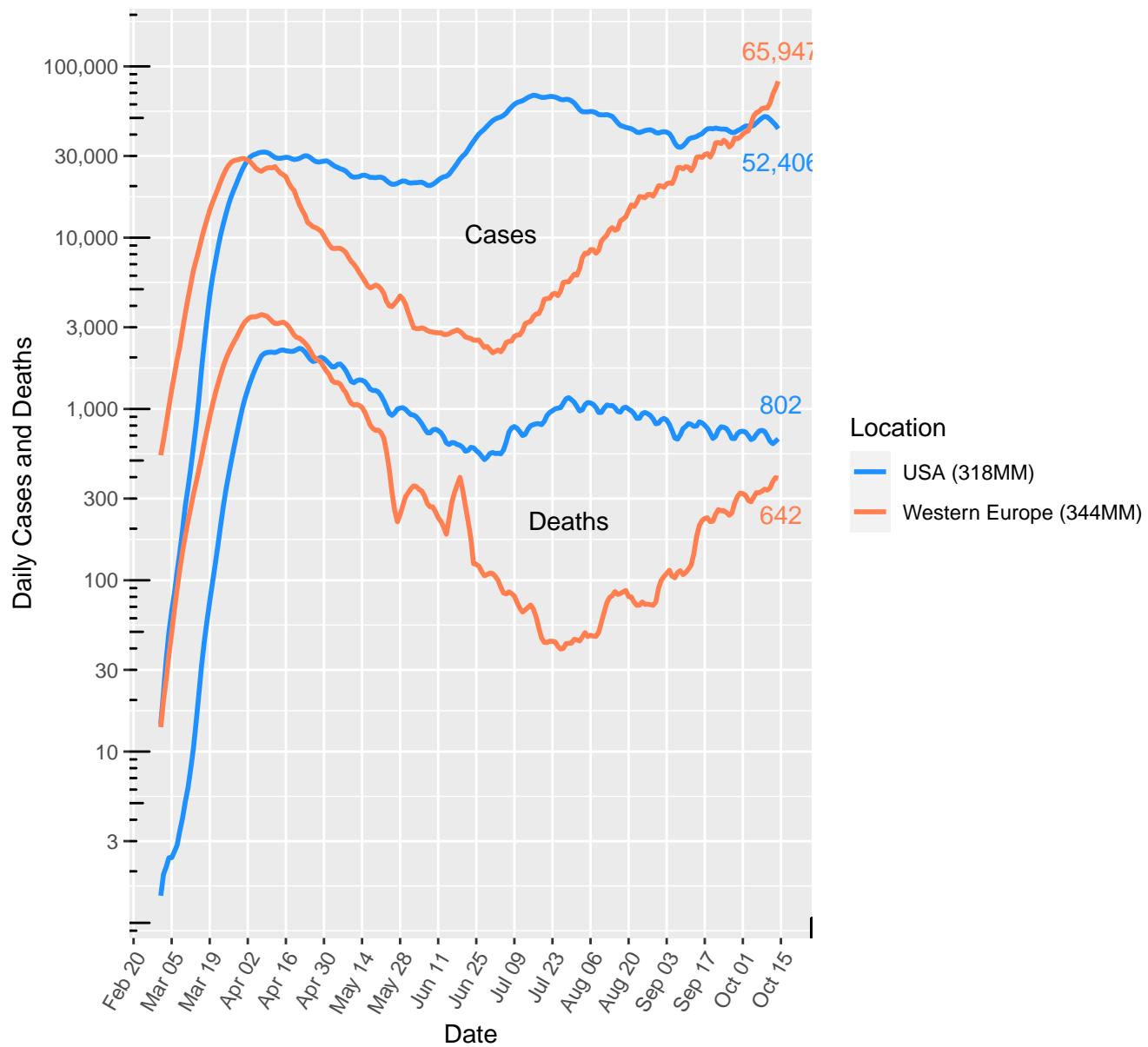
Western Europe projection as of 2020-10-14

Belgium, France, Germany, Greece, Italy, Portugal, Spain, Netherlands, Luxembourg, and the UK (Population = 344MM)



Comparison of COVID-19 Cases & Deaths between US & Europe

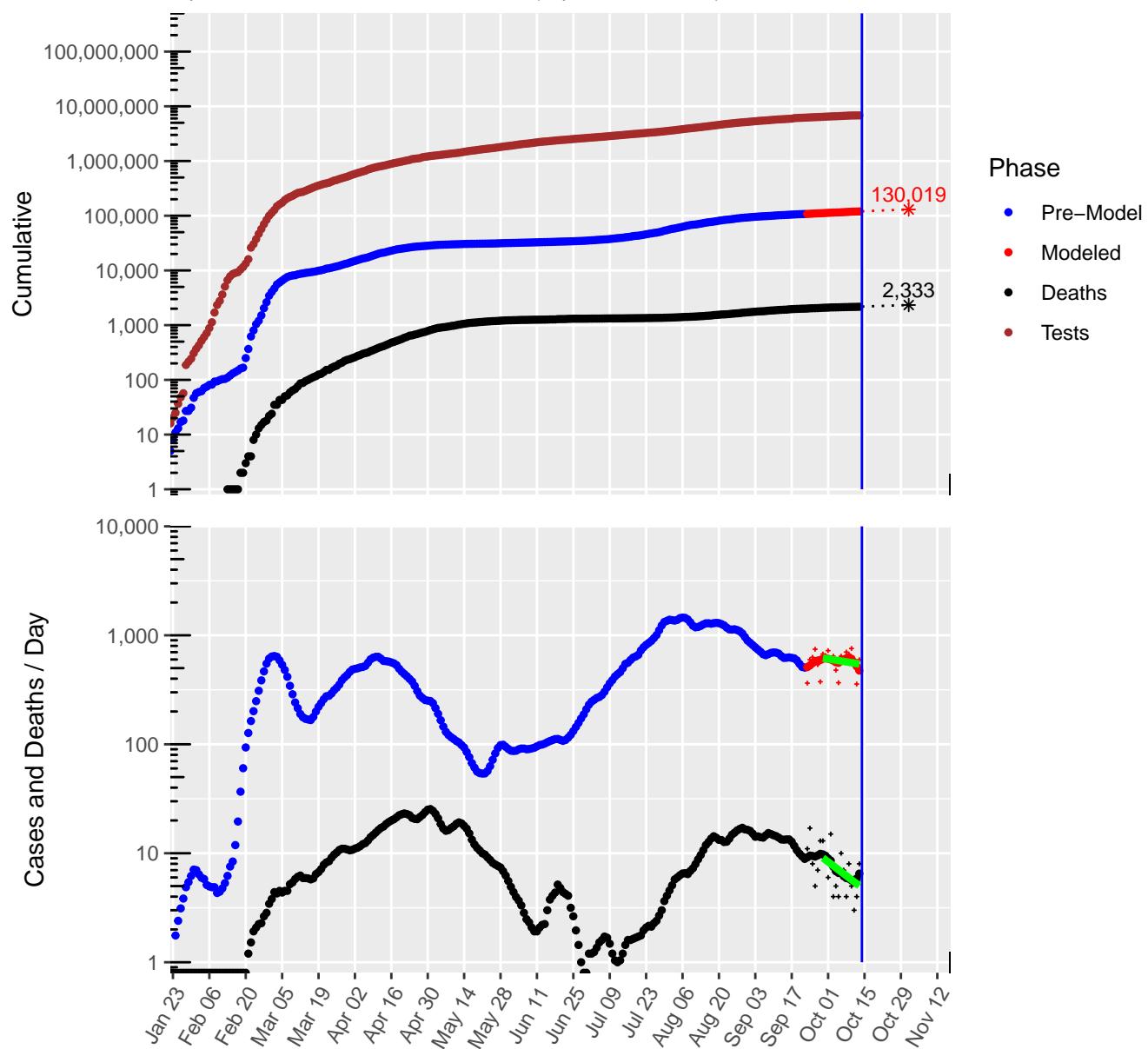
Log plot of 7 day average



Numbers on the right are yesterday's figures, and will differ a bit from the plotted rolling mean

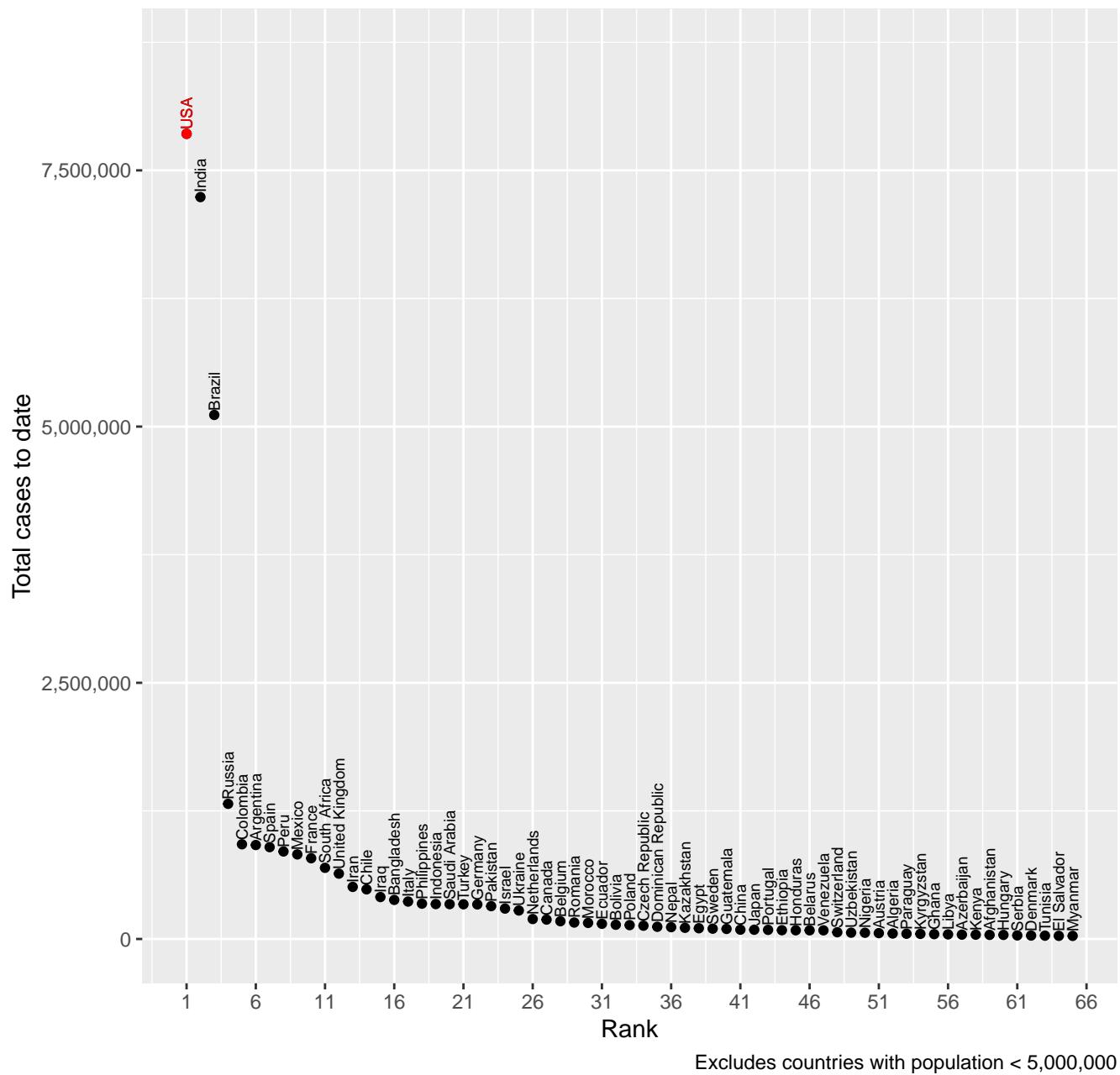
Non-authoritarian Asian ensemble projection as of 2020-10-14

Japan, South Korea, Thailand, and Vietnam (Population = 328 MM)



(597) — Deaths: 2,167 (8) — Case Mortality: 1.8% — Daily Change: -0.9% Cases, -4.1% Deaths

Worldwide cases



Worldwide cases

Total cases to date

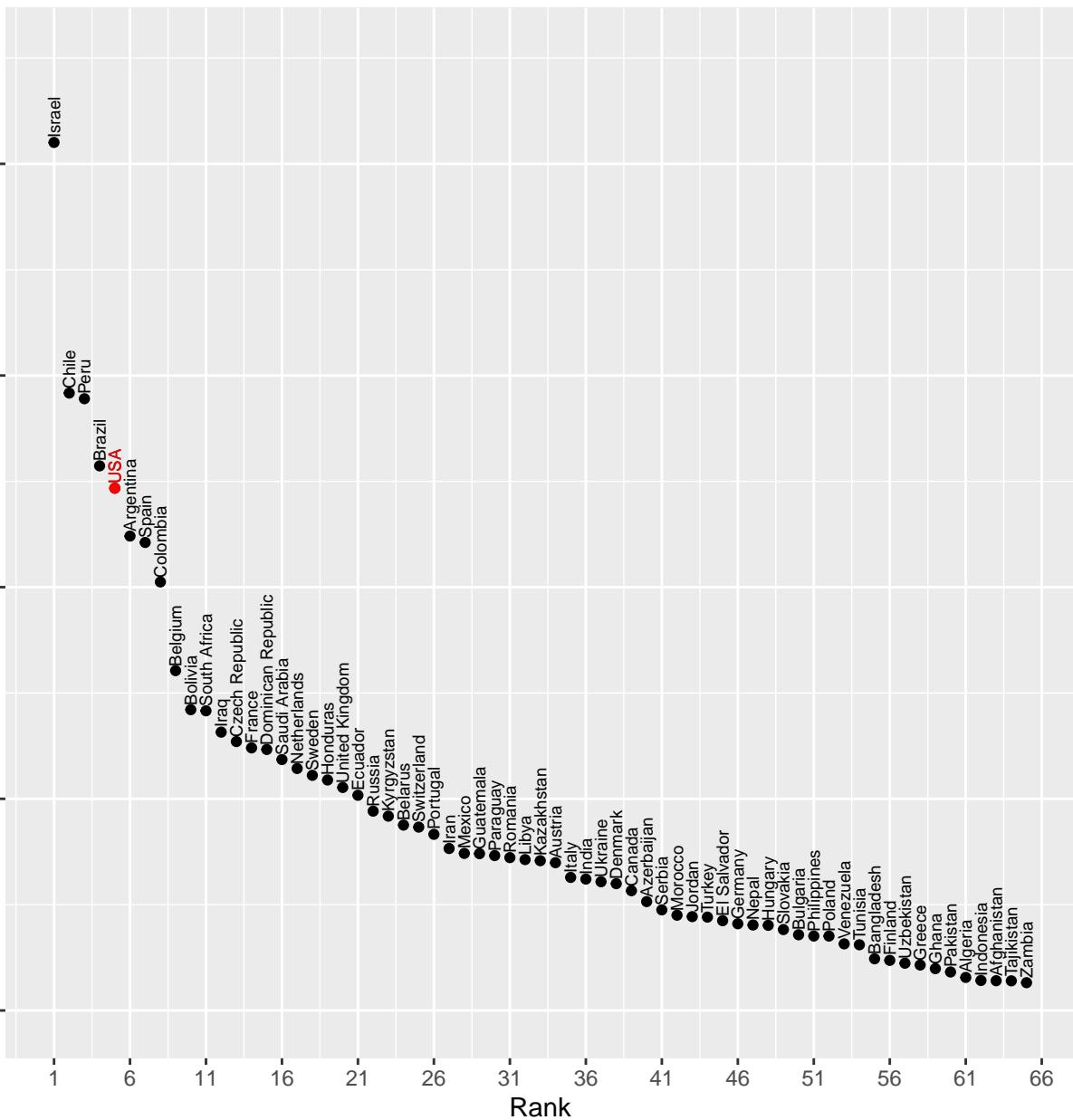
1 in 25

1 in 33

1 in 50

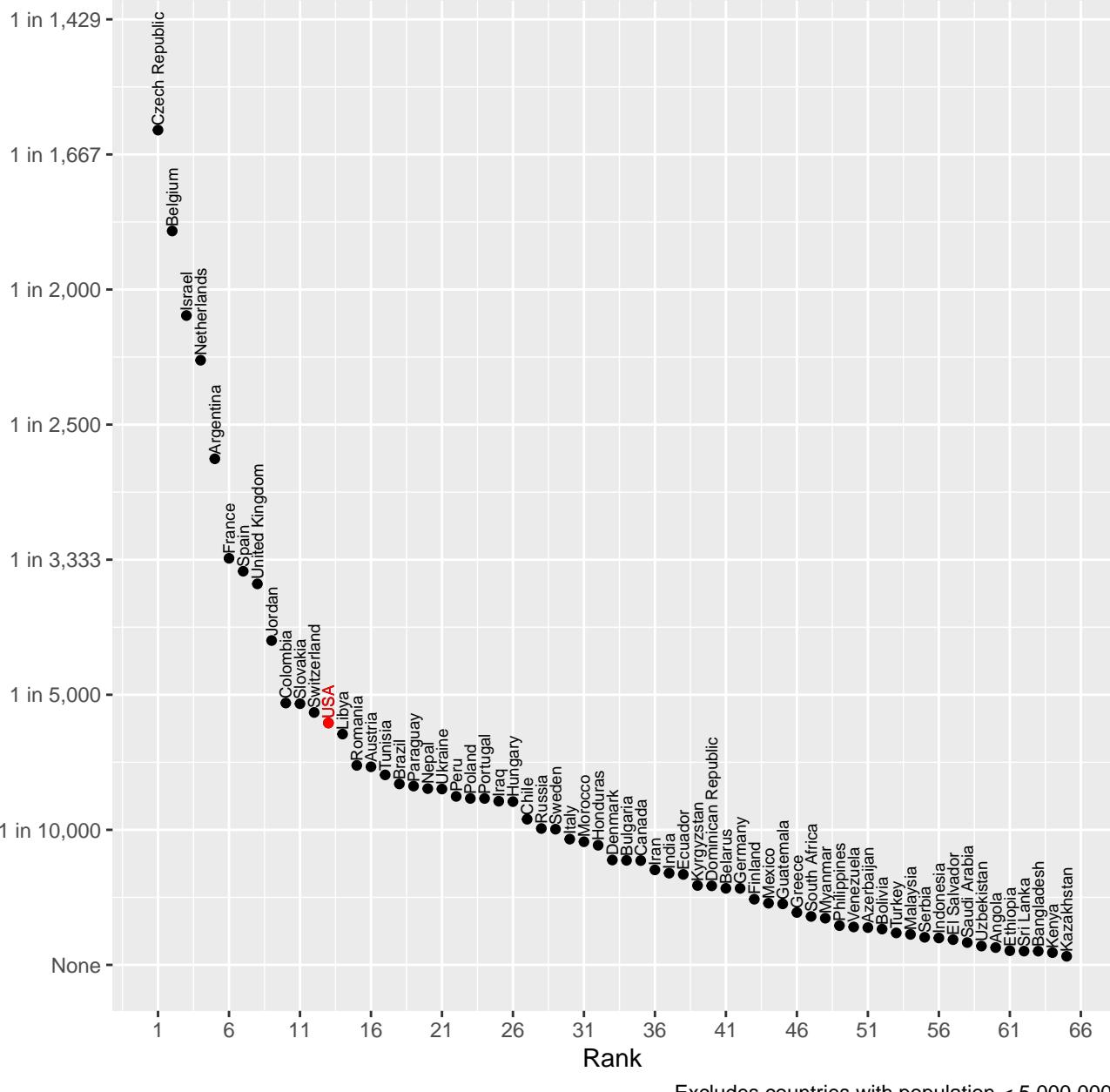
1 in 100

None



Excludes countries with population < 5,000,000

Average new cases over past 7 days



Excludes countries with population < 5,000,000

Worldwide deaths

Total deaths to date

200,000

150,000

100,000

50,000

0

1

6

11

16

21

26

31

36

41

46

51

56

61

66

Rank

USA

Brazil

Mexico

India

United Kingdom

Italy

Peru

Spain

France

Iran

Colombia

Argentina

Russia

South Africa

Chile

Ecuador

Indonesia

Belgium

Iraq

Canada

Germany

Turkey

Bolivia

Netherlands

Pakistan

Egypt

Sweden

Bangladesh

Ukraine

Saudi Arabia

China

Guatemala

Poland

Morocco

Honduras

Dominican Republic

Portugal

Switzerland

Israel

Algeria

Kazakhstan

Japan

Afghanistan

Ethiopia

Nigeria

Paraguay

Czech Republic

Kyrgyzstan

Hungary

Bulgaria

Belarus

Australia

El Salvador

Austria

Sudan

Kenya

Serbia

Venezuela

Myanmar

Denmark

Nepal

Libya

Azerbaijan

Excludes countries with population < 5,000,000

Worldwide deaths

Total deaths to date

1 in 833 -

Peru

1 in 1,000 -

Bolivia

Ecuador

Spain

Chile

Mexico

Brazil

United Kingdom

USA

Sweden

Italy

Colombia

Argentina

France

Iran

Netherlands

South Africa

Honduras

Iraq

Canada

Israel

Switzerland

Guateamala

Romania

Dominican Republic

Kyrgyzstan

Portugal

Saudi Arabia

Russia

Paraguay

Bulgaria

El Salvador

Denmark

Germany

Ukraine

Kazakhstan

Czech Republic

Austria

Serbia

Libya

Hungary

India

Belarus

Morocco

Azerbaijan

Egypt

Finland

Philippines

Algeria

Afghanistan

Indonesia

Tunisia

Greece

Australia

Pakistan

Bangladesh

Jordan

Sudan

Zambia

Venezuela

Nicaragua

Haiti

1

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

360

370

380

390

400

410

420

430

440

450

460

470

480

490

500

510

520

530

540

550

560

570

580

590

600

610

620

630

640

650

660

Rank

Excludes countries with population < 5,000,000

Average daily deaths over past 7 days

1 in 83,333

Argentina

1 in 100,000

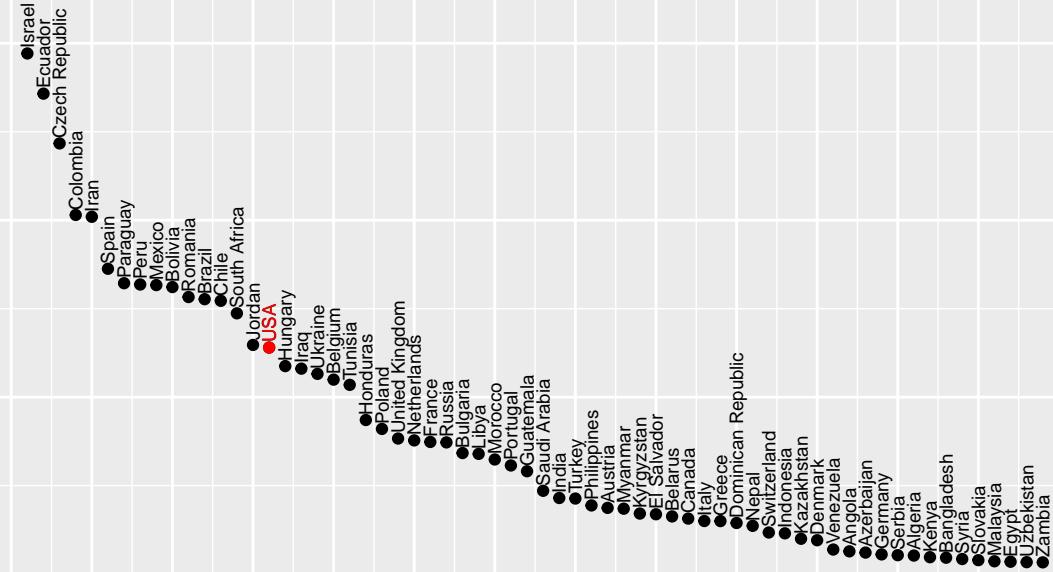
1 in 125,000

1 in 166,667

1 in 250,000

1 in 500,000

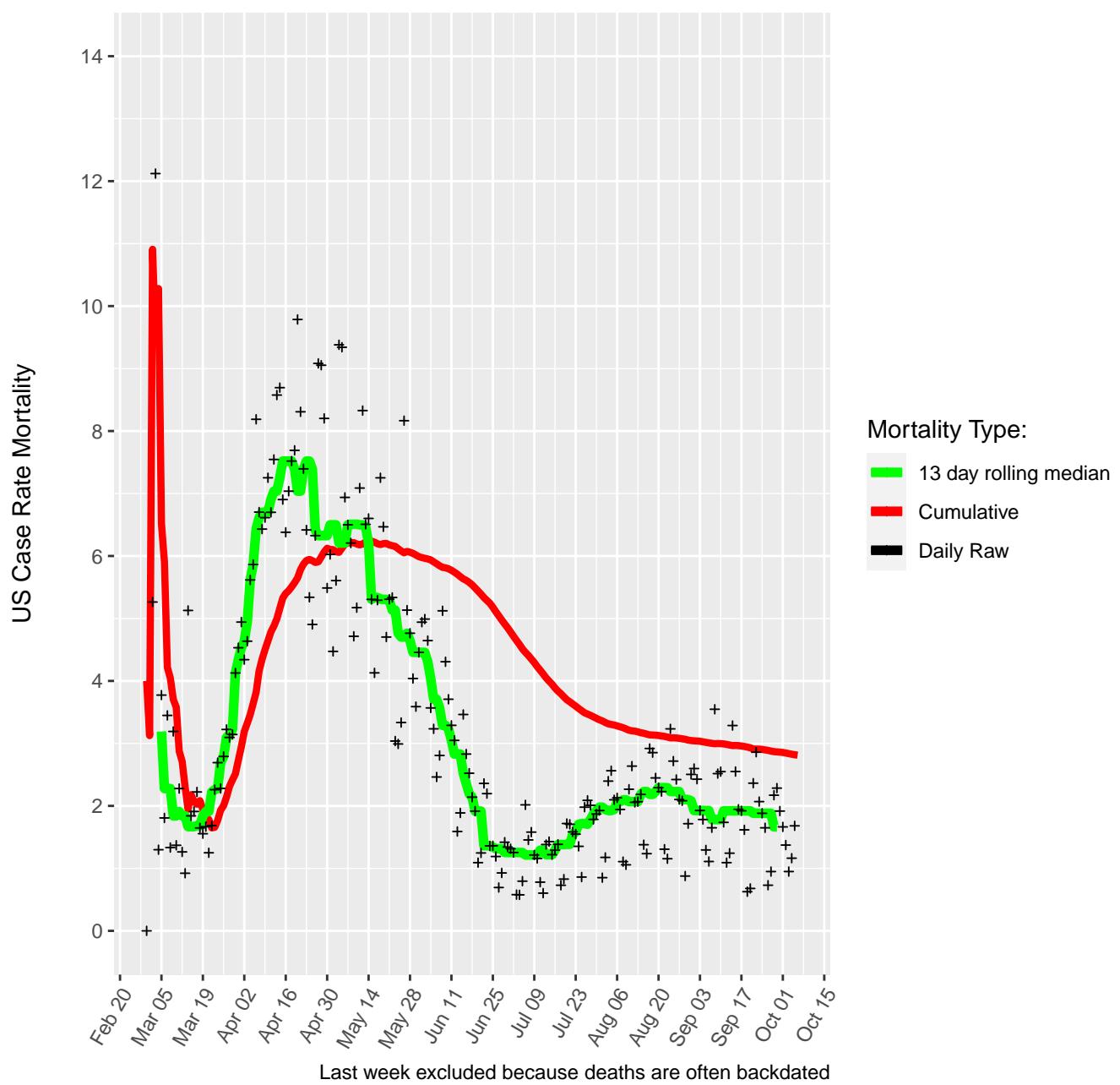
None



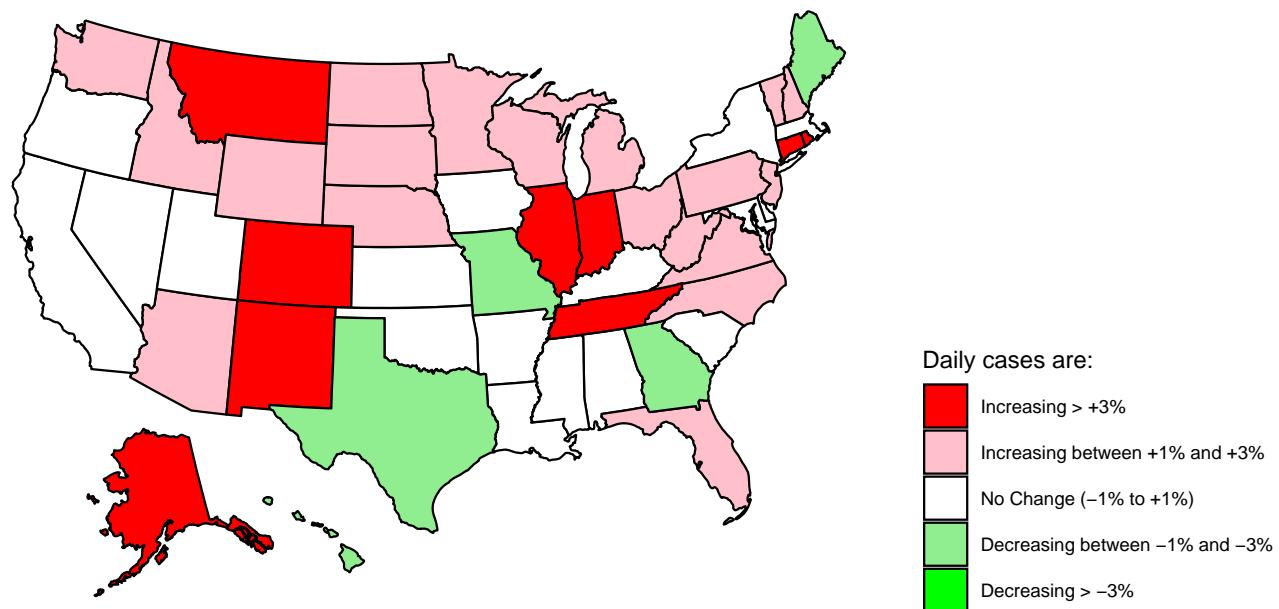
Rank

Excludes countries with population < 5,000,000

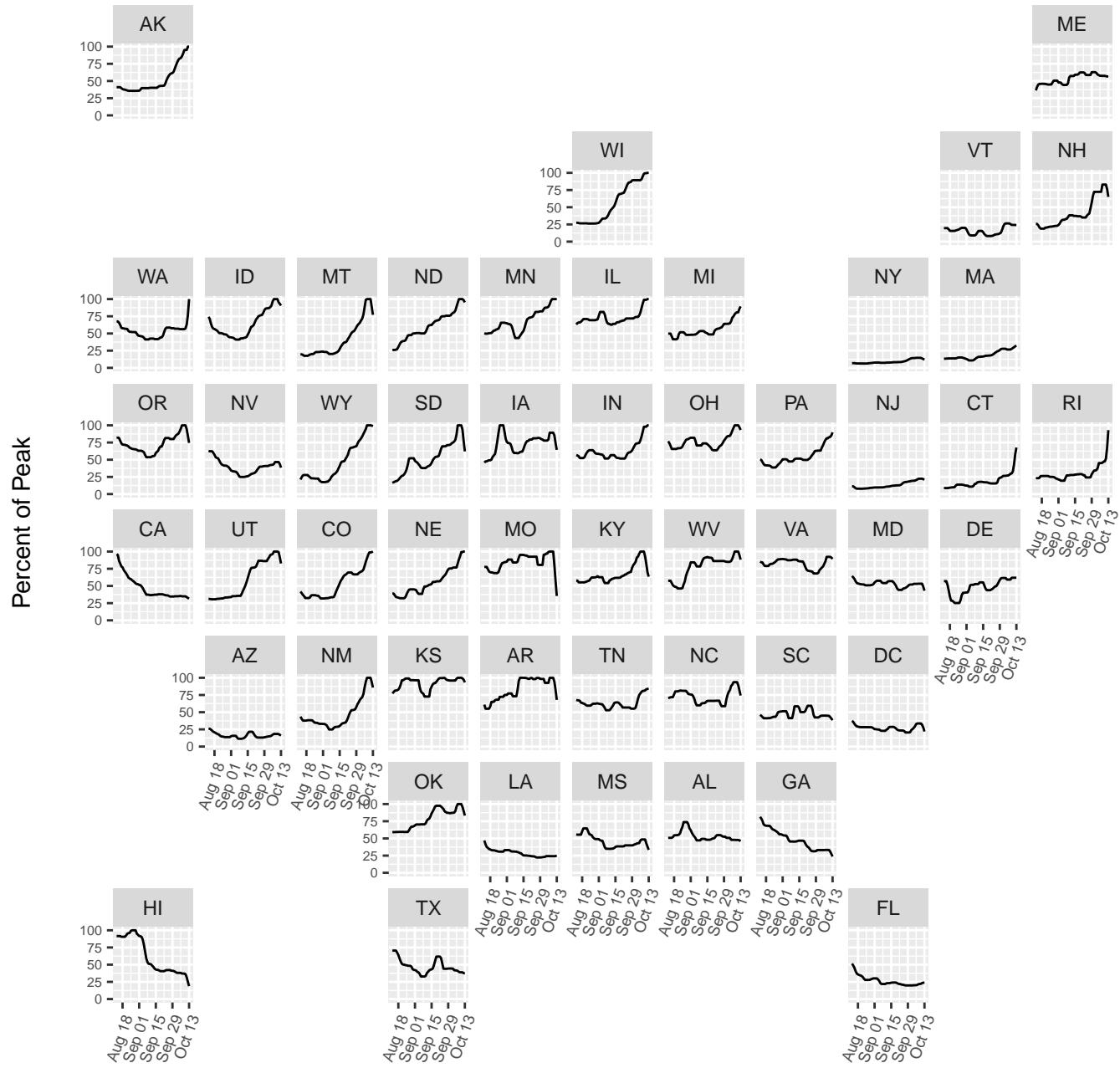
Daily vs. Cumulative US Case Rate Mortality



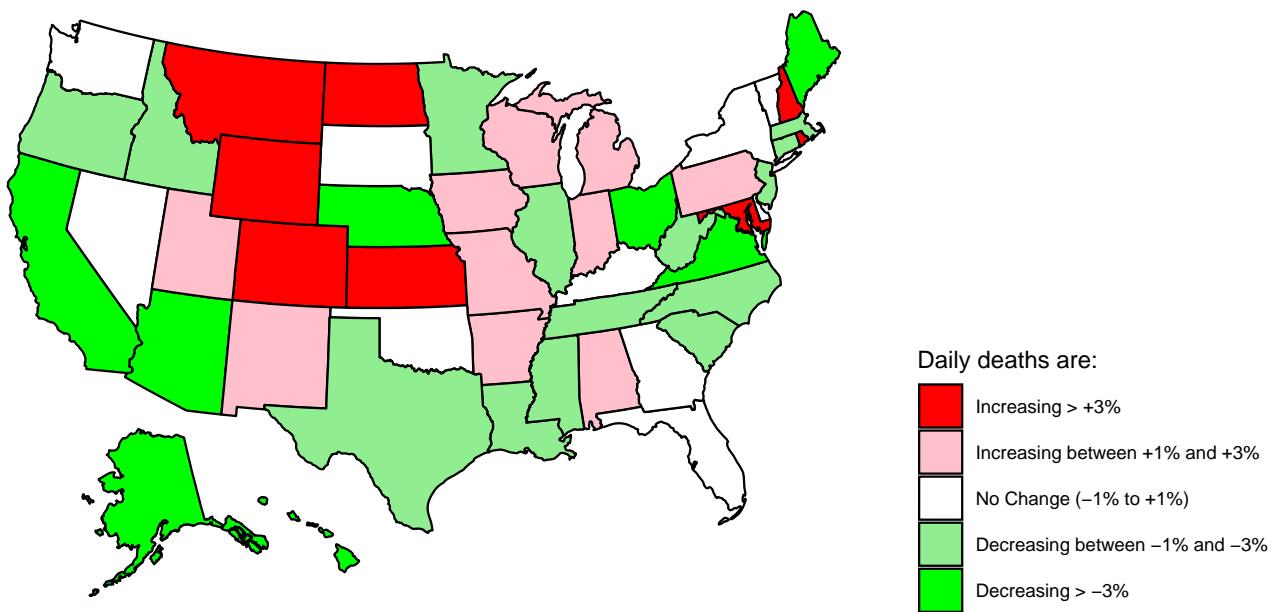
Daily cases by state as of 2020–10–14



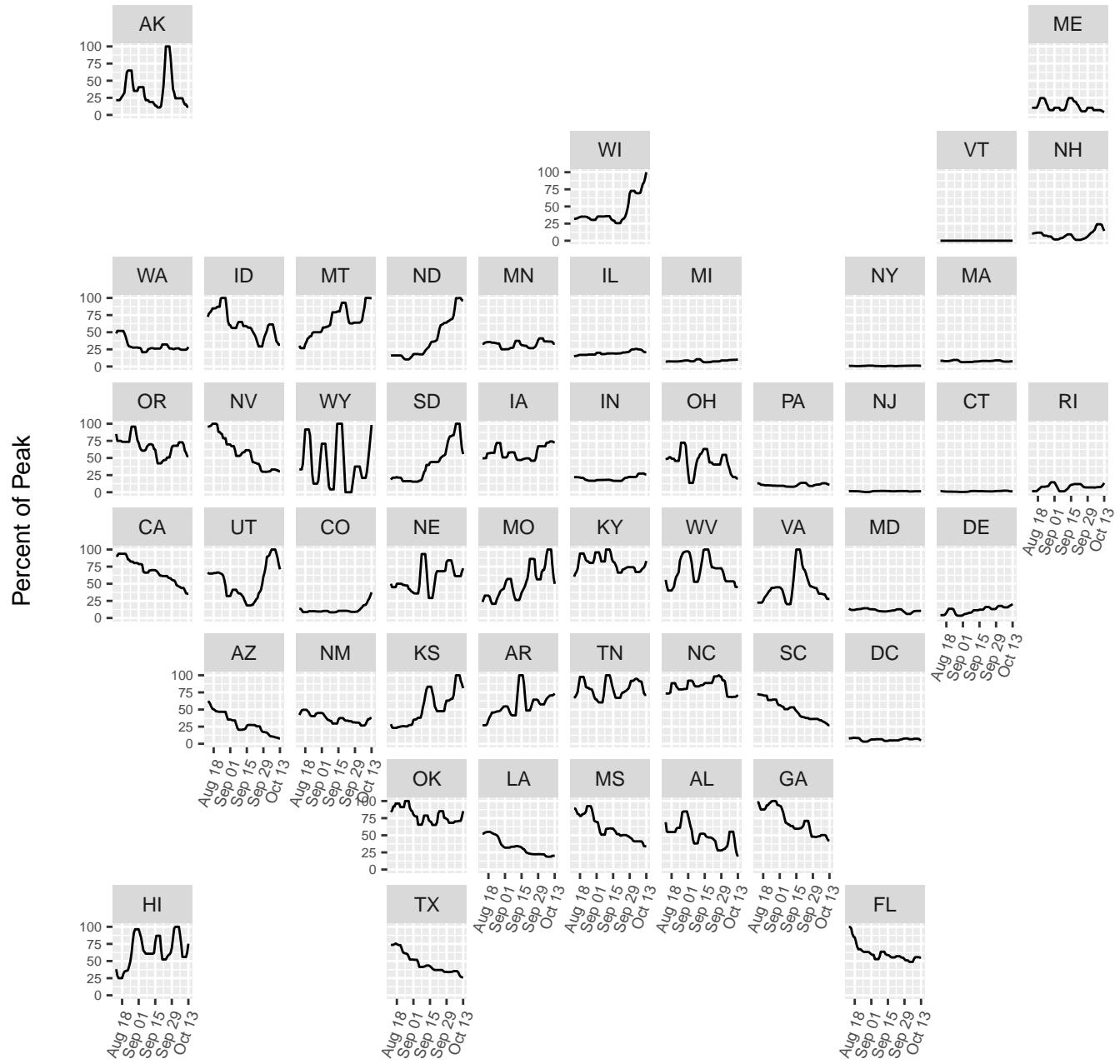
Daily Cases as a Percent of Peak Cases



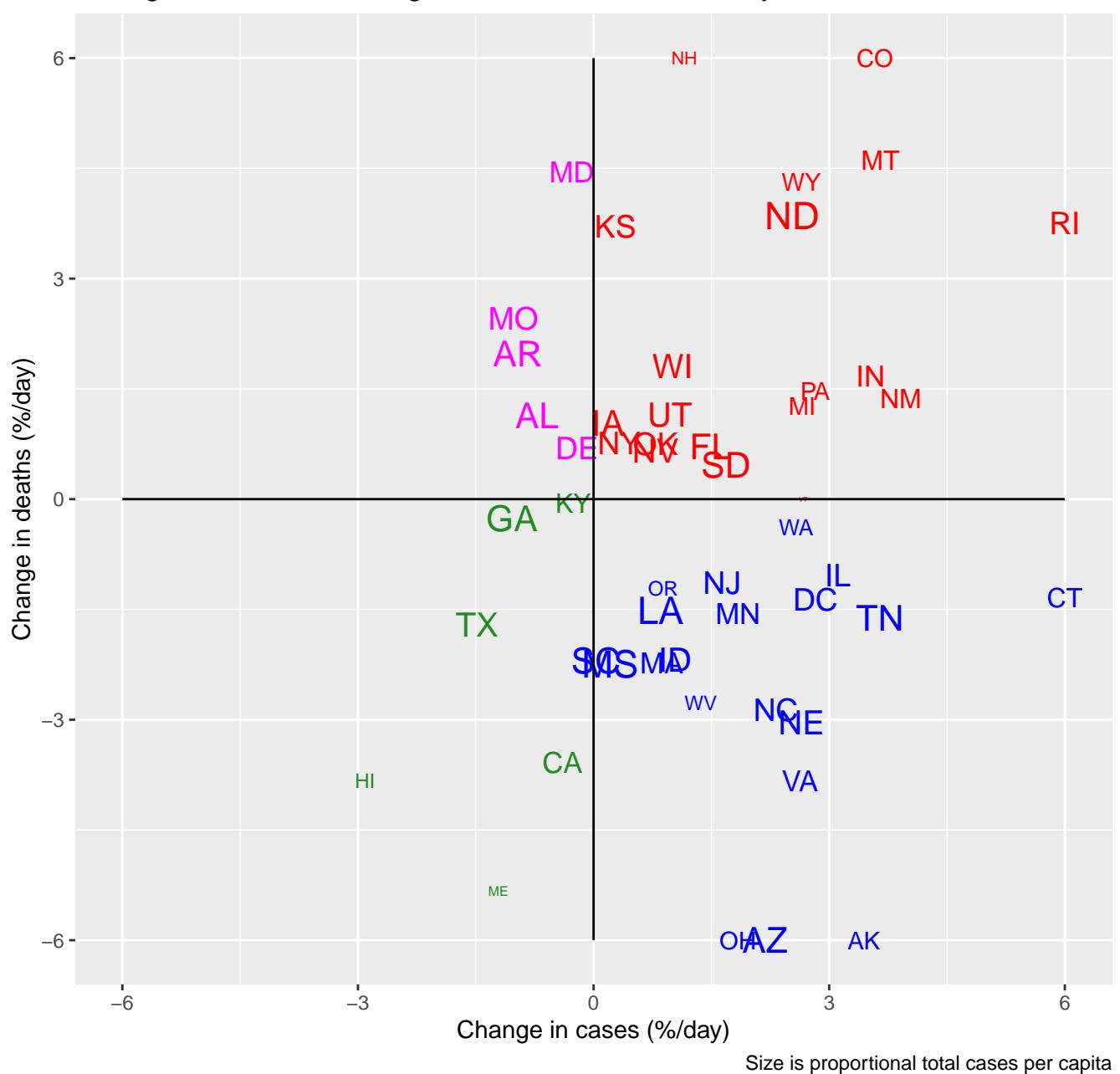
Daily deaths by state as of 2020-10-14



Daily Deaths as a Percent of Peak Deaths

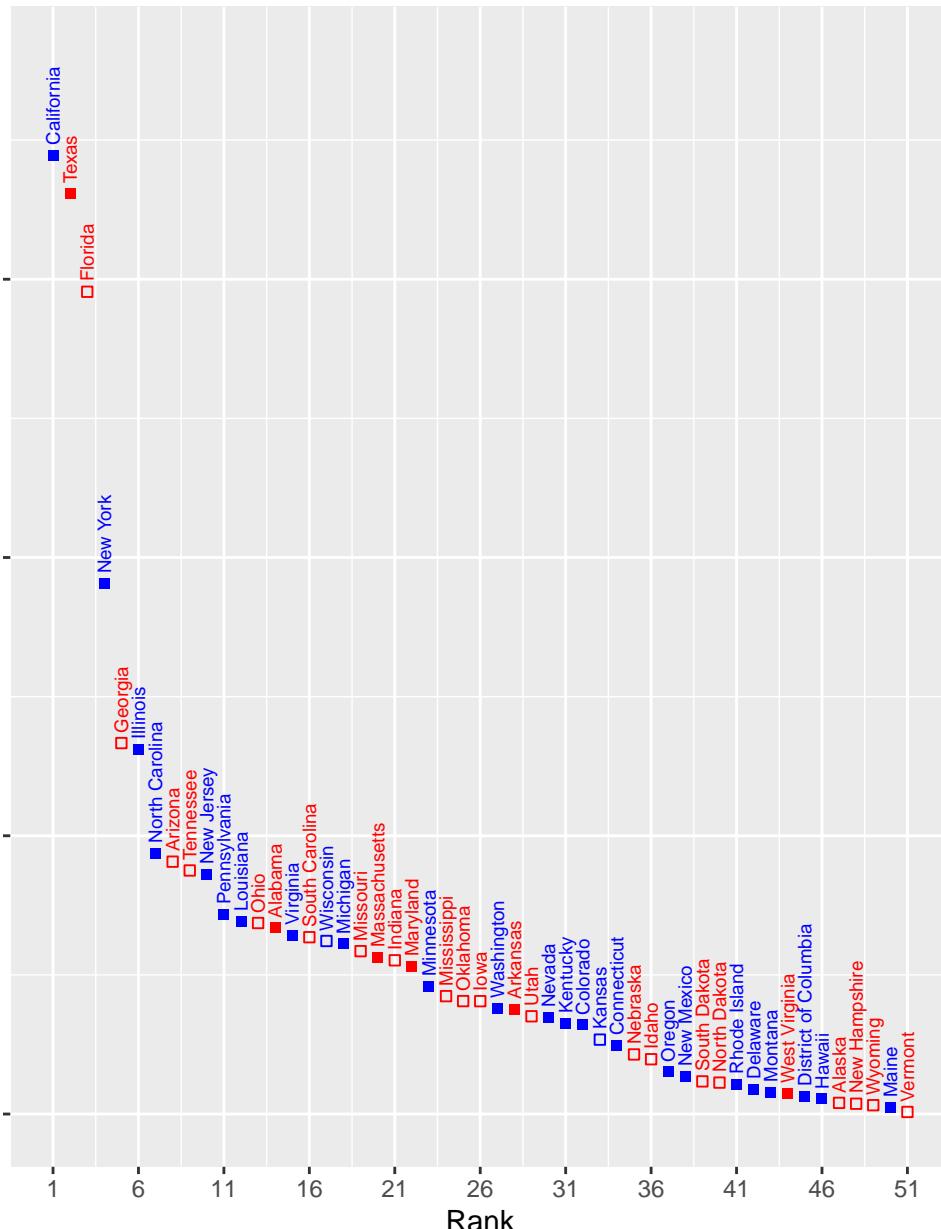


Change in cases vs. change in deaths over last 14 days as of 2020-10-14



Total US COVID-19 Cases

Total cases



Masks

- No
- Yes

Governor

- Democratic
- Republican

p masks as of July 20, 2020: 0.7, p governor: 0.96. NB: association != causation.

Total US COVID-19 Cases

Total Cases

1 in 25

1 in 33

1 in 50

1 in 100

None

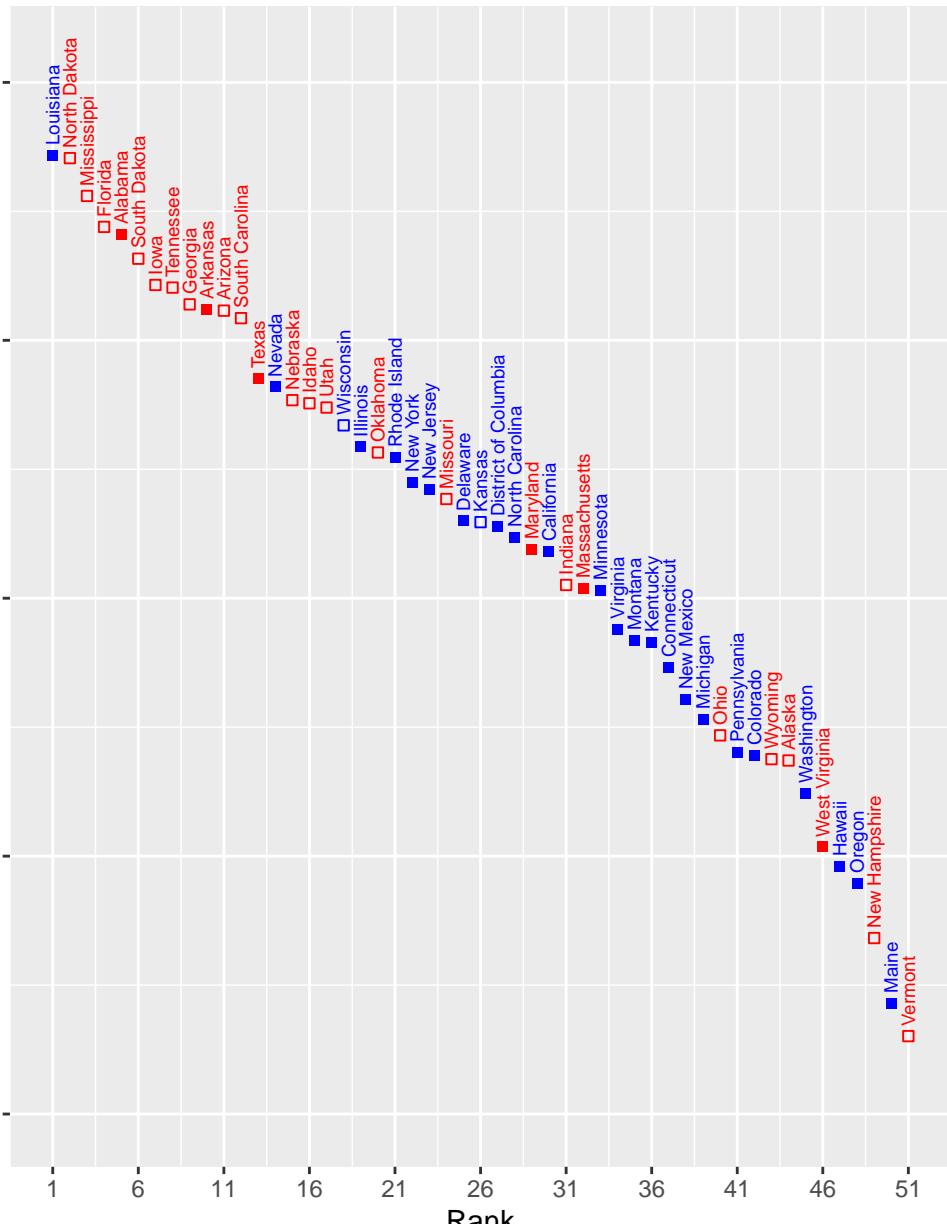
Rank

Masks

- No
- Yes

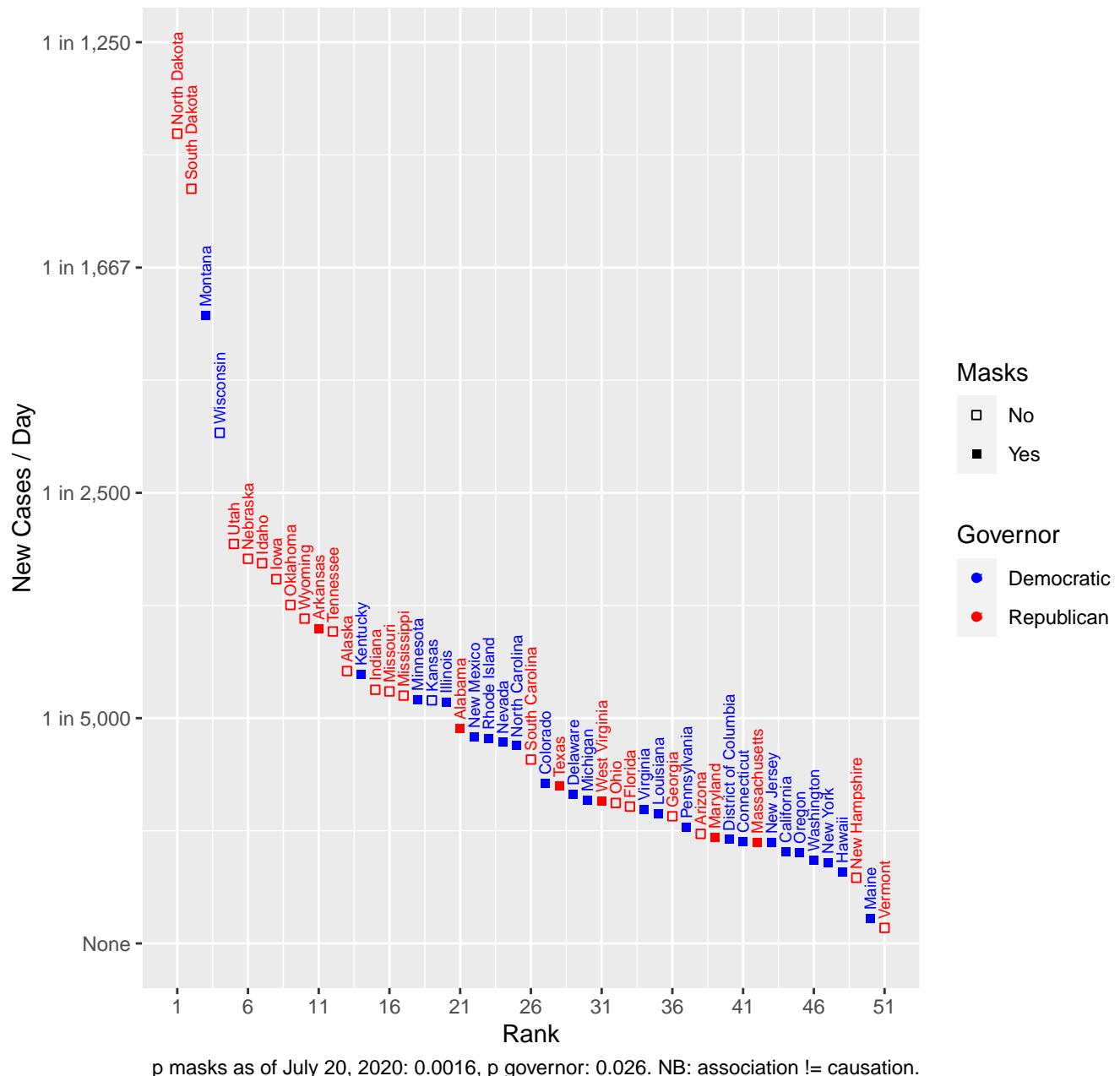
Governor

- Democratic
- Republican



p masks as of July 20, 2020: 0.027, p governor: 0.015. NB: association != causation.

Average US COVID–19 cases over the past 7 days



Total US COVID-19 Deaths

Total Deaths

30,000

20,000

10,000

0

1

6

11

16

21

26

31

36

41

46

51

Rank

p masks as of July 20, 2020: 0.082, p governor: 0.46. NB: association != causation.

Masks

- No
- Yes

Governor

- Democratic
- Republican

New York

Texas

California

New Jersey

Florida

Massachusetts

Illinois

Pennsylvania

Arizona

Michigan

Louisiana

Georgia

Ohio

Connecticut

Indiana

North Carolina

South Carolina

Virginia

Mississippi

Tennessee

Alabama

Missouri

Washington

Minnesota

Colorado

Nevada

Arkansas

Wisconsin

Iowa

Kentucky

Rhode Island

Oklahoma

New Mexico

Kansas

District of Columbia

Oregon

Nebraska

Utah

Idaho

New Hampshire

West Virginia

North Dakota

South Dakota

Montana

Hawaii

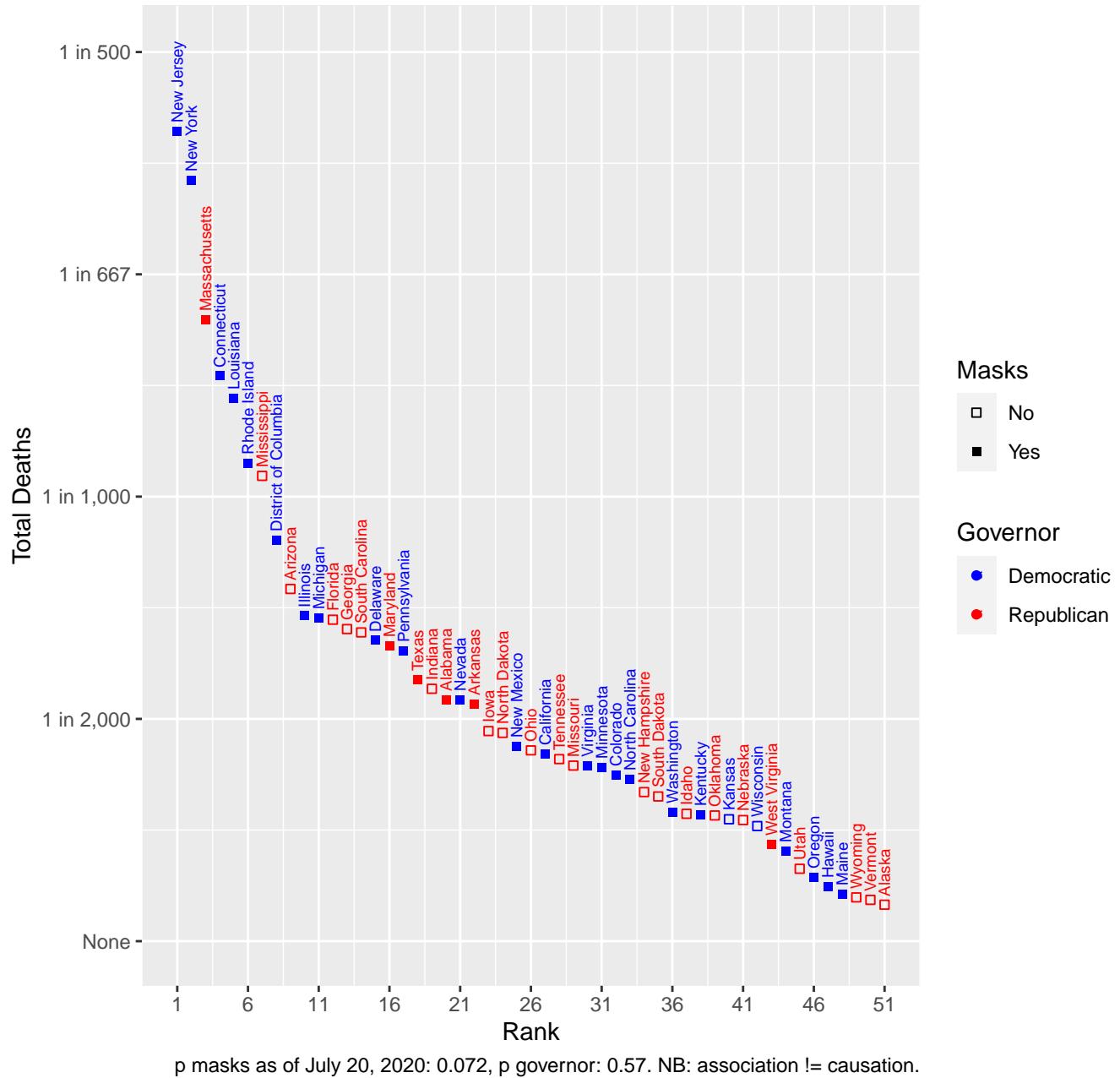
Maine

Alaska

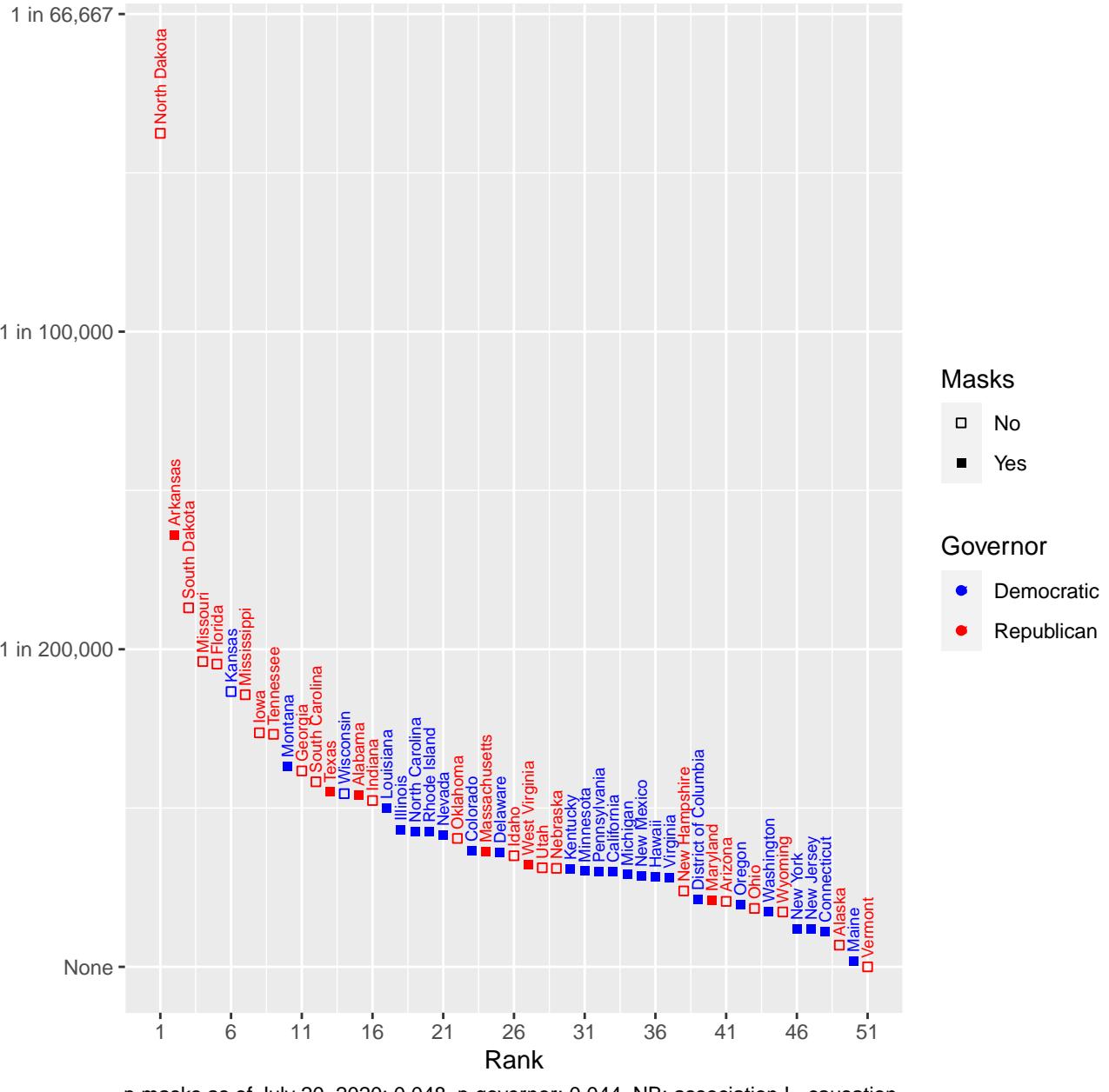
Vermont

Wyoming

Total US COVID-19 Deaths

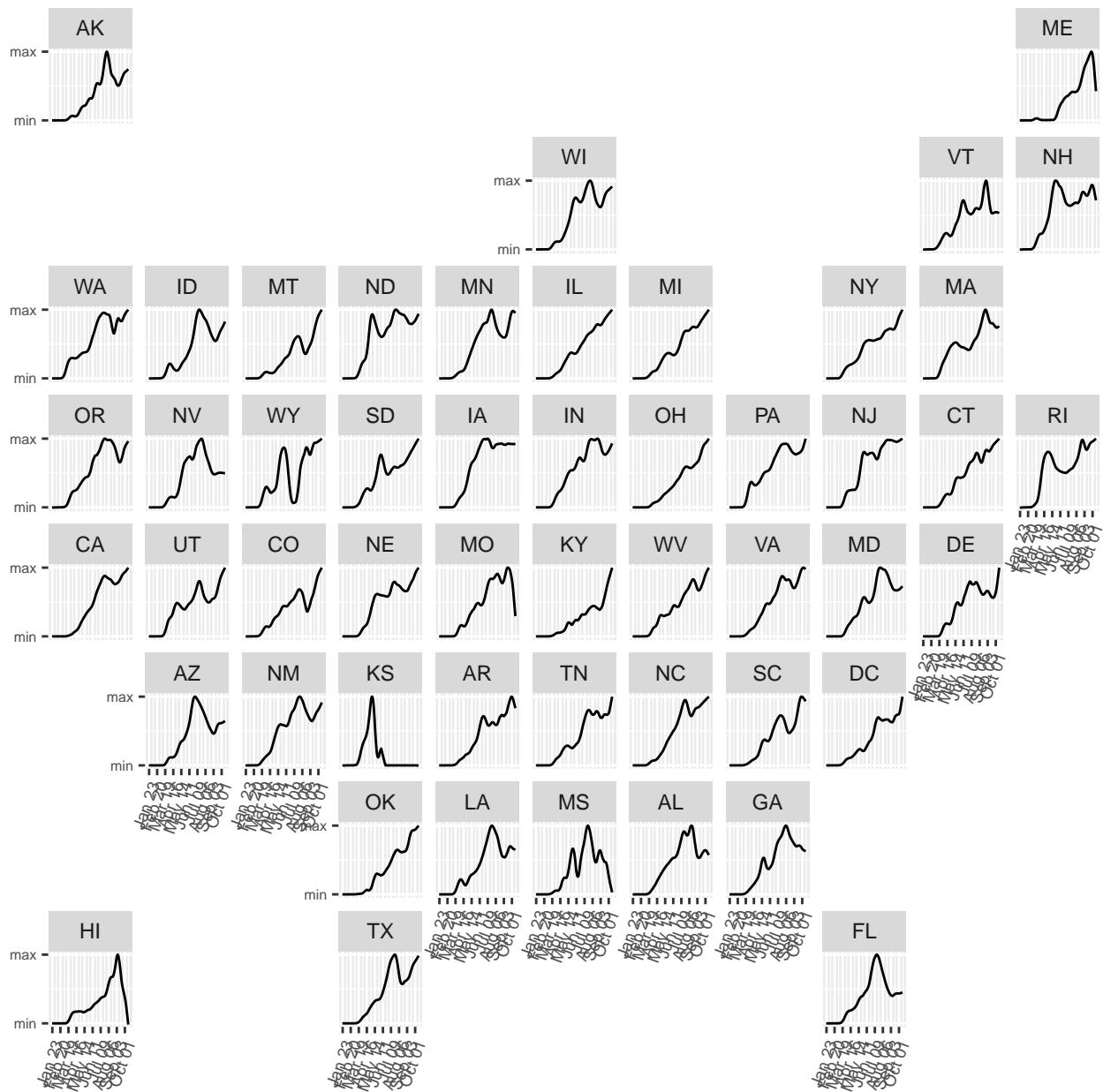


Average US COVID-19 deaths over the past 7 days



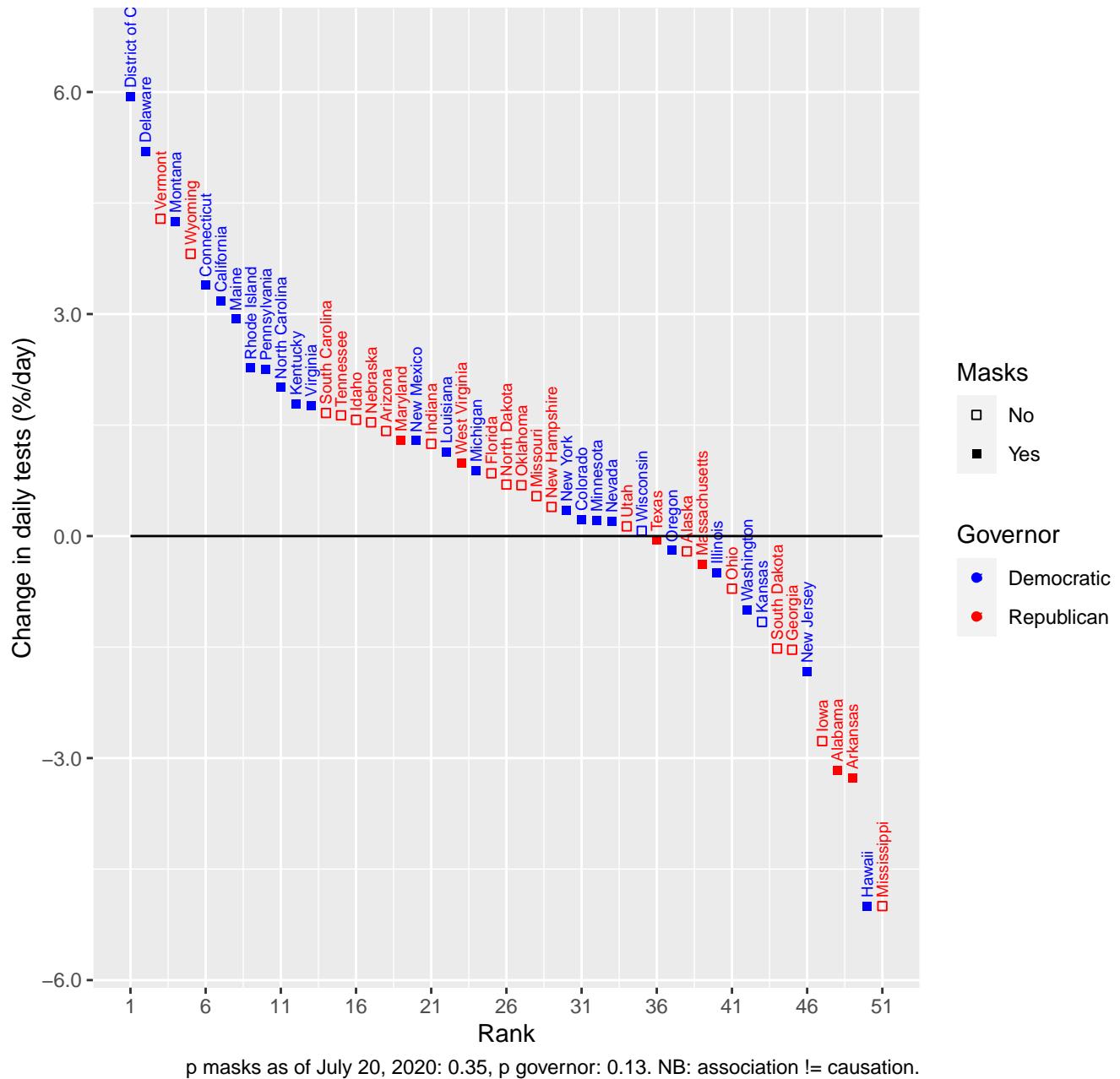
Daily testing trends from min to max

Daily testing from min to max

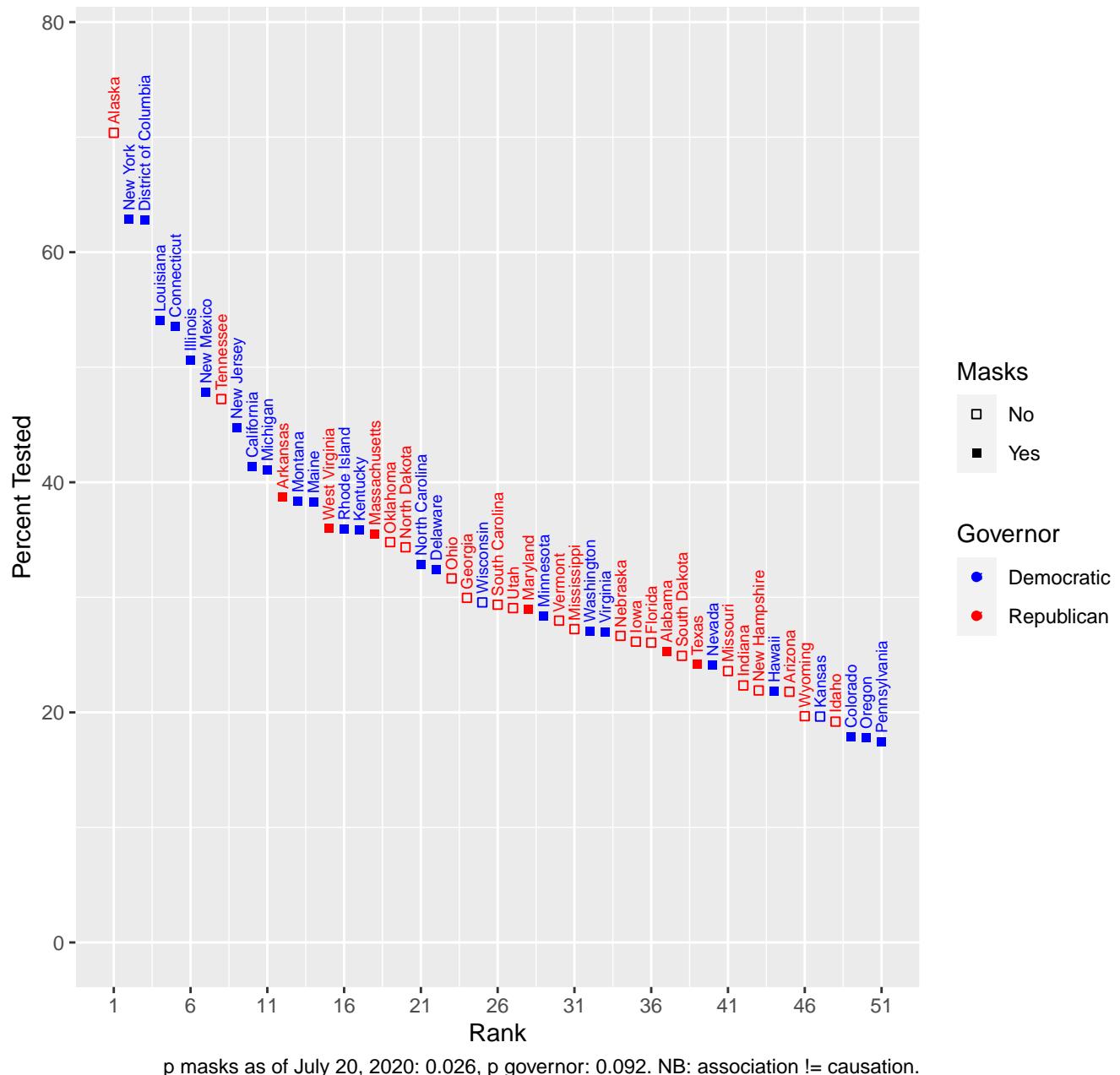


Line = Friedman's supersmooter

Change in daily tests over past 14 days



Percent Tested



Percent of Positive COVID Tests

Percent of Positive Tests

□ Mississippi

□ North Dakota

■ South Dakota

□ Idaho

□ Wisconsin

□ Wyoming

■ Nevada

□ Kansas

■ Iowa

□ Indiana

■ Utah

□ Nebraska

■ Alabama

□ Missouri

■ Montana

□ Florida

■ Minnesota

□ Colorado

■ Pennsylvania

□ Arkansas

■ Oklahoma

□ Texas

■ Arizona

□ Tennessee

■ Georgia

□ Oregon

■ Kentucky

□ North Carolina

■ New Mexico

□ South Carolina

■ Maryland

□ Virginia

■ Rhode Island

□ Delaware

■ Illinois

□ Alaska

■ Massachusetts

□ New Hampshire

■ West Virginia

□ Ohio

■ Michigan

□ Washington

■ Louisiana

□ New Jersey

■ California

□ Connecticut

■ District of Columbia

□ New York

■ Vermont

□ Maine

Rank

p masks as of July 20, 2020: 0.0012, p governor: 0.025. NB: association != causation.

Masks

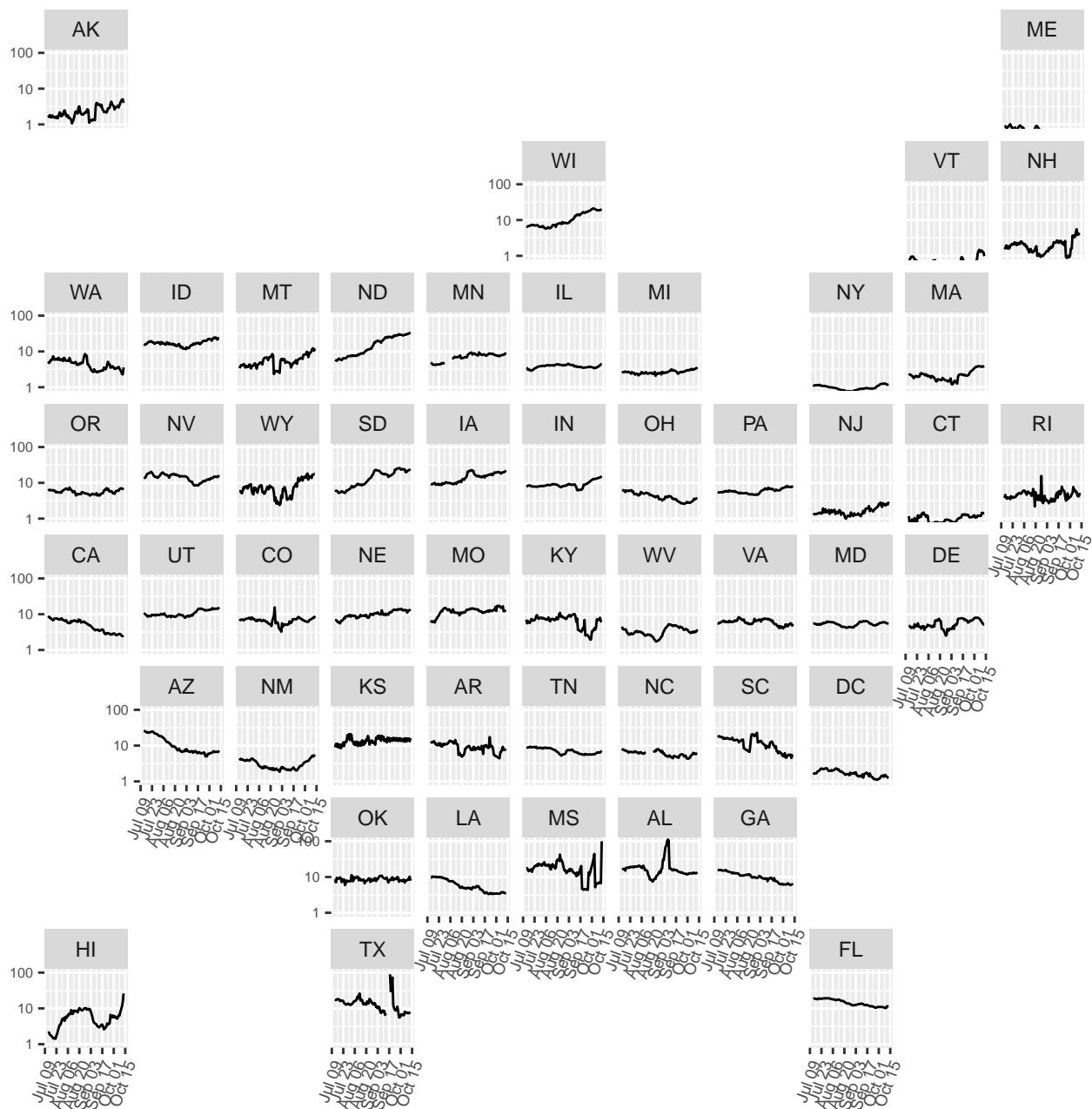
- No
- Yes

Governor

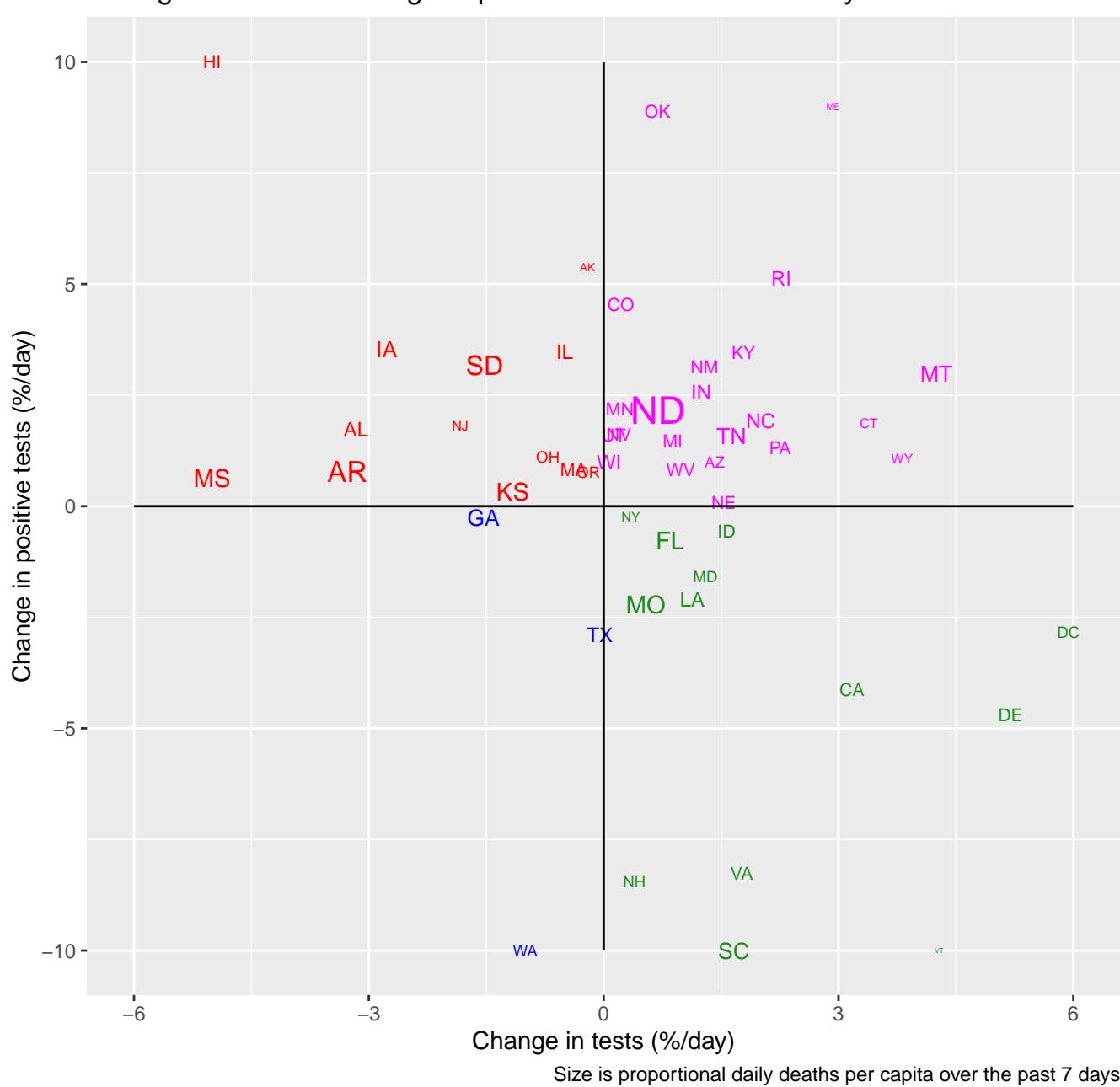
- Democratic
- Republican

Percent Positive Trends

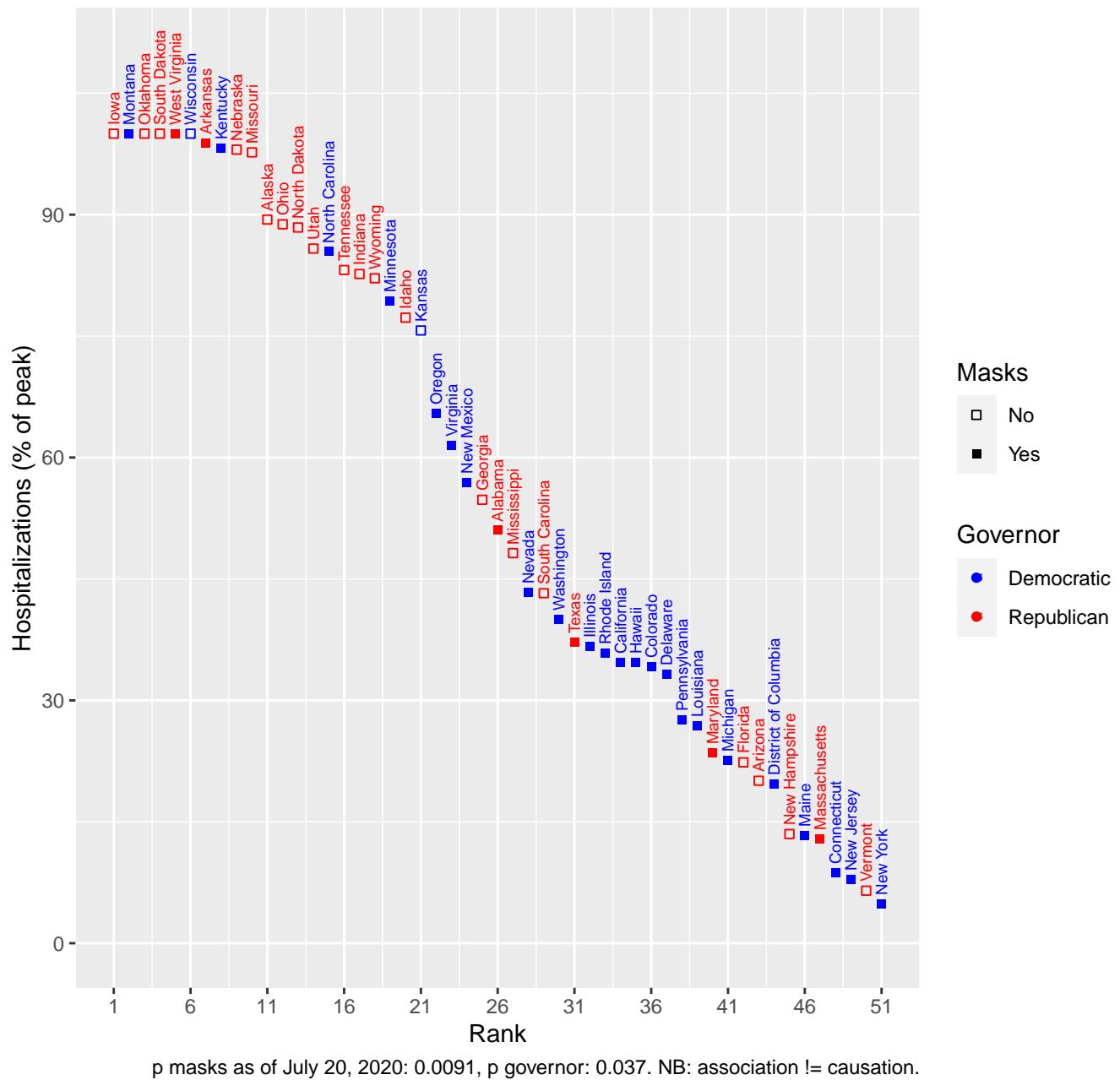
Percent Positive (log scale)



Change in tests vs. change in positive tests over last 14 days as of 2020-10-14

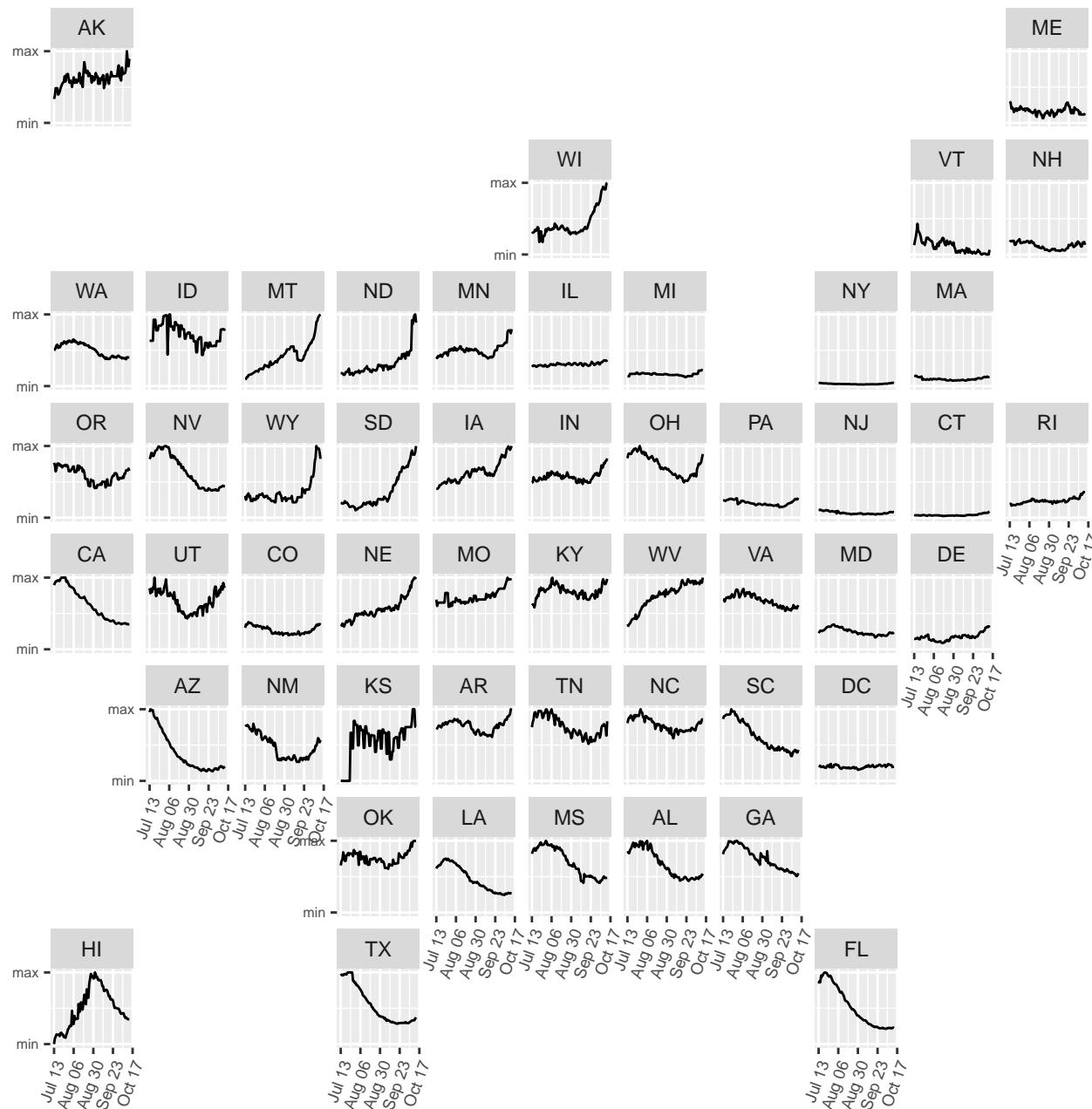


Current hospitalizations as a percent of peak since February

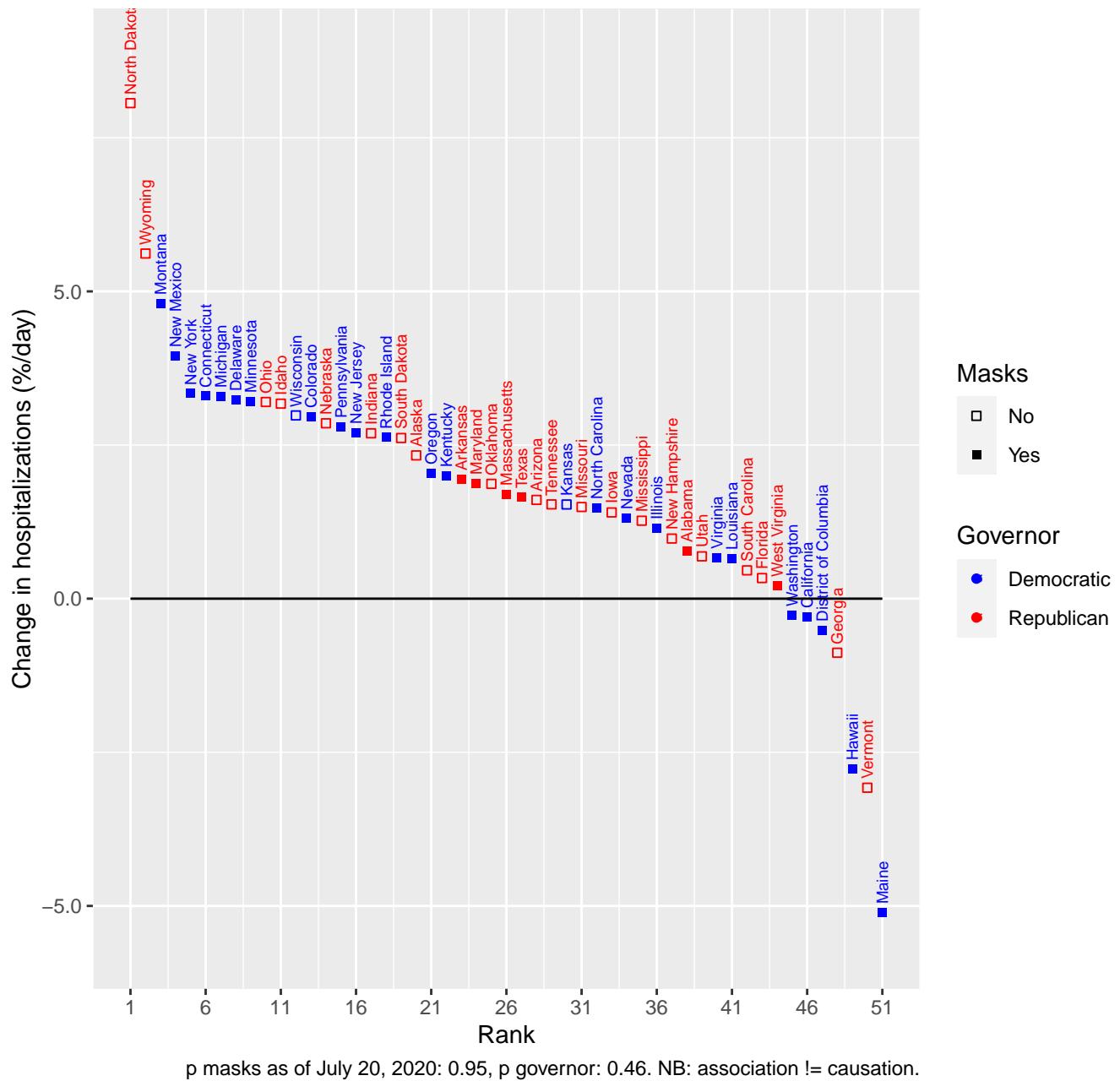


Hospitalizations trends from min to max

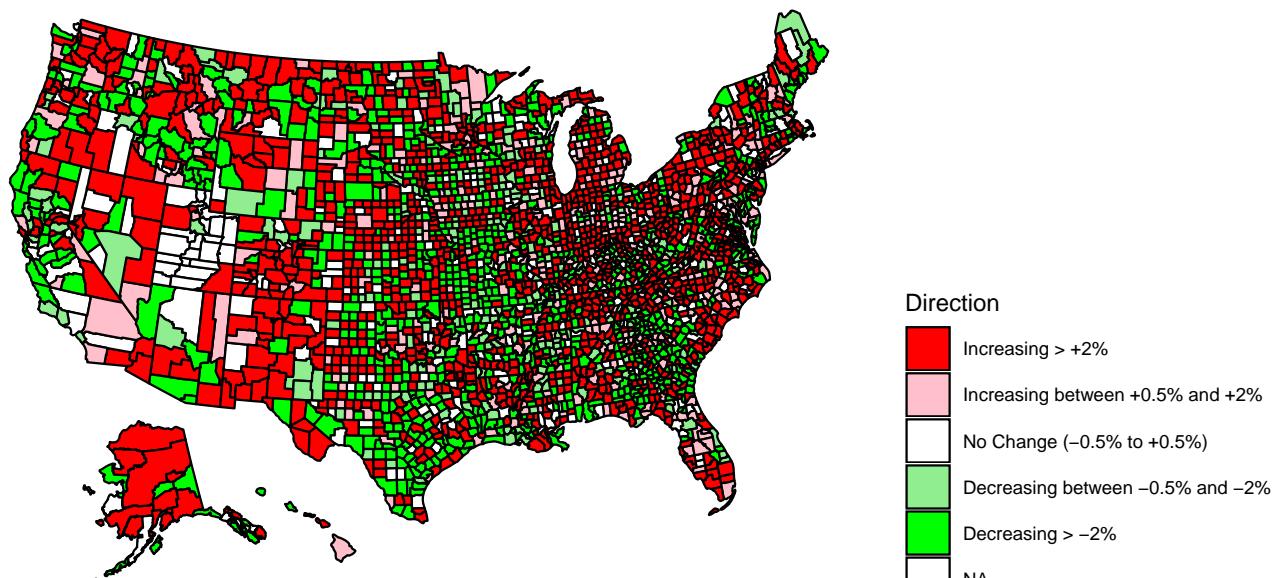
Hospitalizations from min to max



Change in hospitalizations over past 14 days

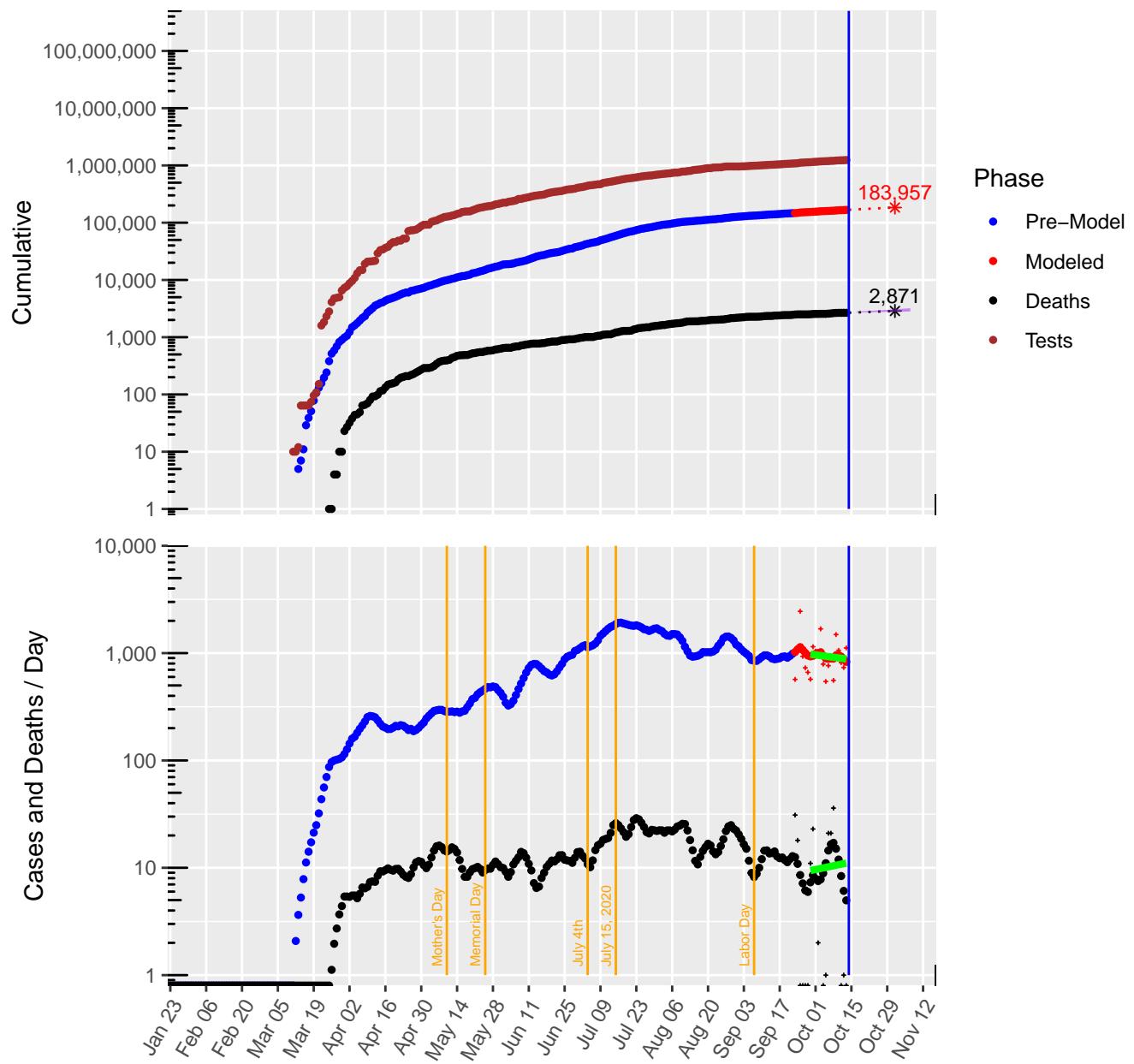


Trends by county as of 2020-10-14

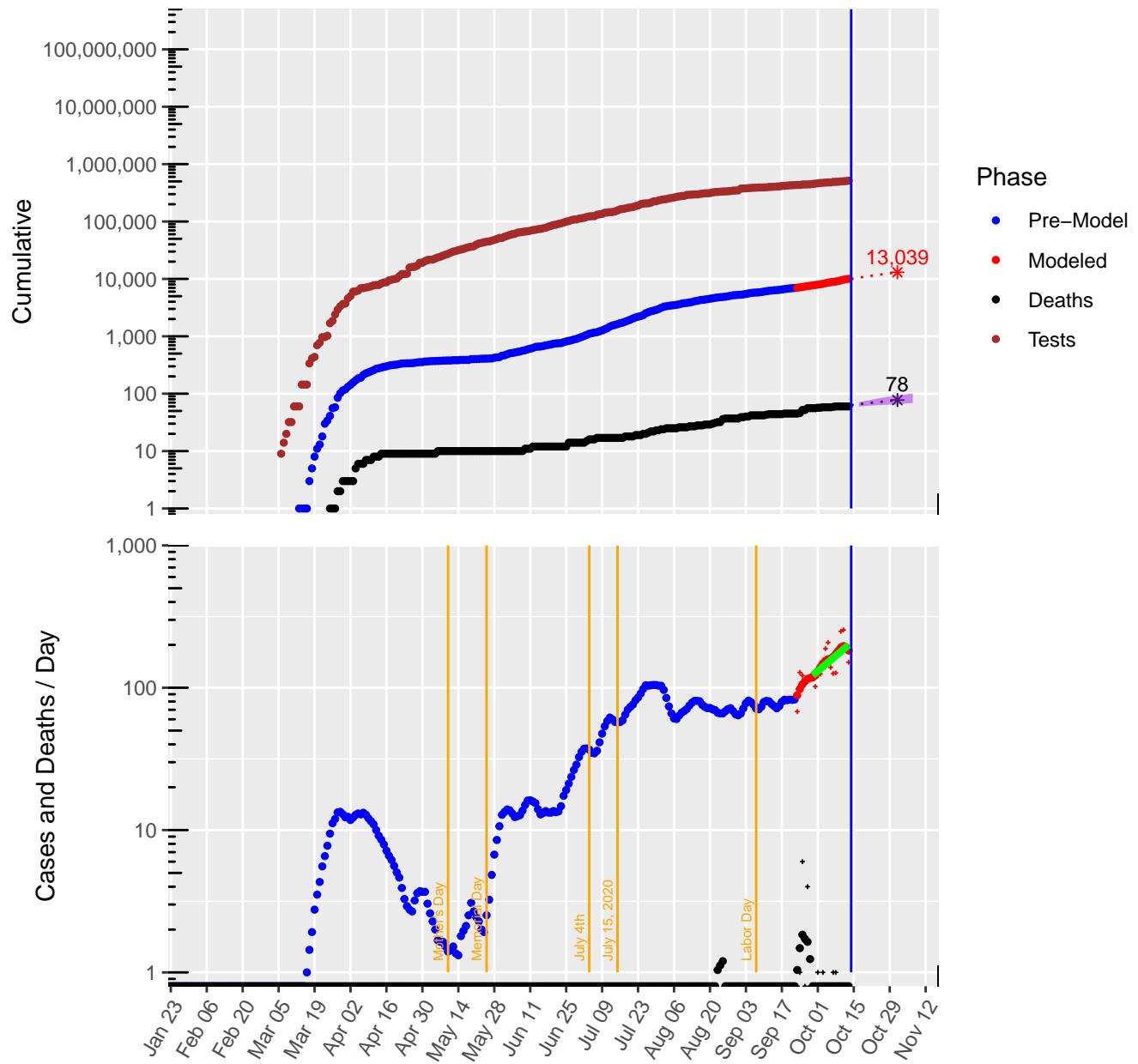


NA = Inadequate data

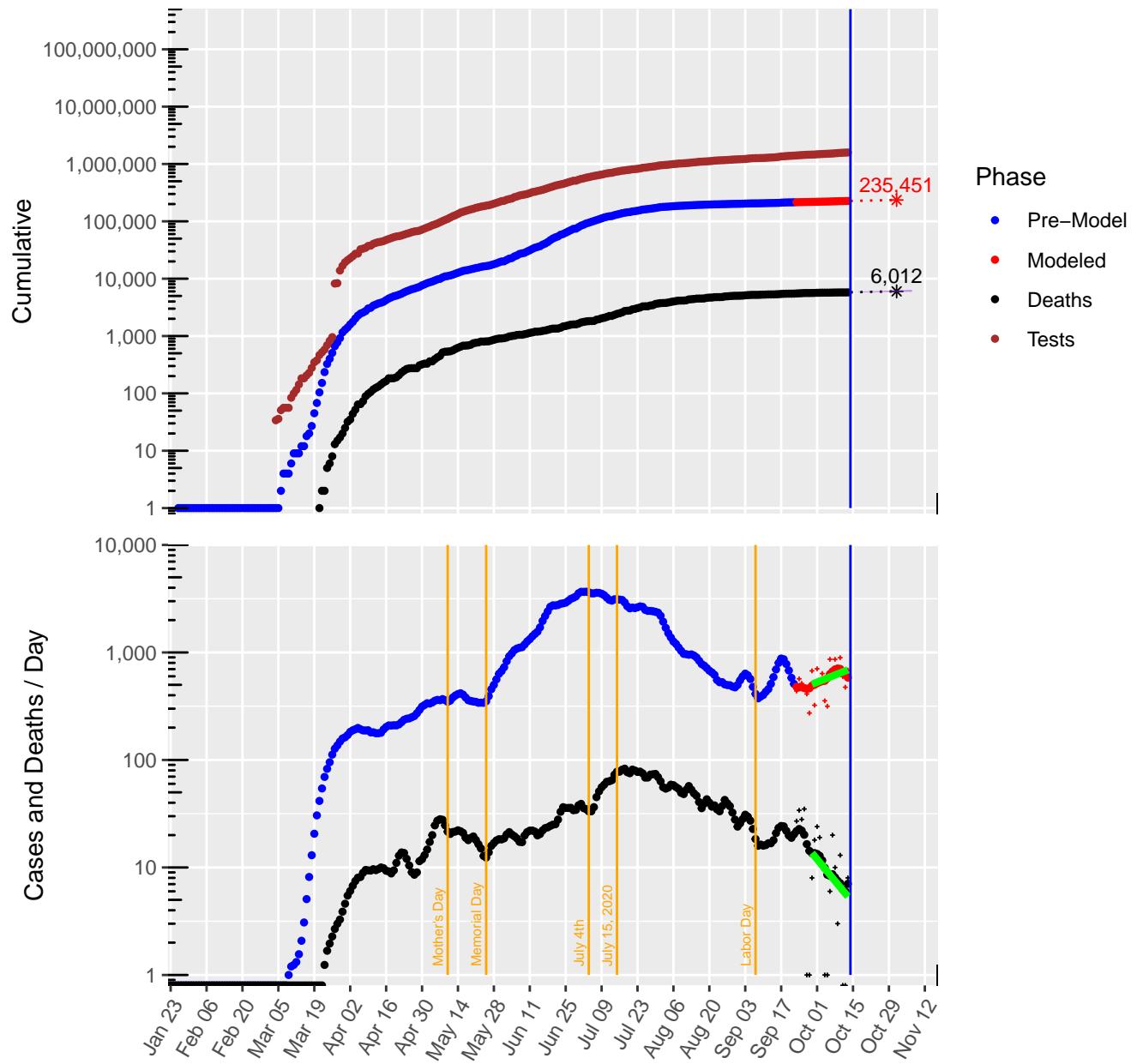
Alabama projection as of 2020-10-14



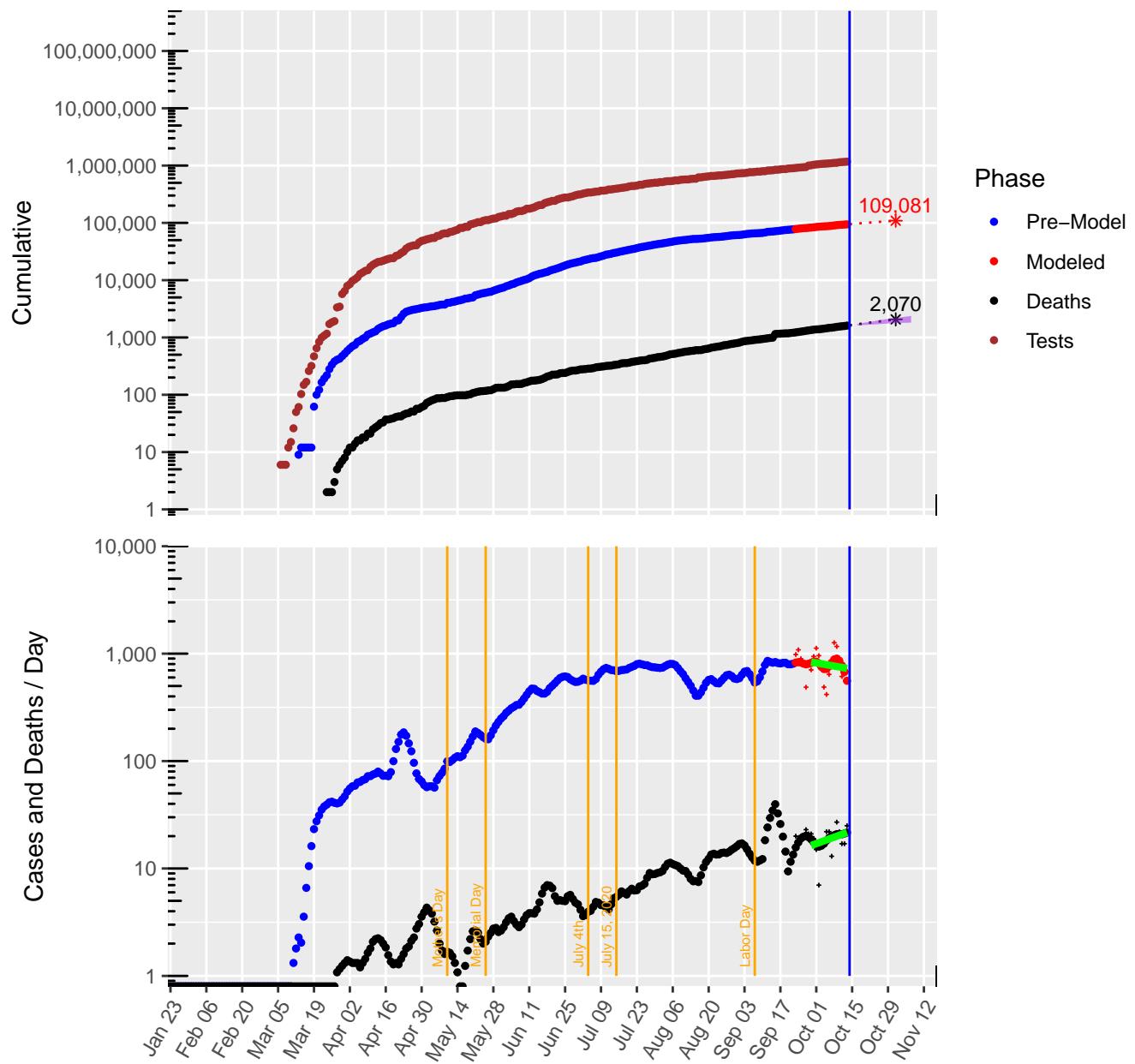
Alaska projection as of 2020-10-14



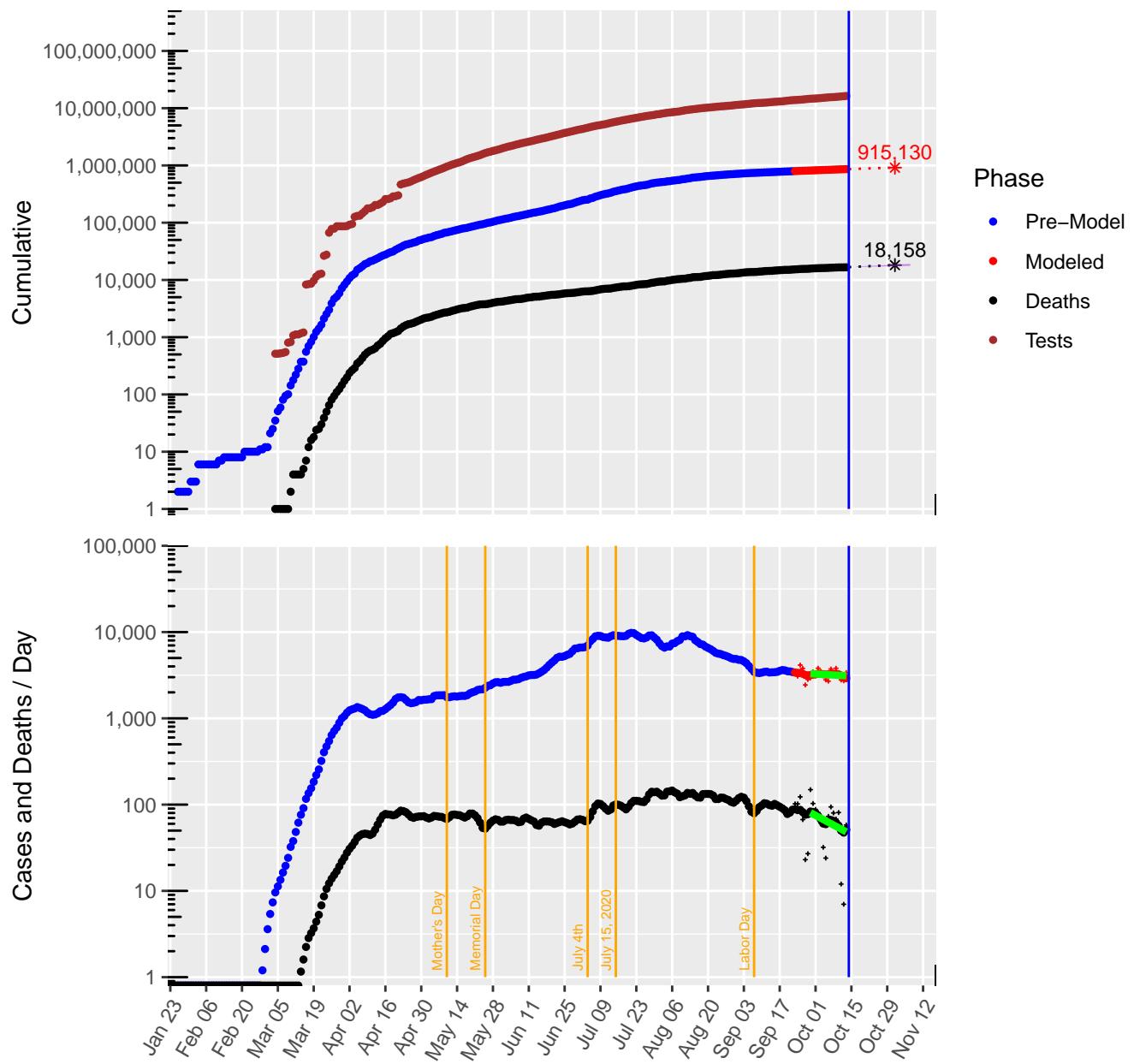
Arizona projection as of 2020-10-14



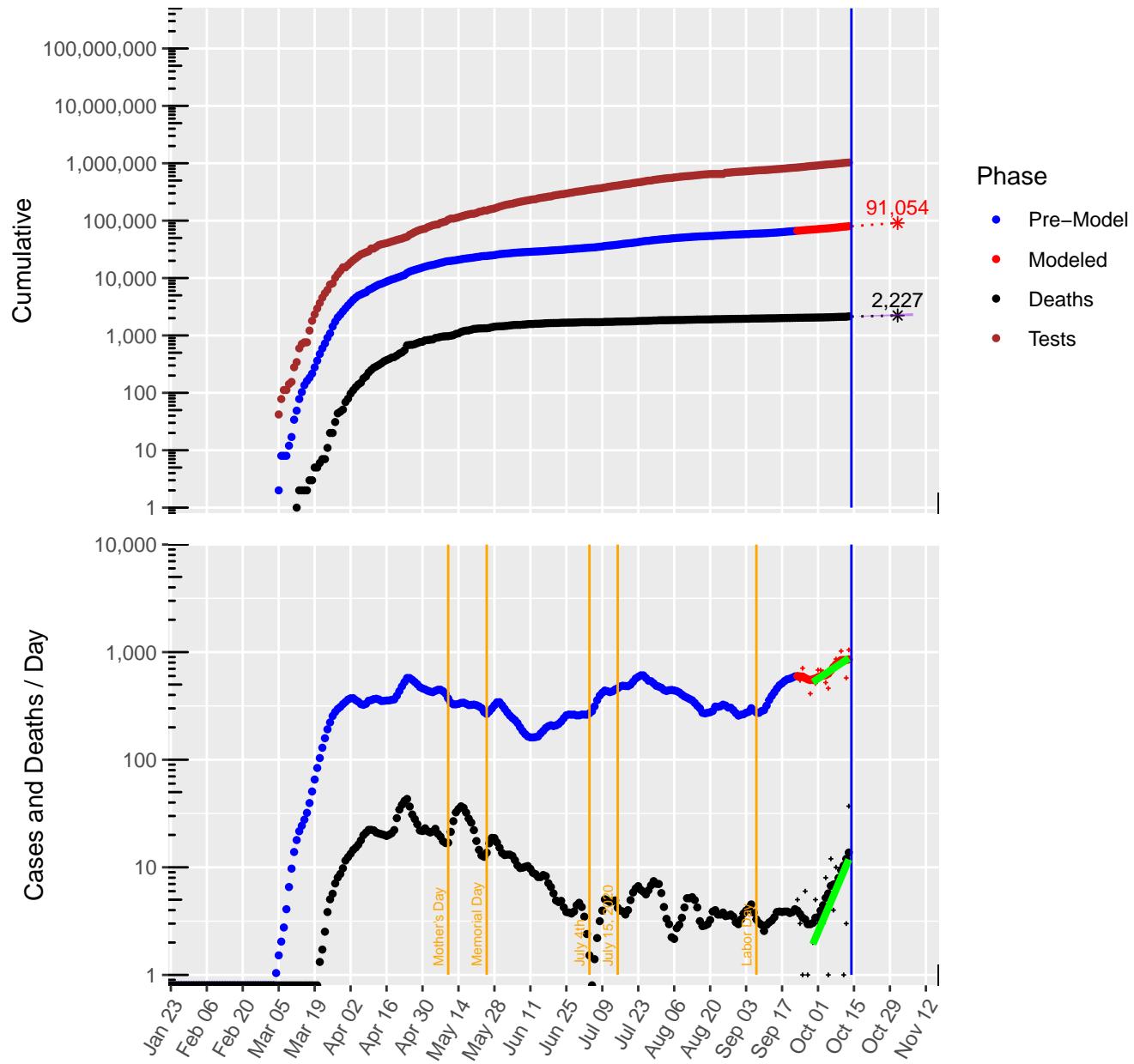
Arkansas projection as of 2020-10-14



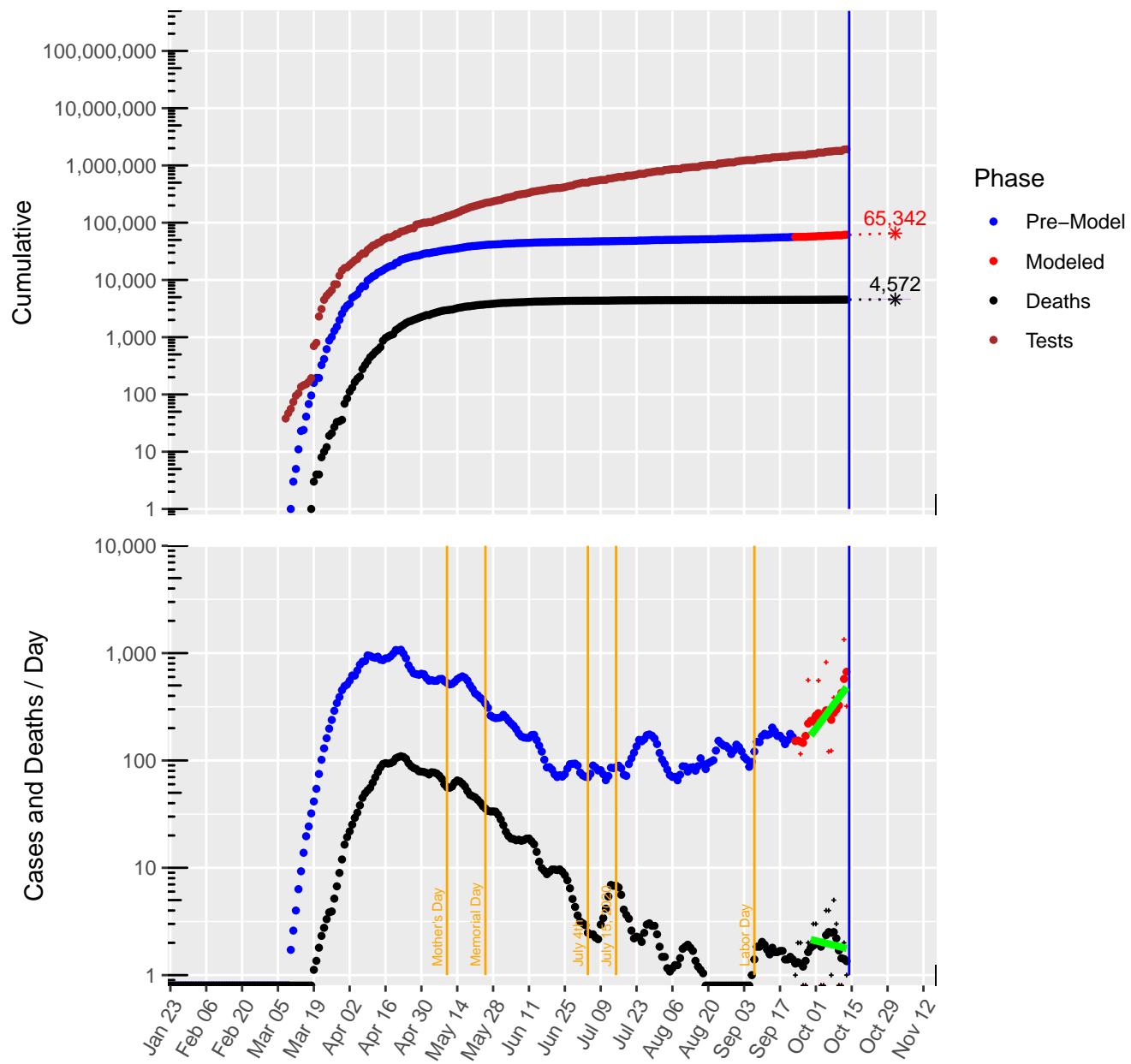
California projection as of 2020-10-14



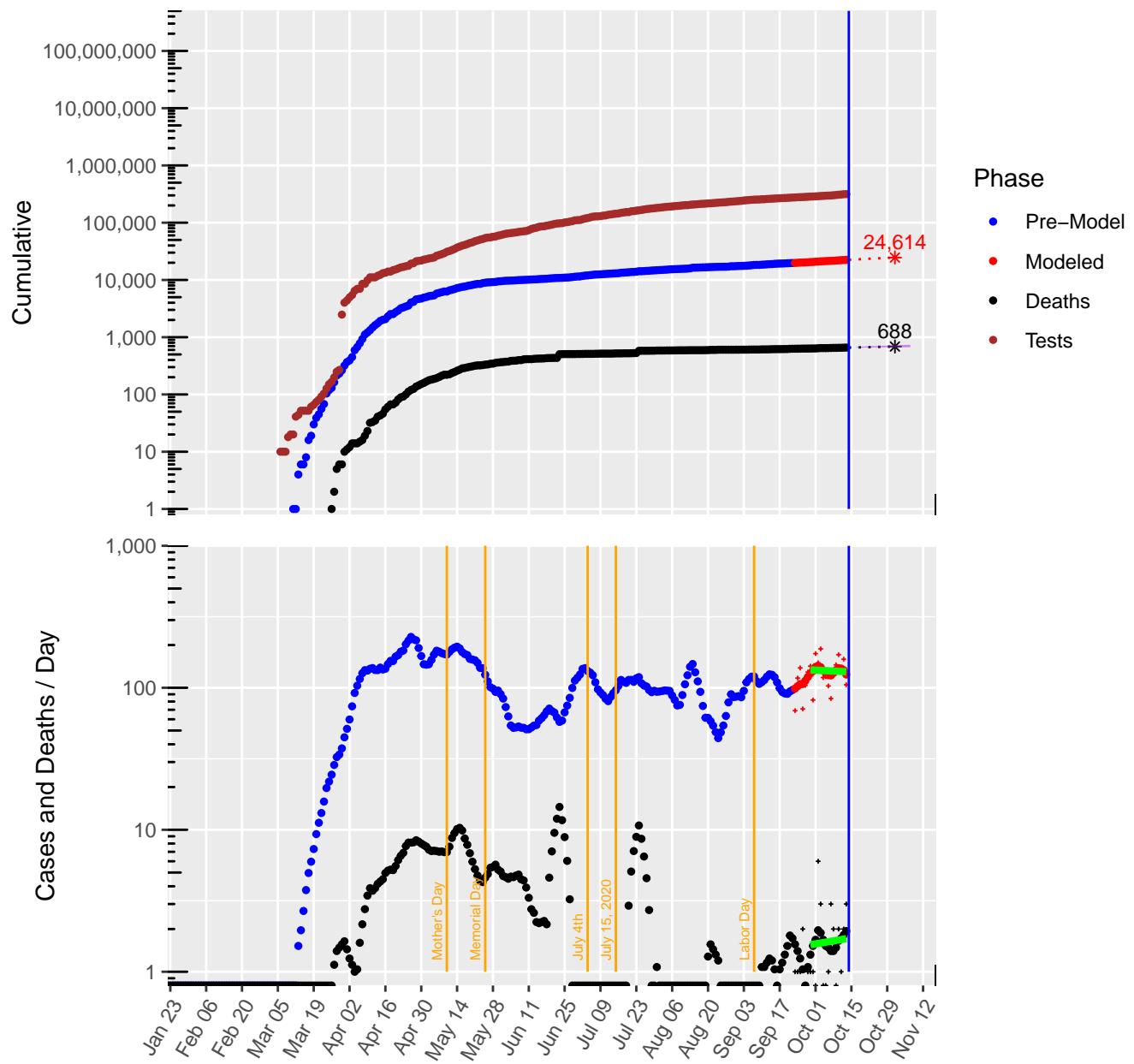
Colorado projection as of 2020-10-14



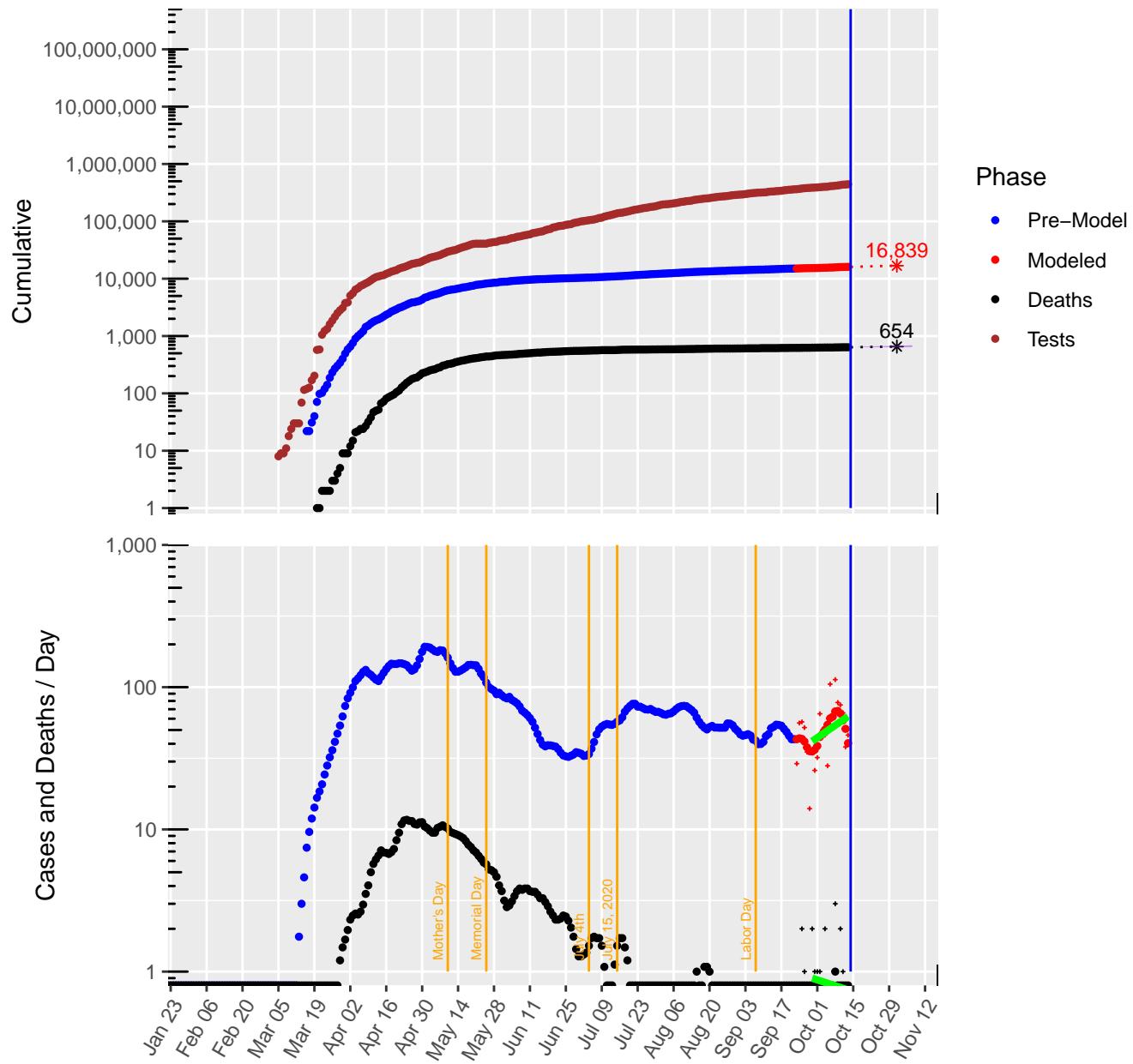
Connecticut projection as of 2020-10-14



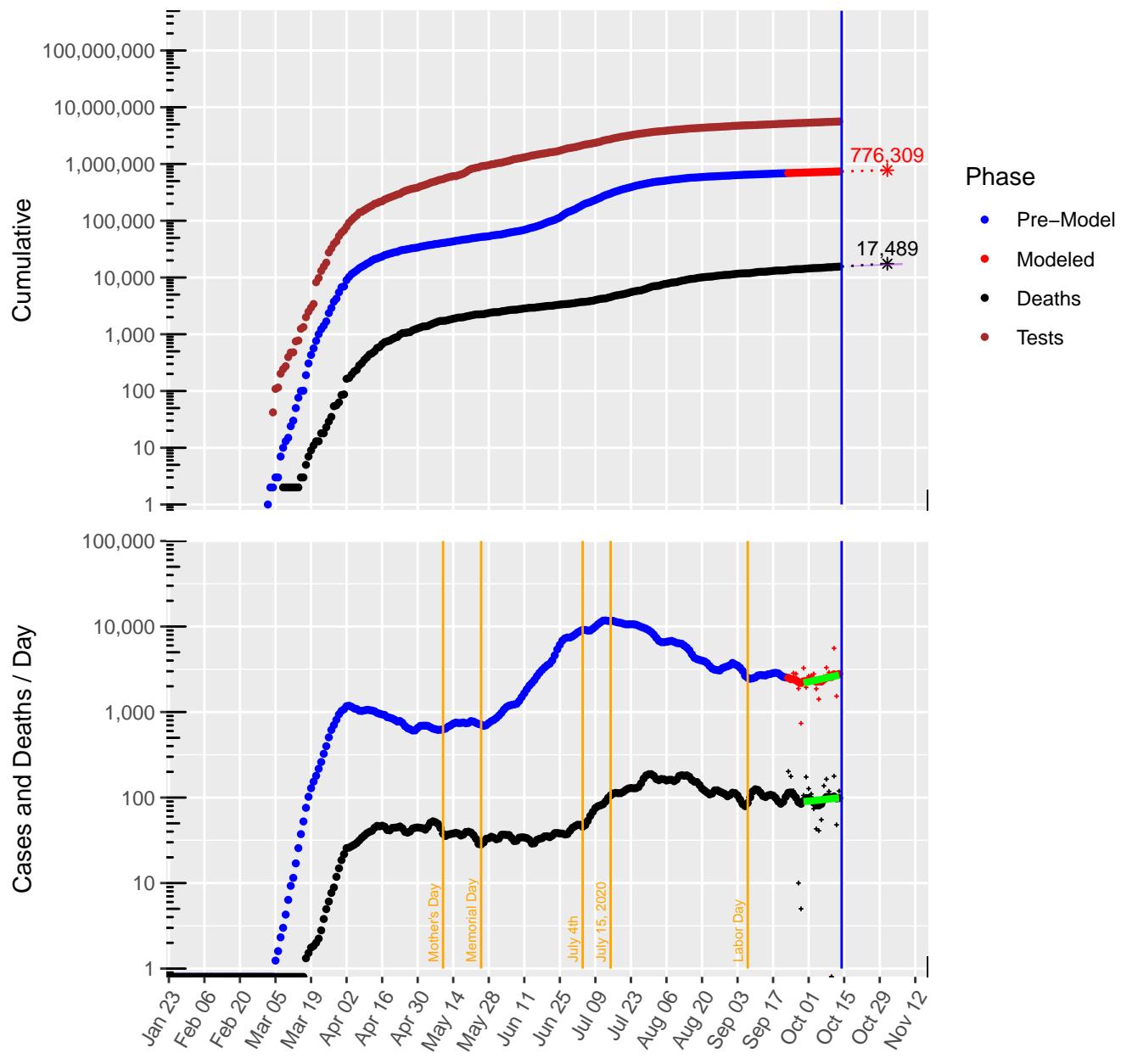
Delaware projection as of 2020-10-14



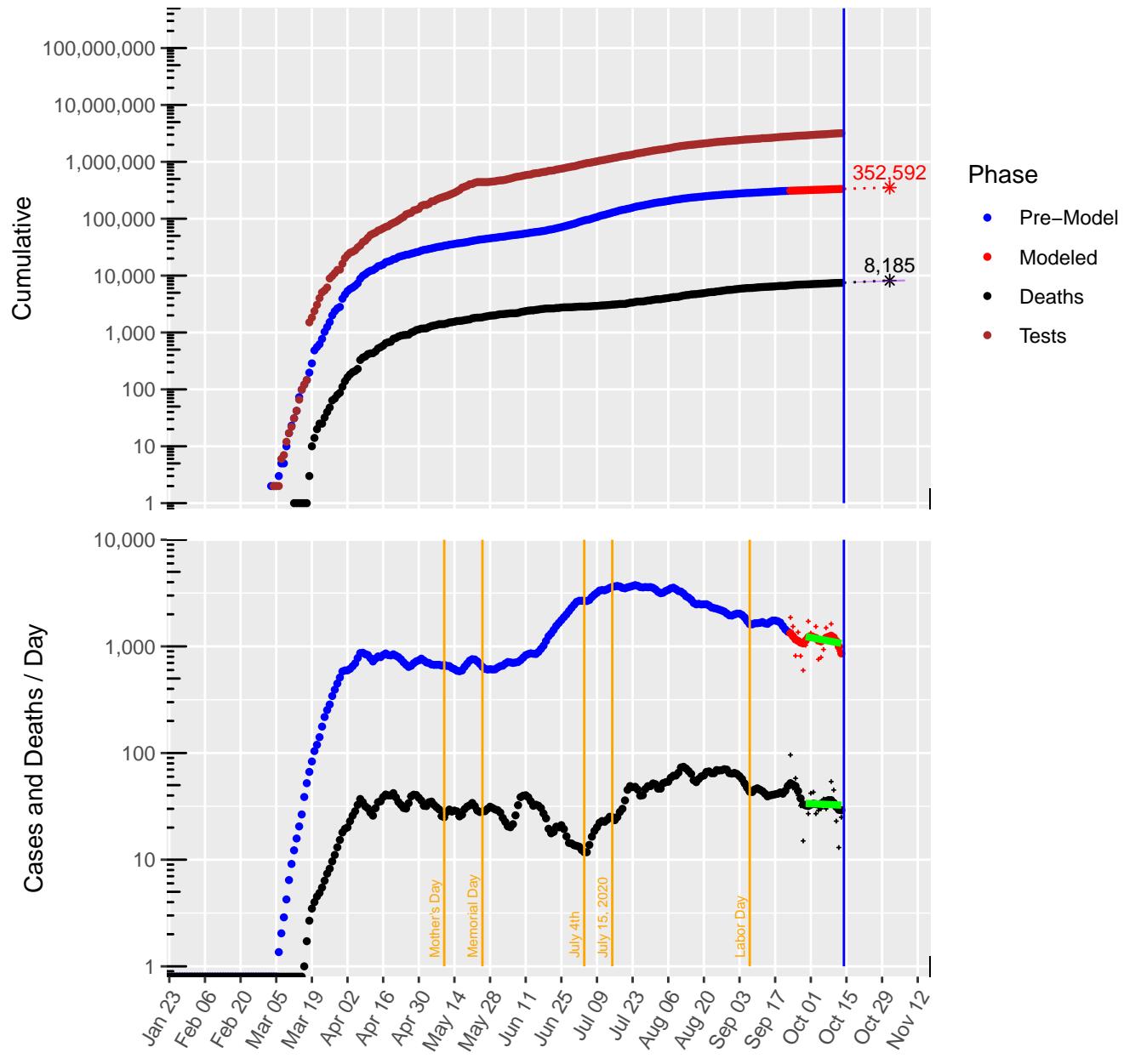
District of Columbia projection as of 2020-10-14



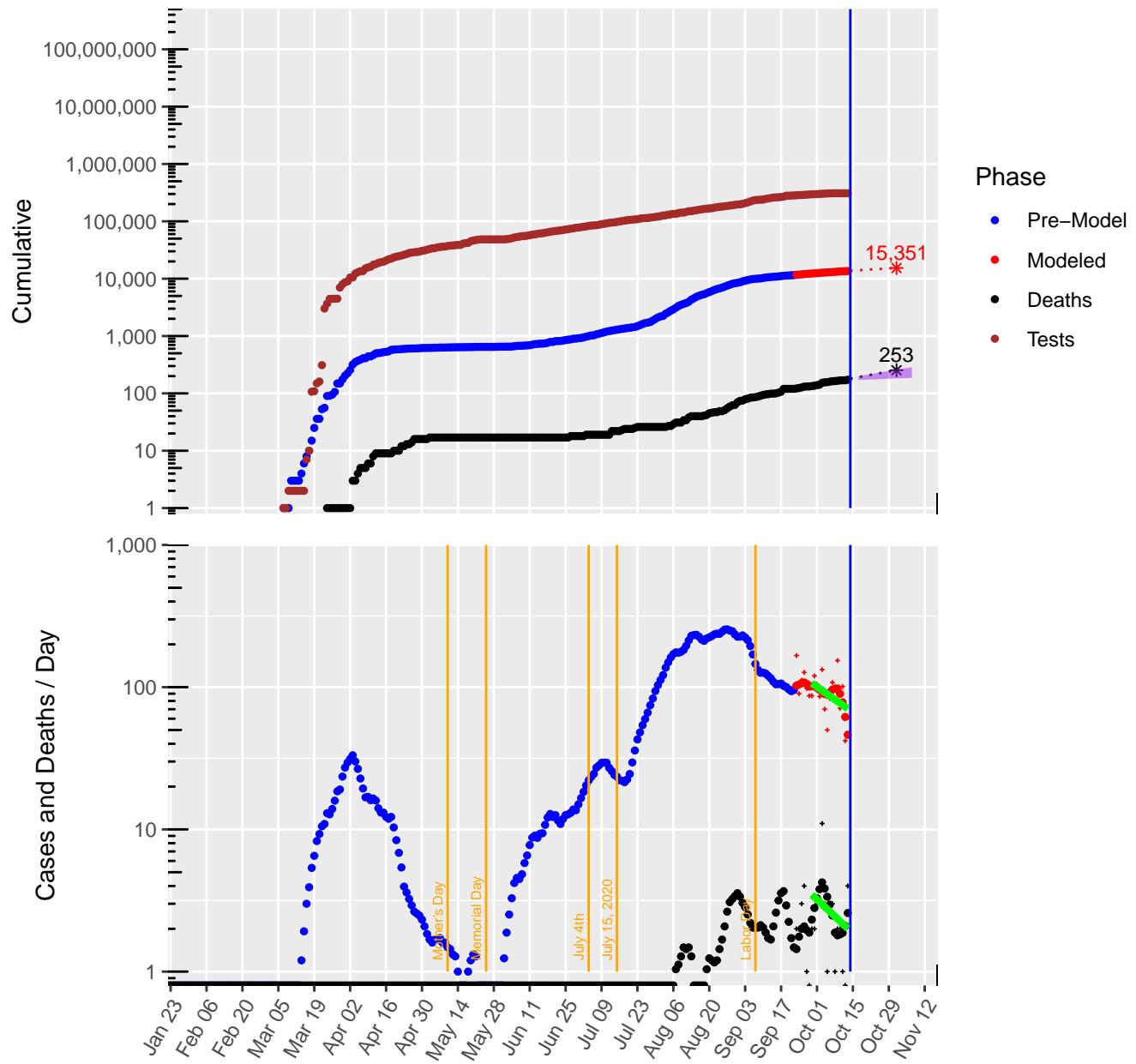
Florida projection as of 2020-10-14



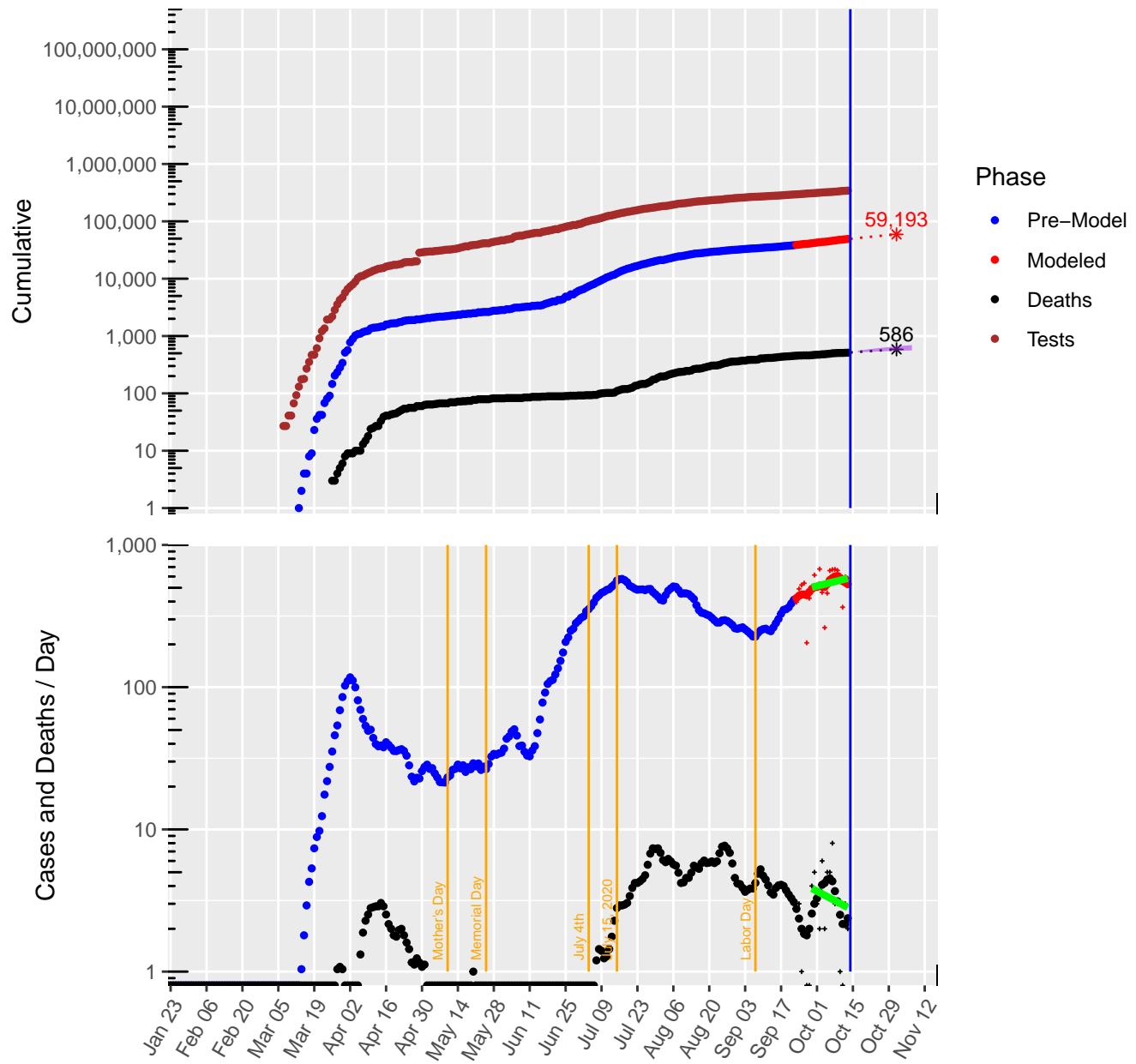
Georgia projection as of 2020-10-14



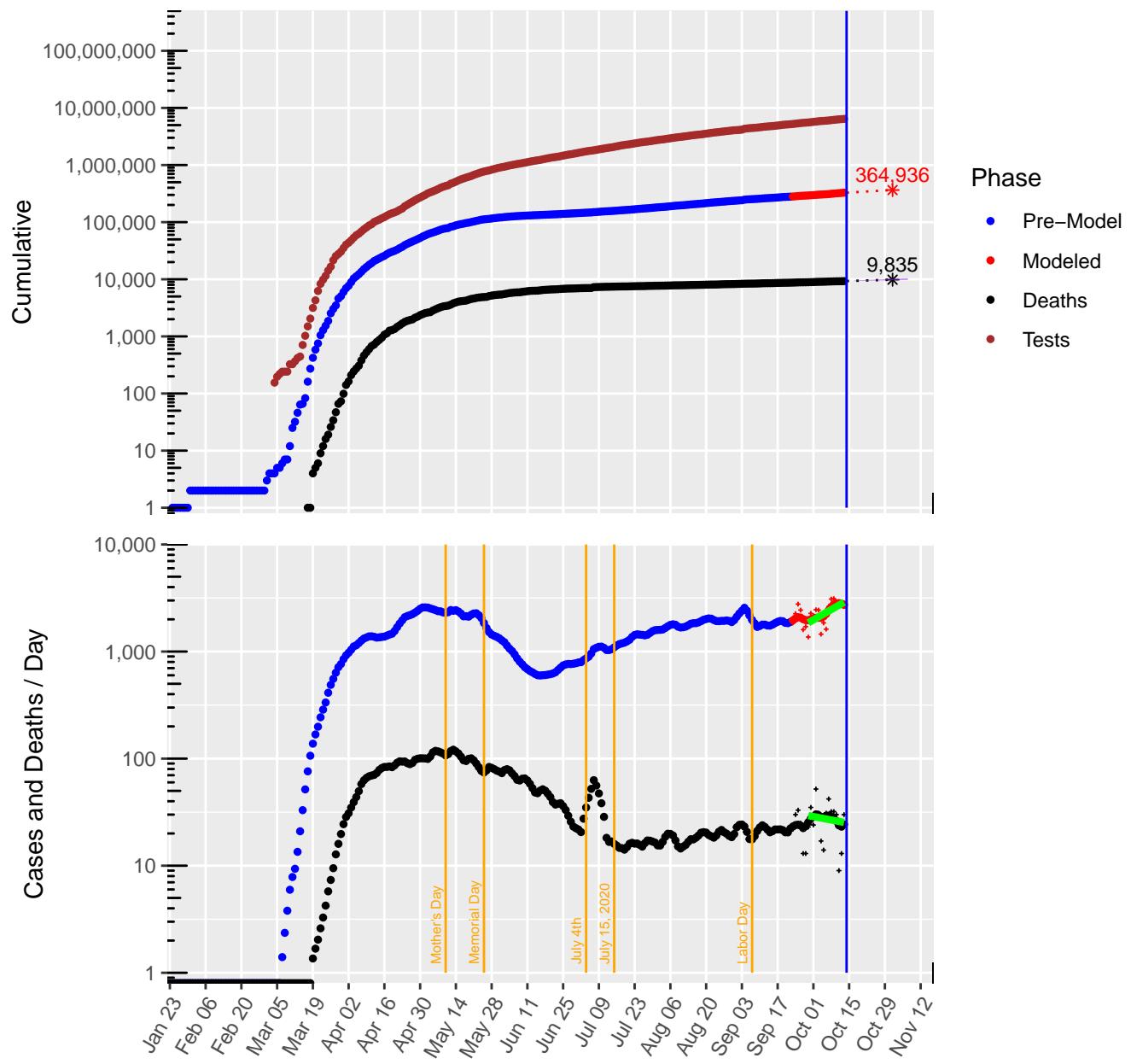
Hawaii projection as of 2020-10-14



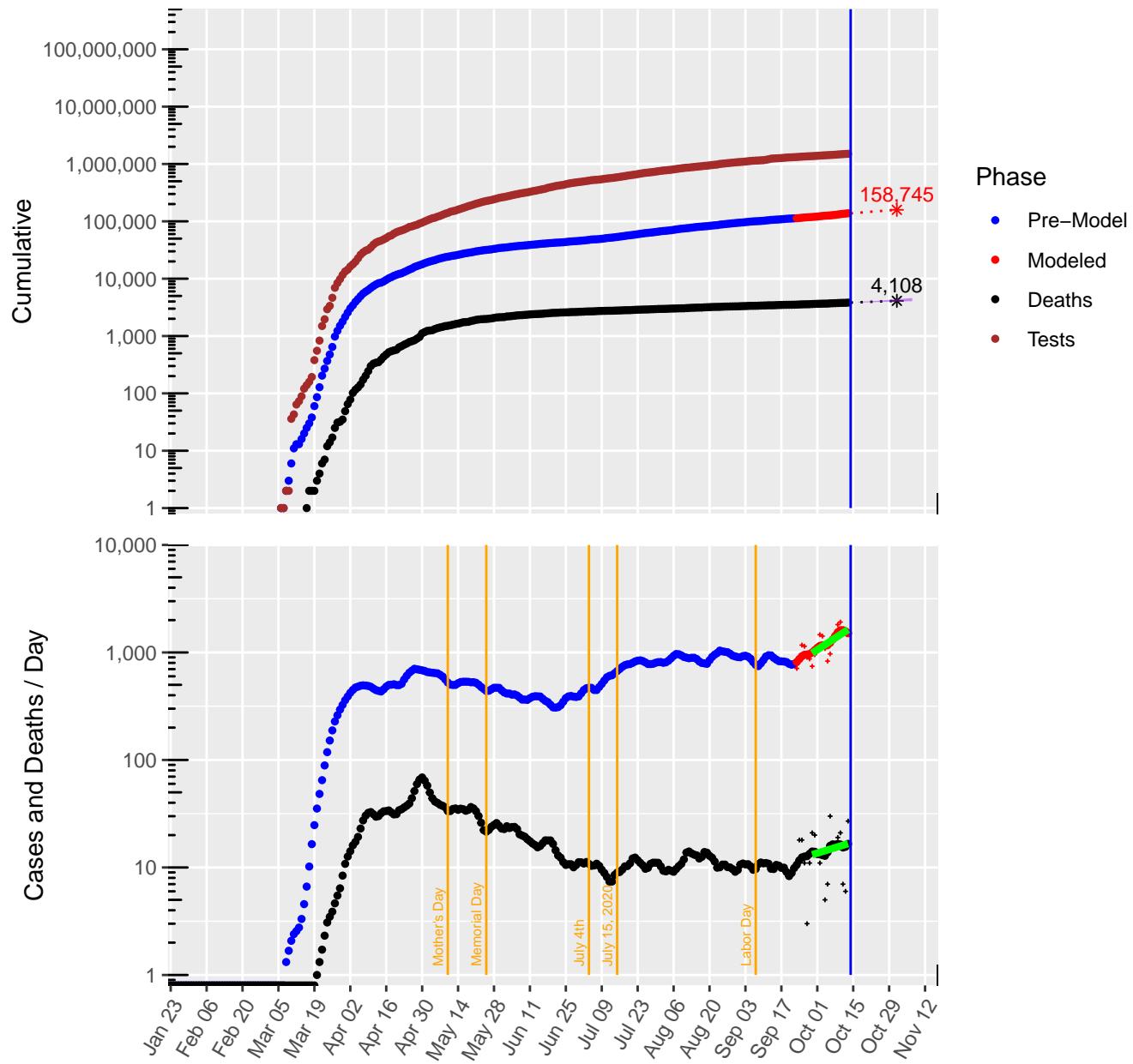
Idaho projection as of 2020-10-14



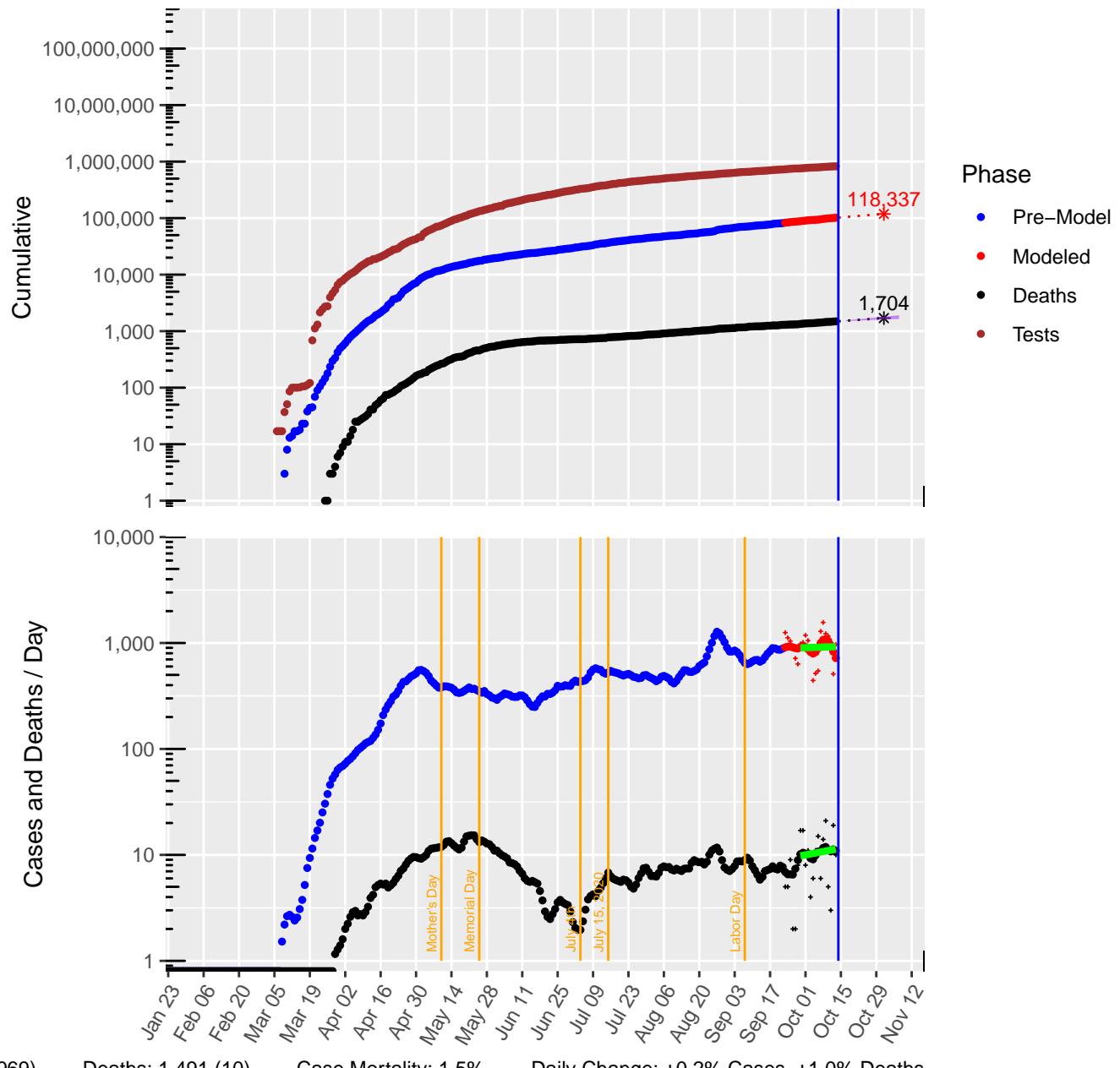
Illinois projection as of 2020-10-14



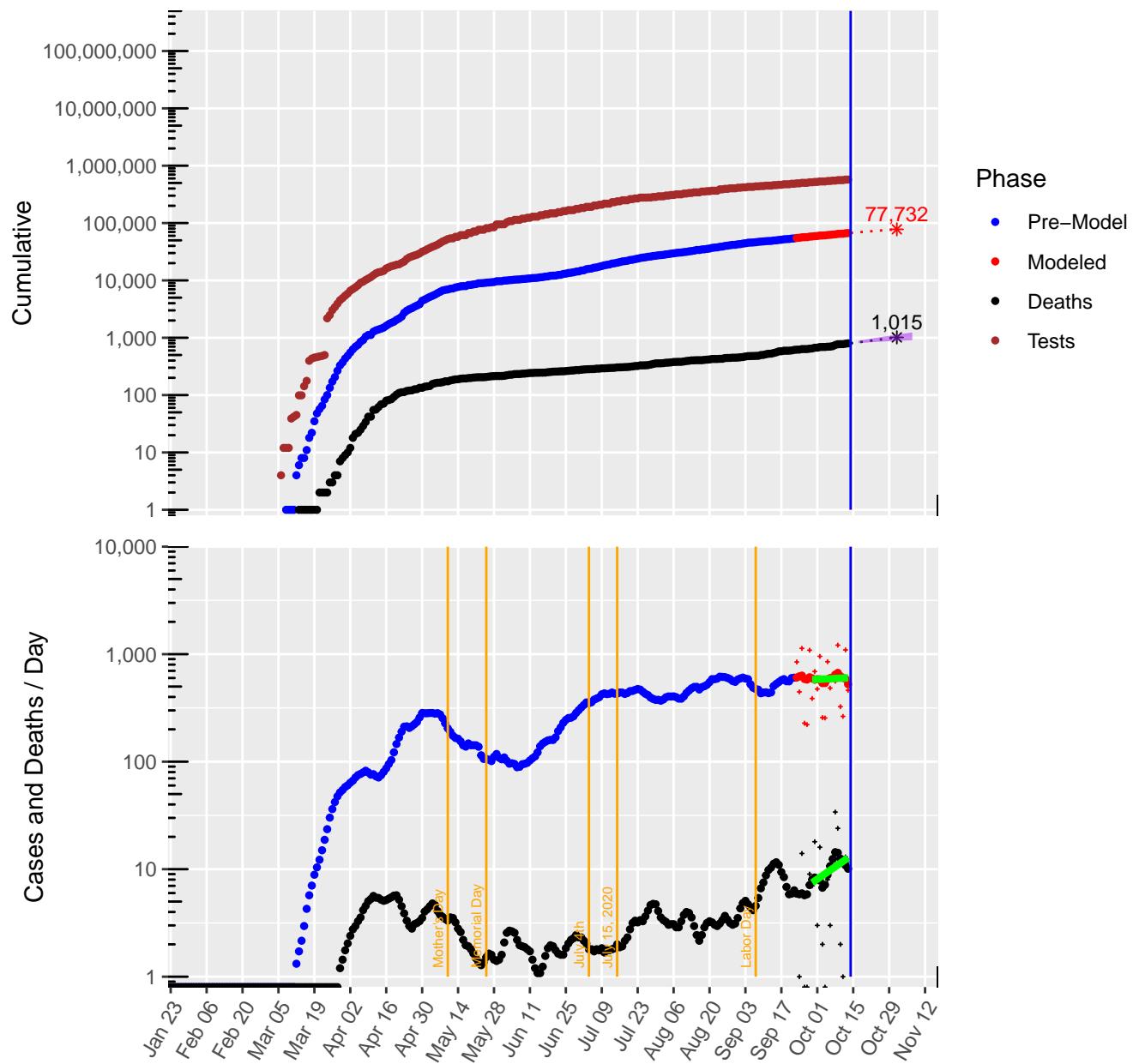
Indiana projection as of 2020-10-14



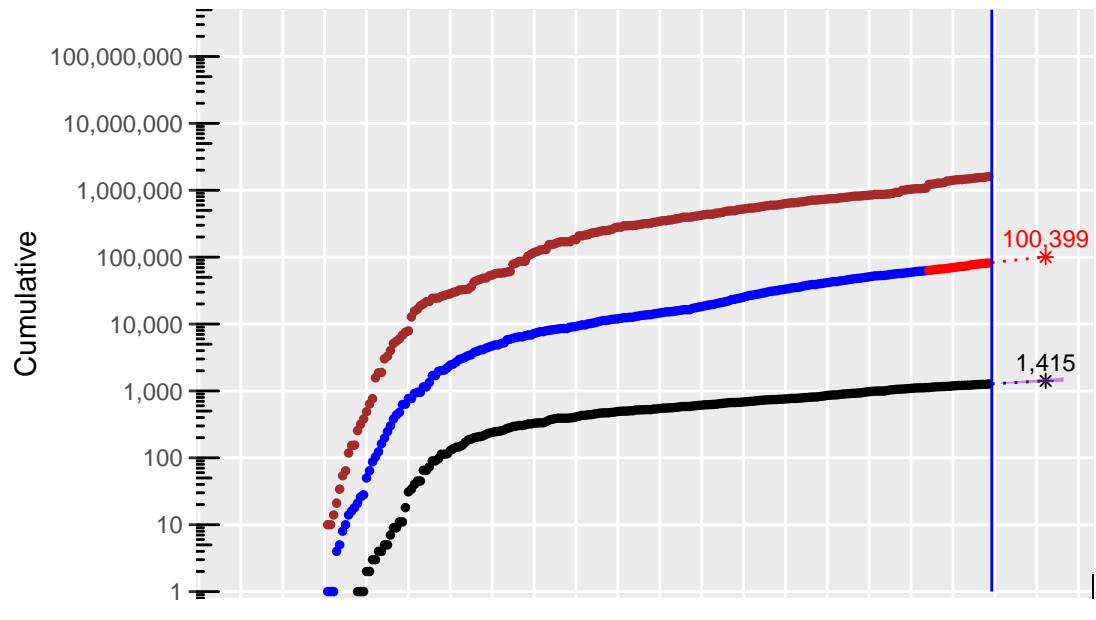
Iowa projection as of 2020-10-14



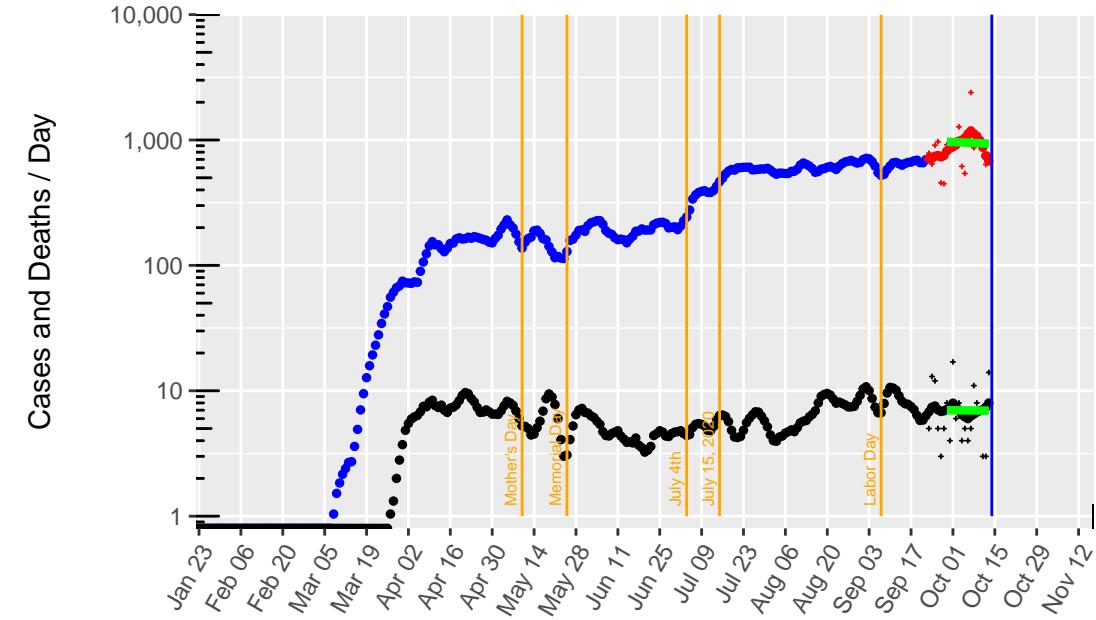
Kansas projection as of 2020-10-14



Kentucky projection as of 2020-10-14

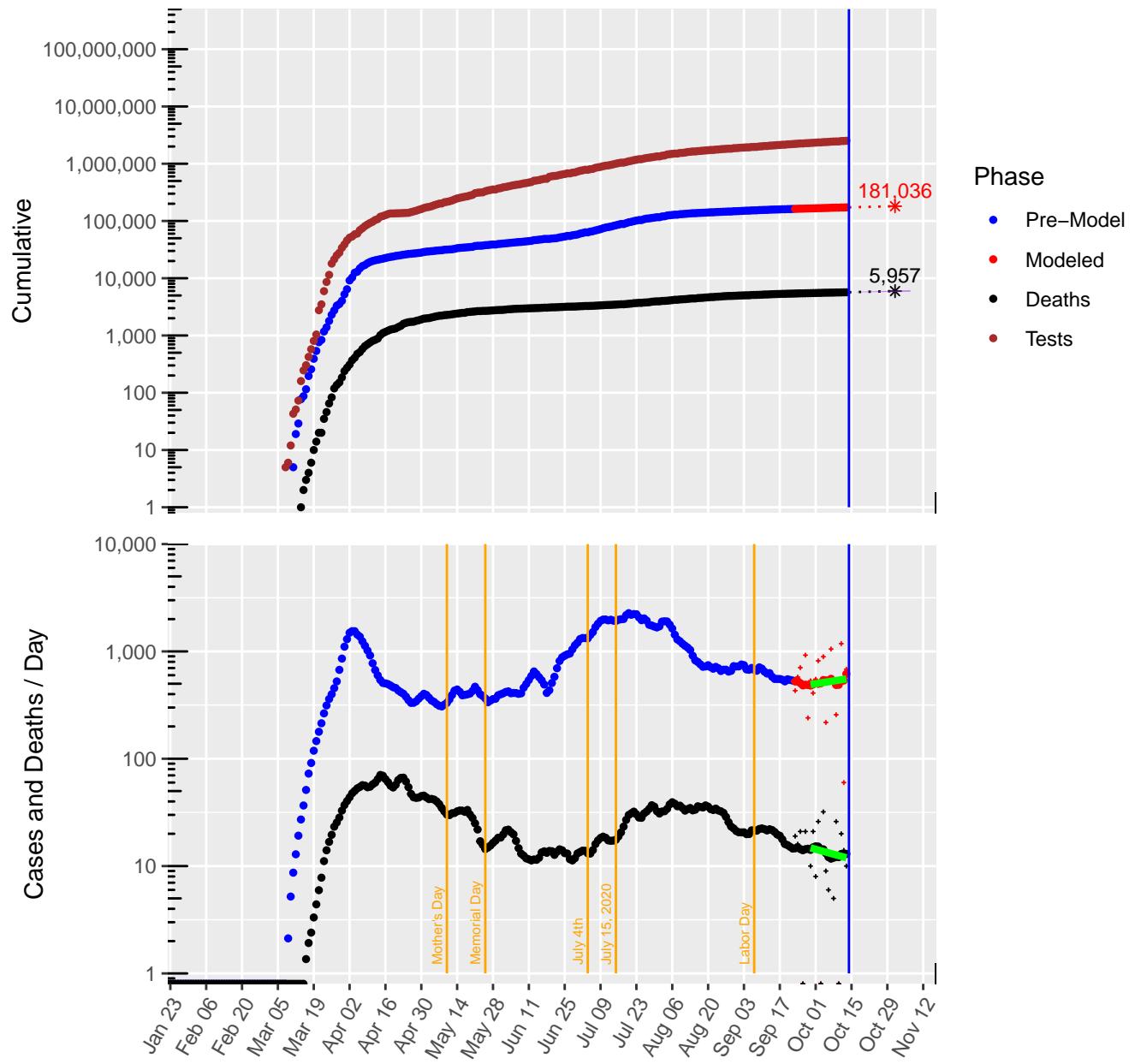


- Phase**
- Pre-Model (Blue line)
 - Modeled (Red line)
 - Deaths (Black dots)
 - Tests (Red dots)

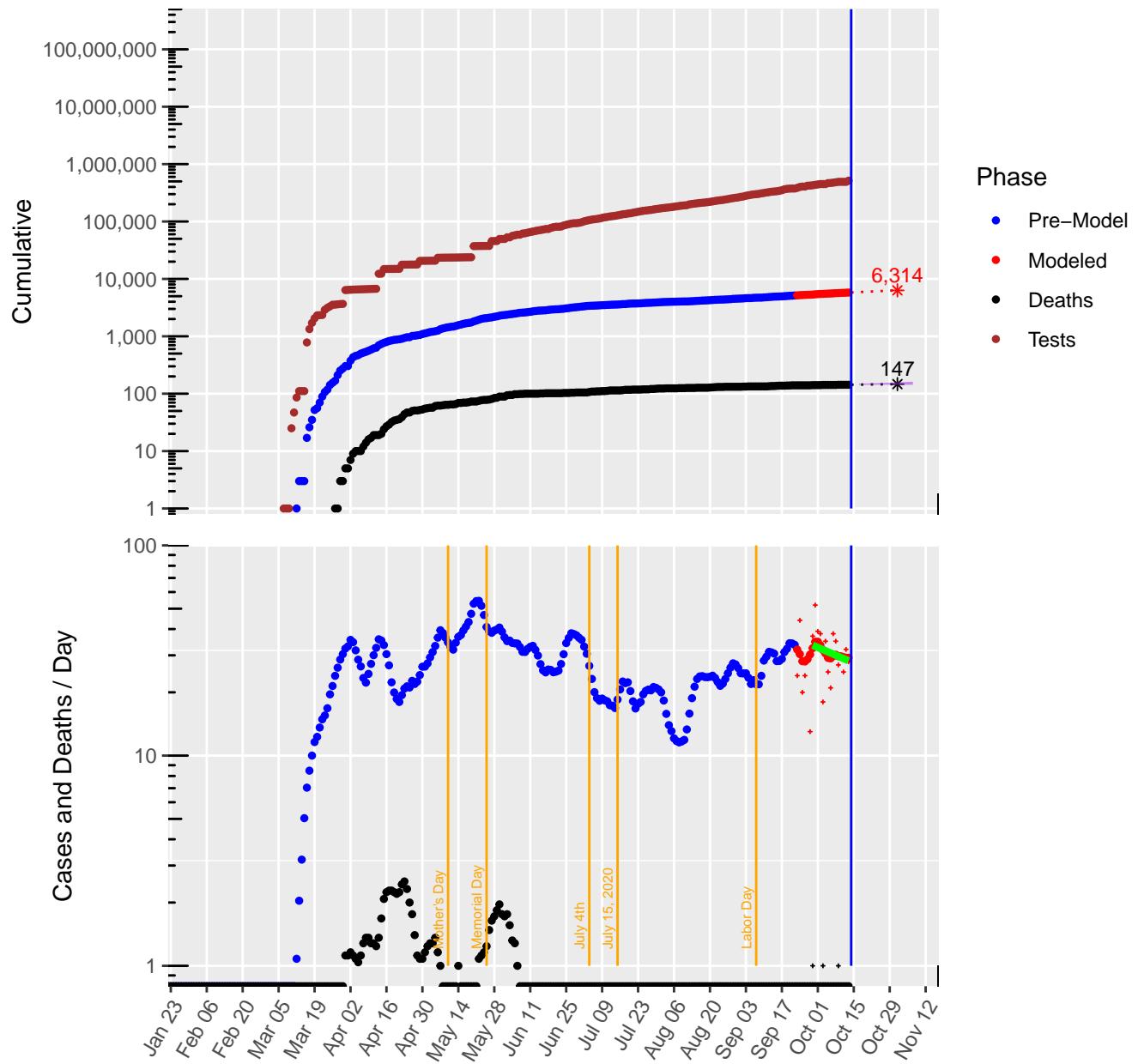


761) --- Deaths: 1,269 (14) --- Case Mortality: 1.6% --- Daily Change: -0.3% Cases, -0.1% Deaths

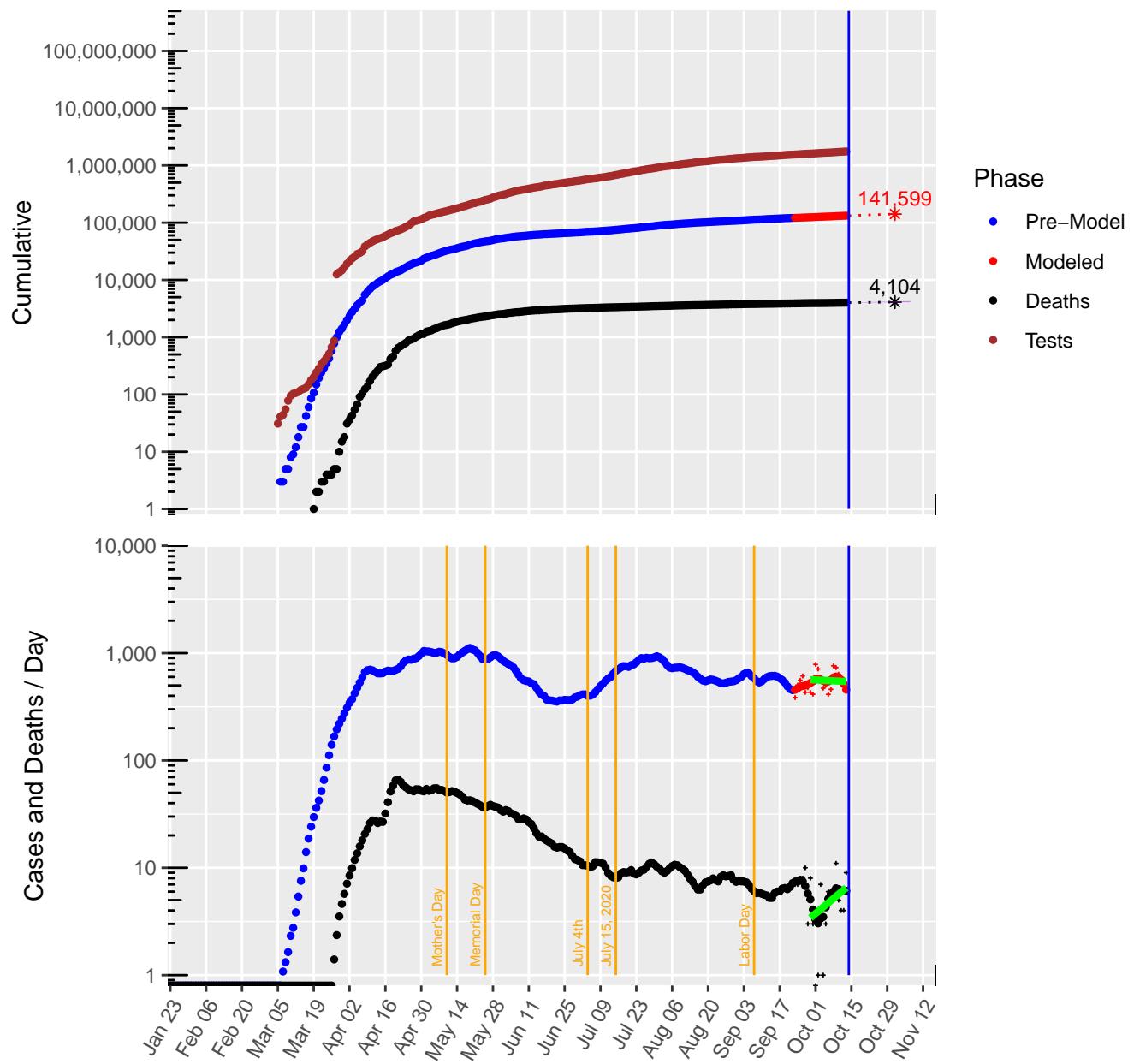
Louisiana projection as of 2020-10-14



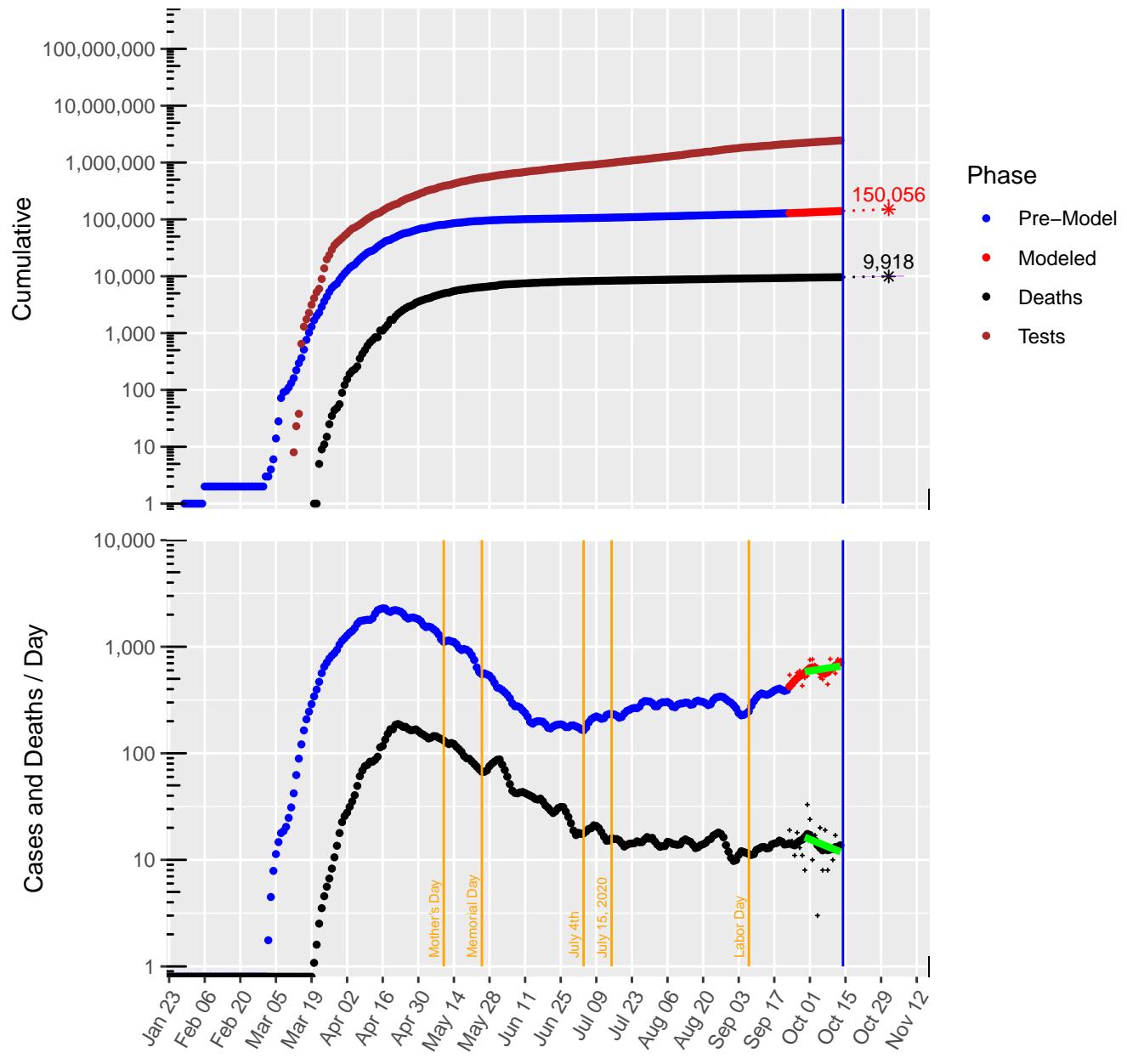
Maine projection as of 2020-10-14



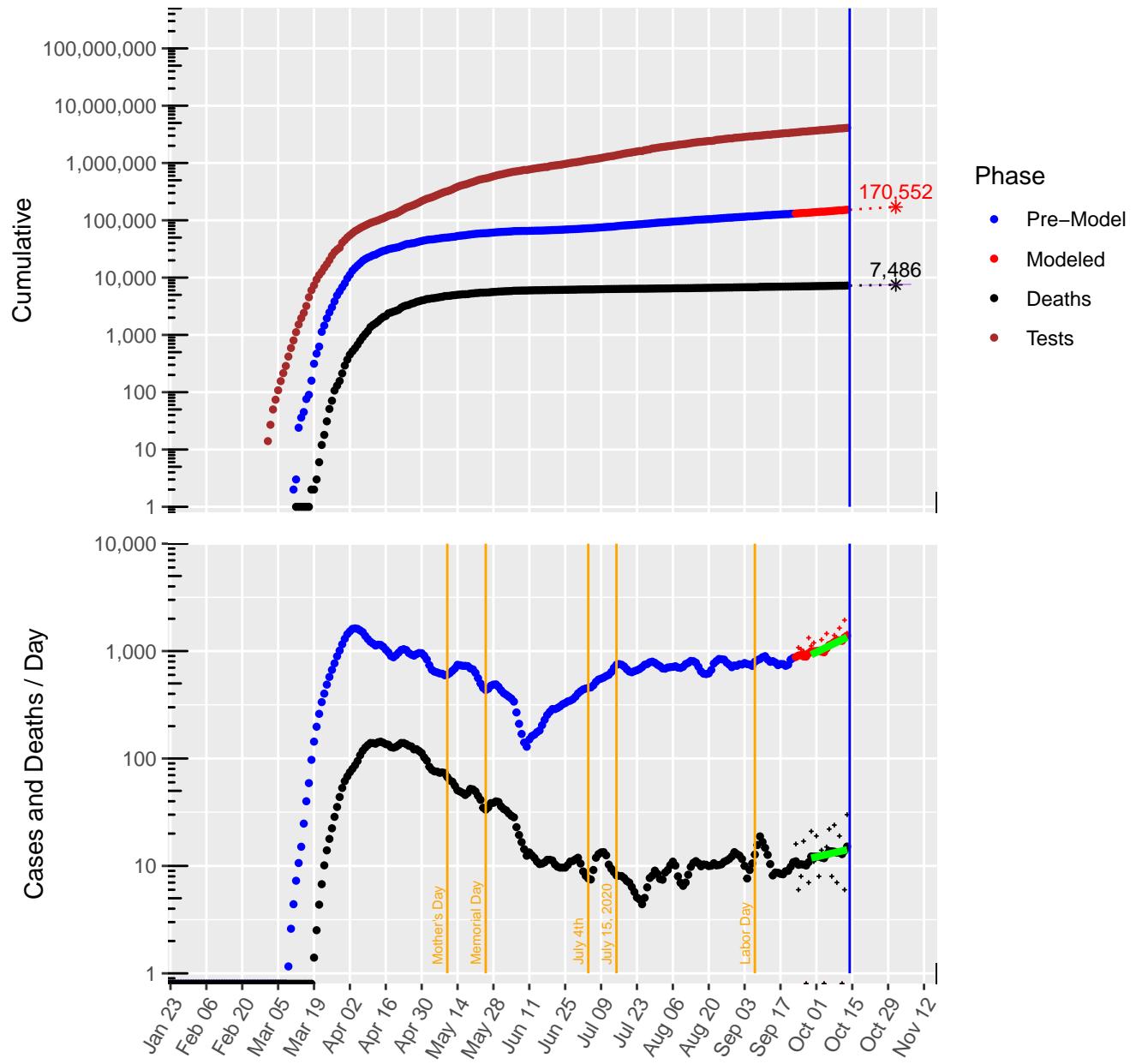
Maryland projection as of 2020-10-14



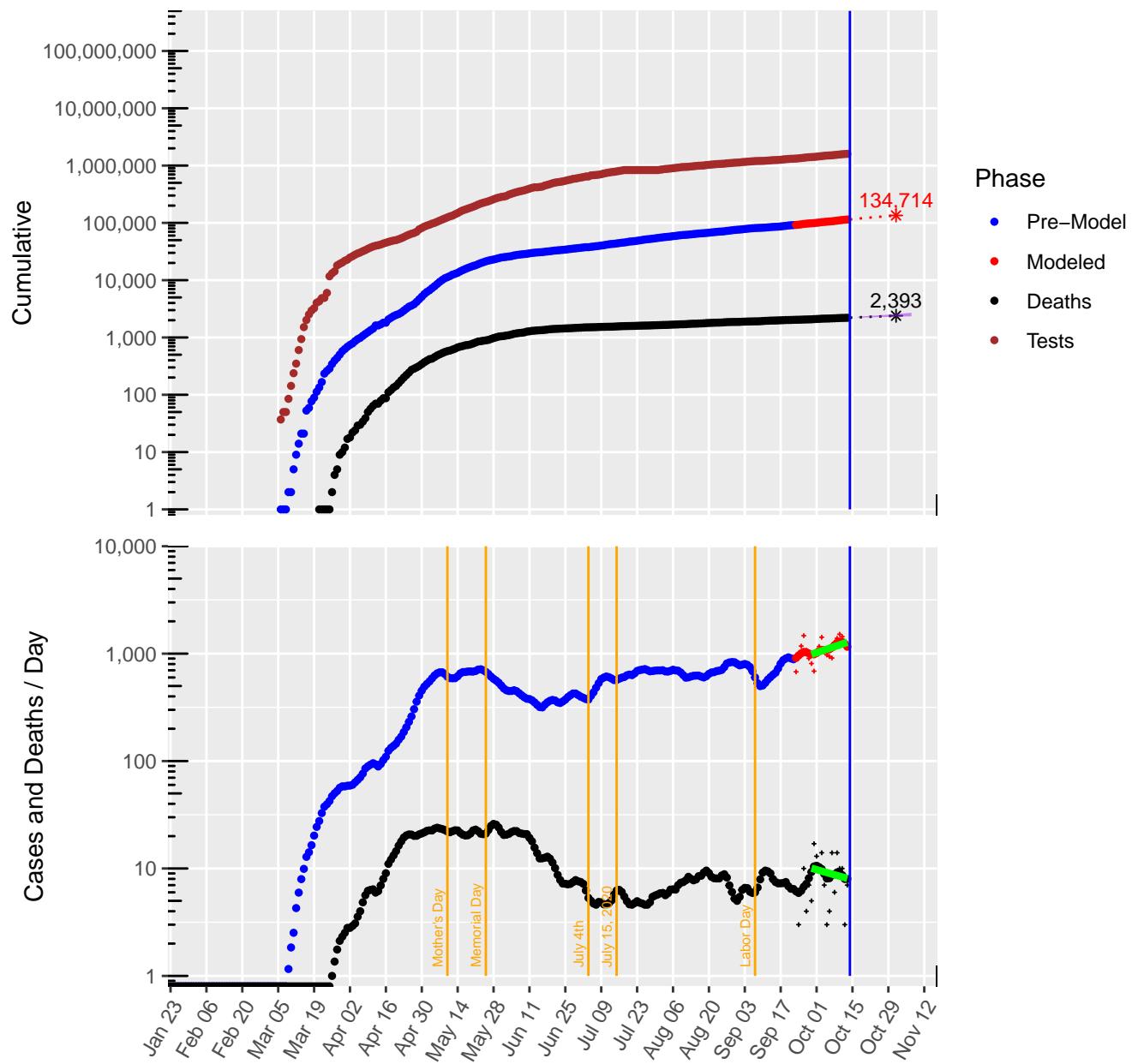
Massachusetts projection as of 2020-10-14



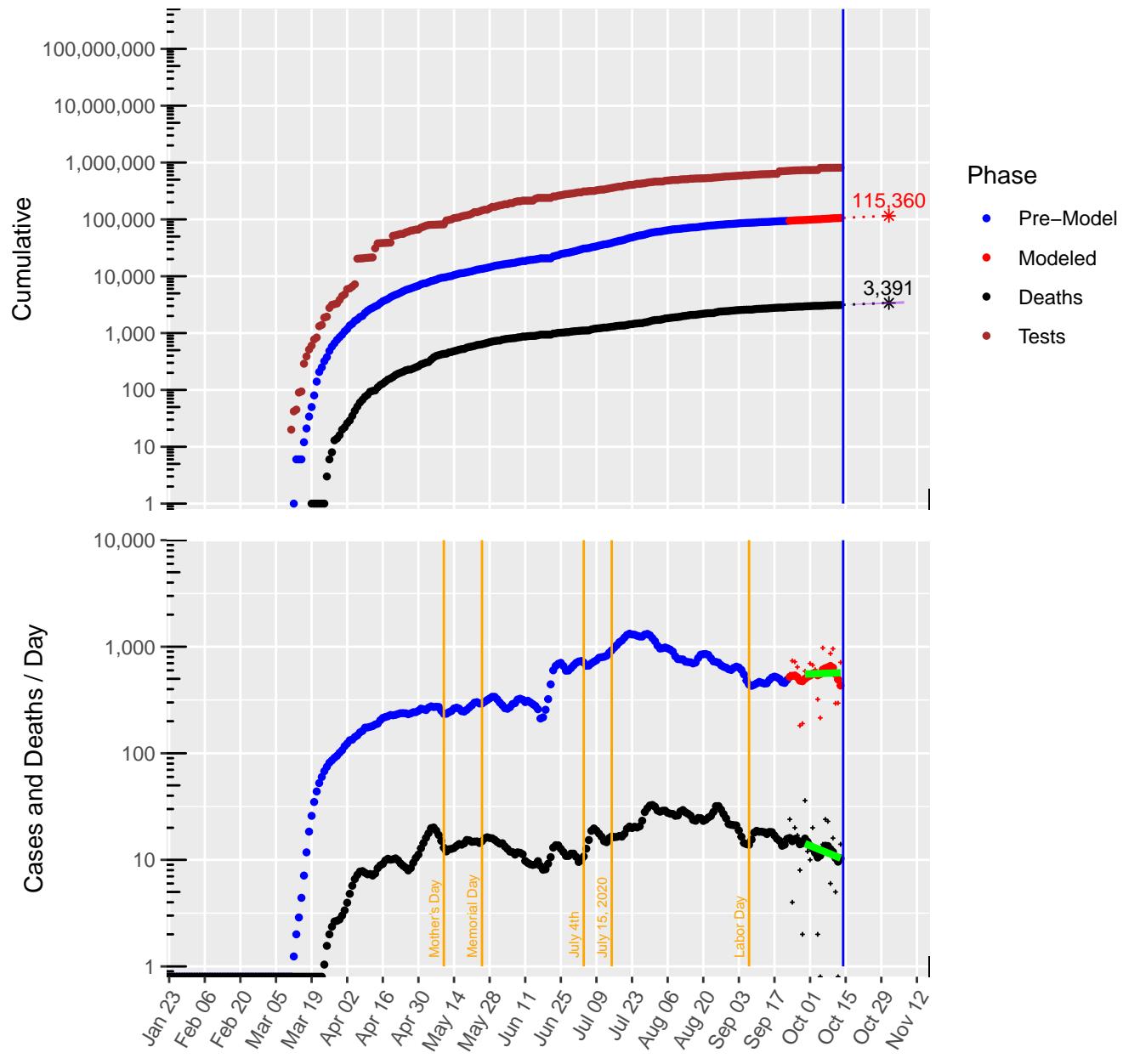
Michigan projection as of 2020-10-14



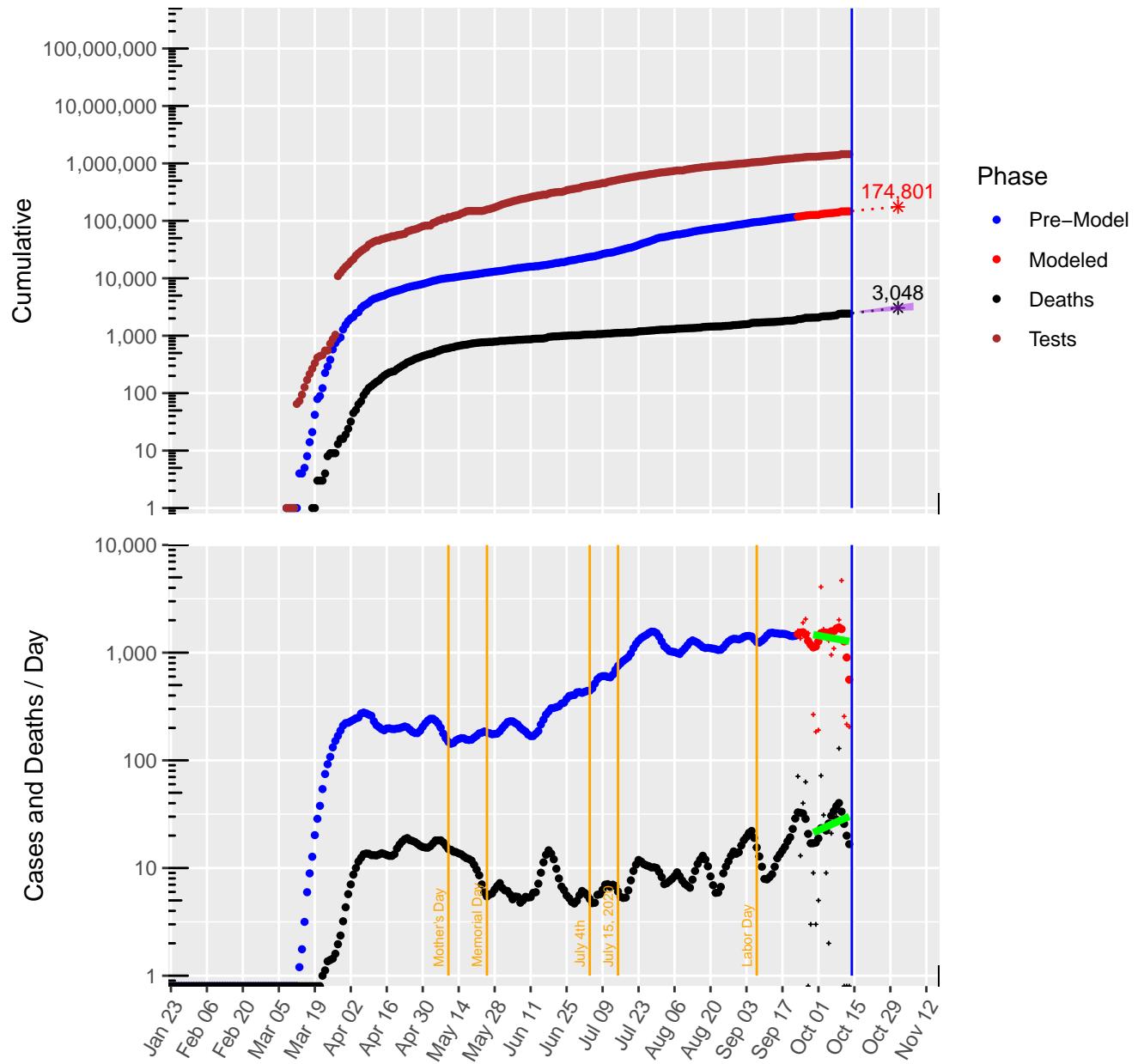
Minnesota projection as of 2020-10-14



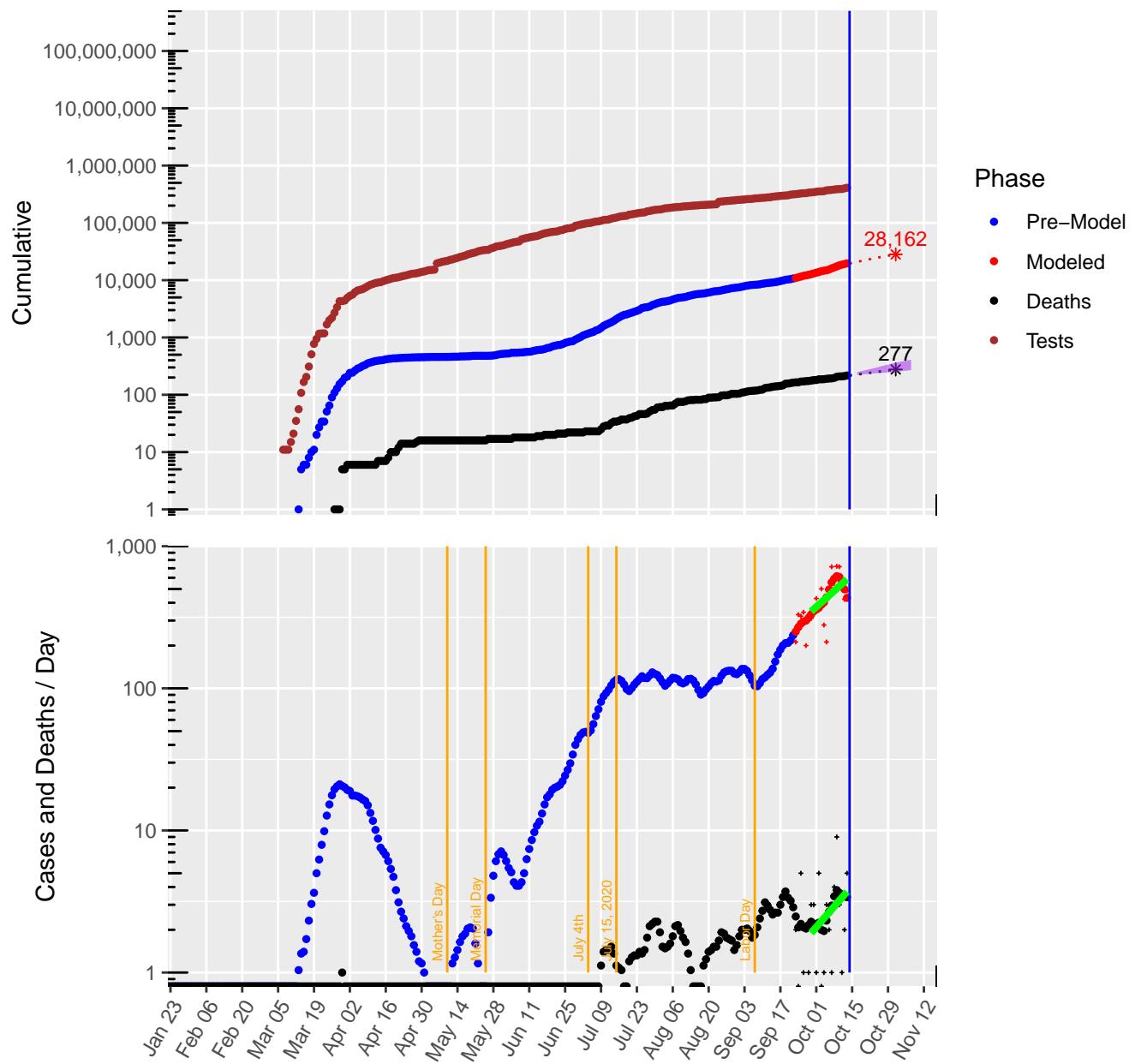
Mississippi projection as of 2020-10-14



Missouri projection as of 2020-10-14

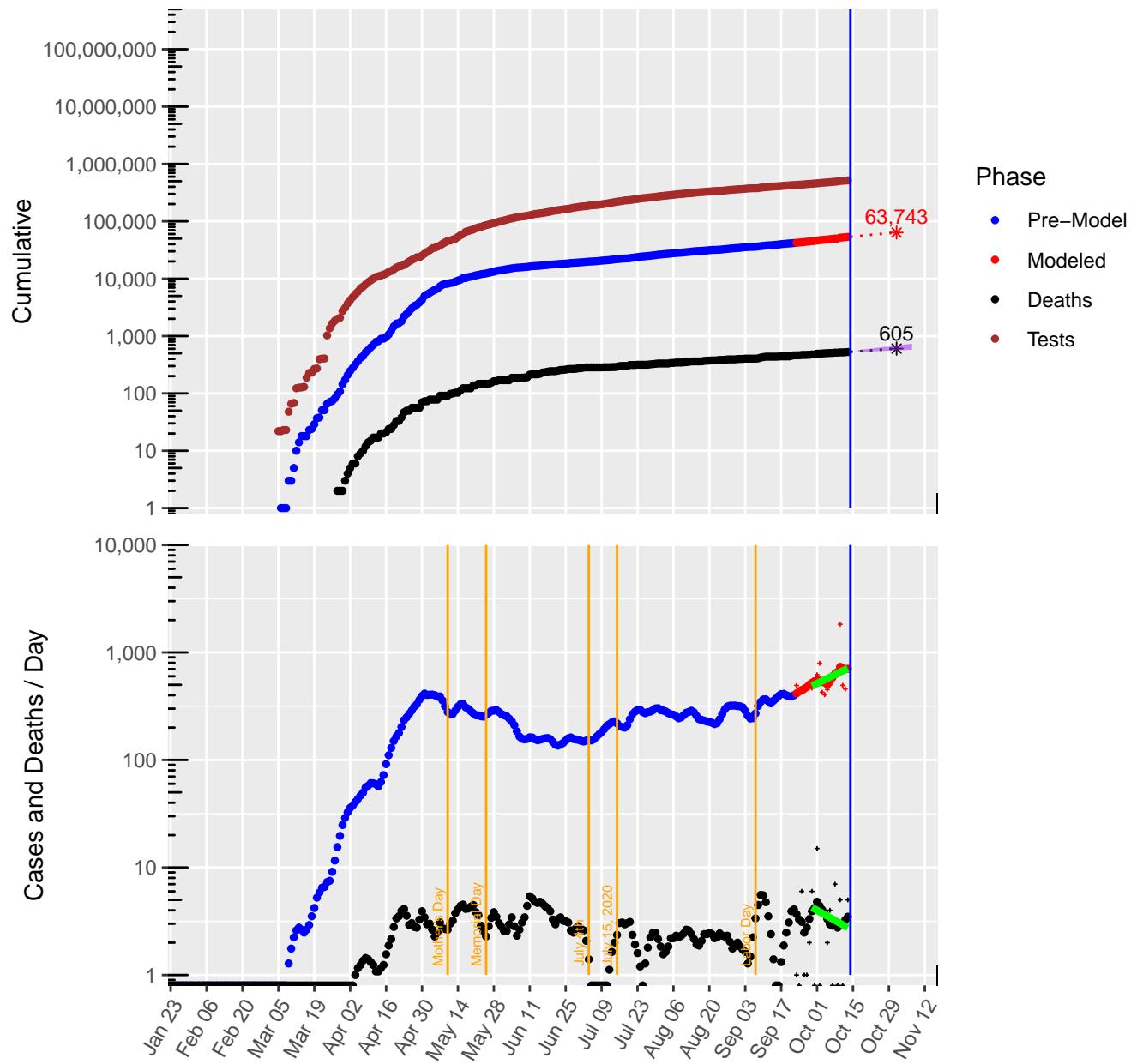


Montana projection as of 2020-10-14

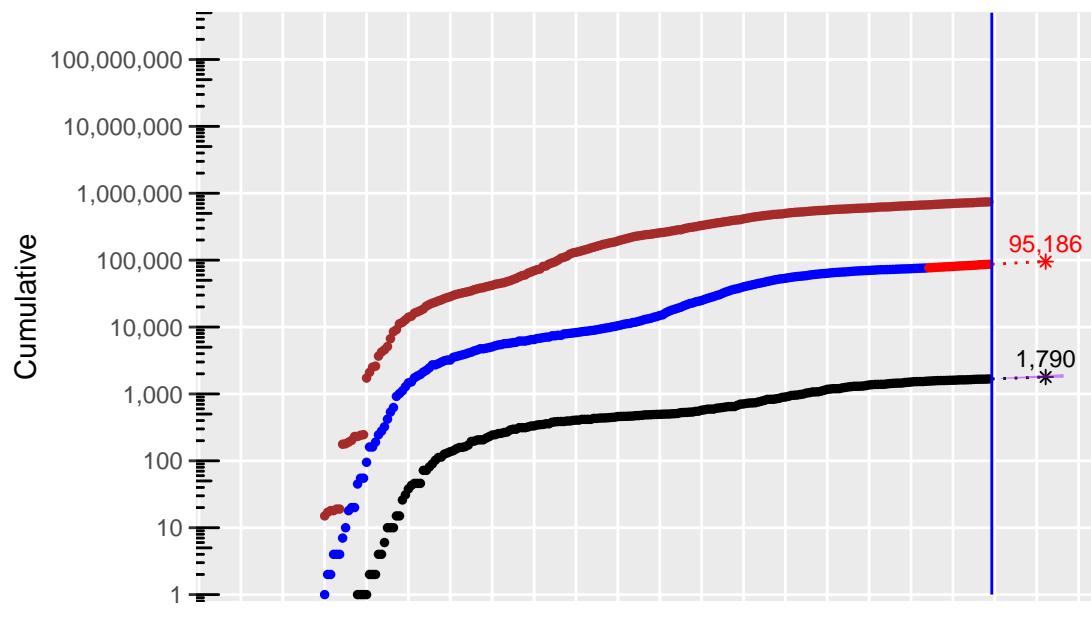


1 (486) --- Deaths: 217 (5) --- Case Mortality: 1.1% --- Daily Change: +3.7% Cases, +4.6% Deaths

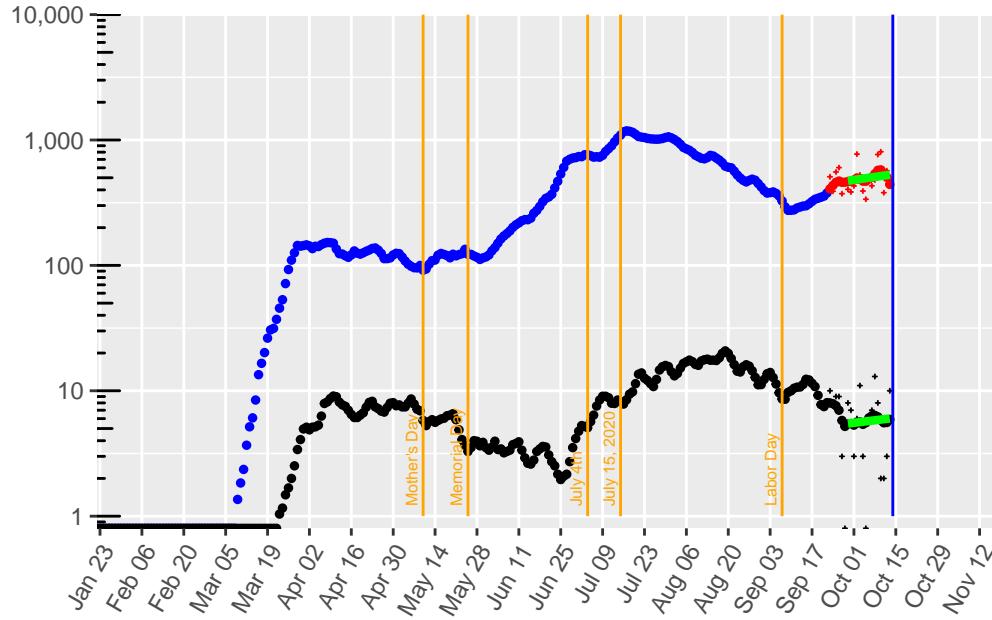
Nebraska projection as of 2020-10-14



Nevada projection as of 2020-10-14

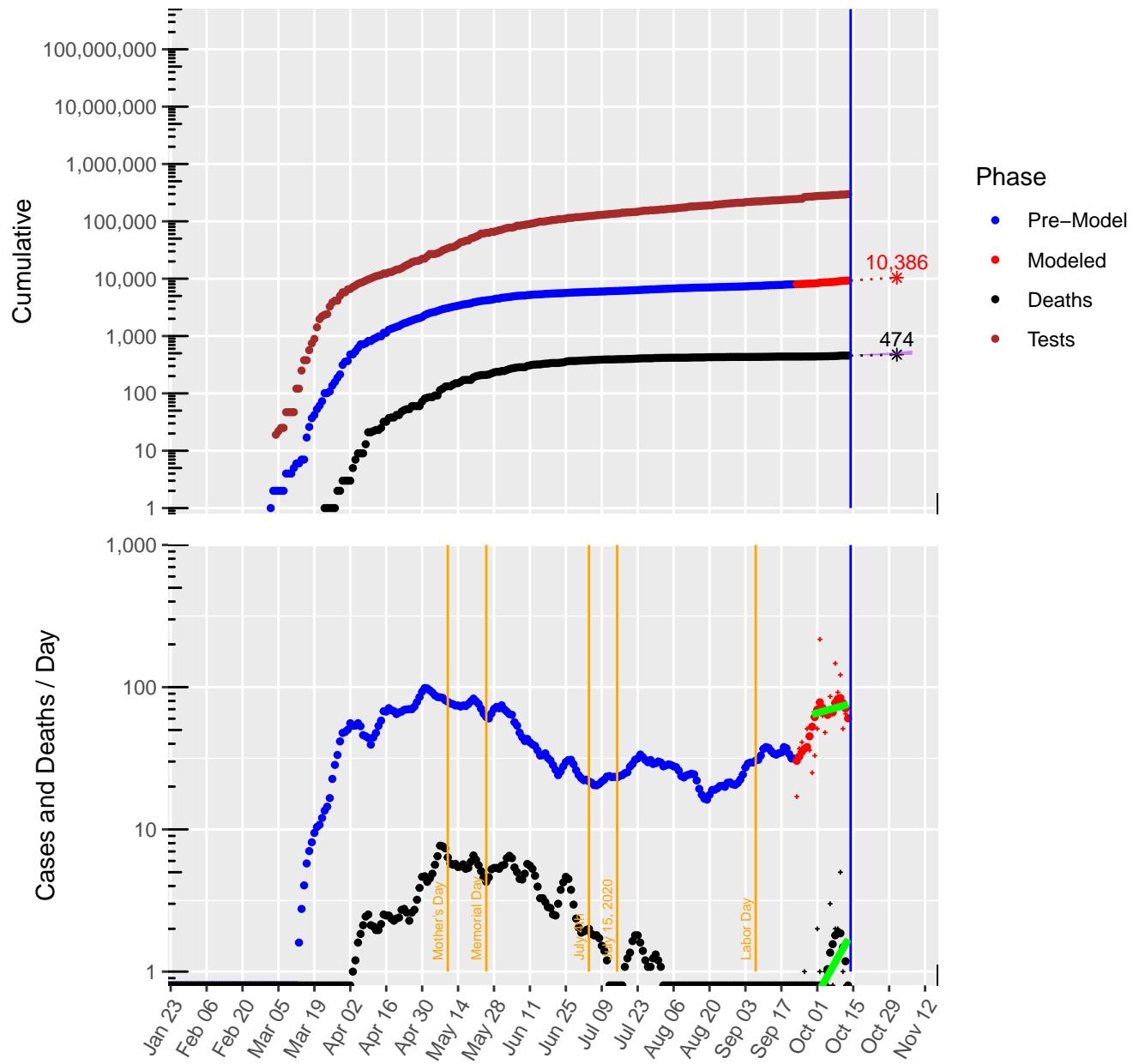


- Phase**
- Pre-Model
 - Modeled
 - Deaths
 - Tests

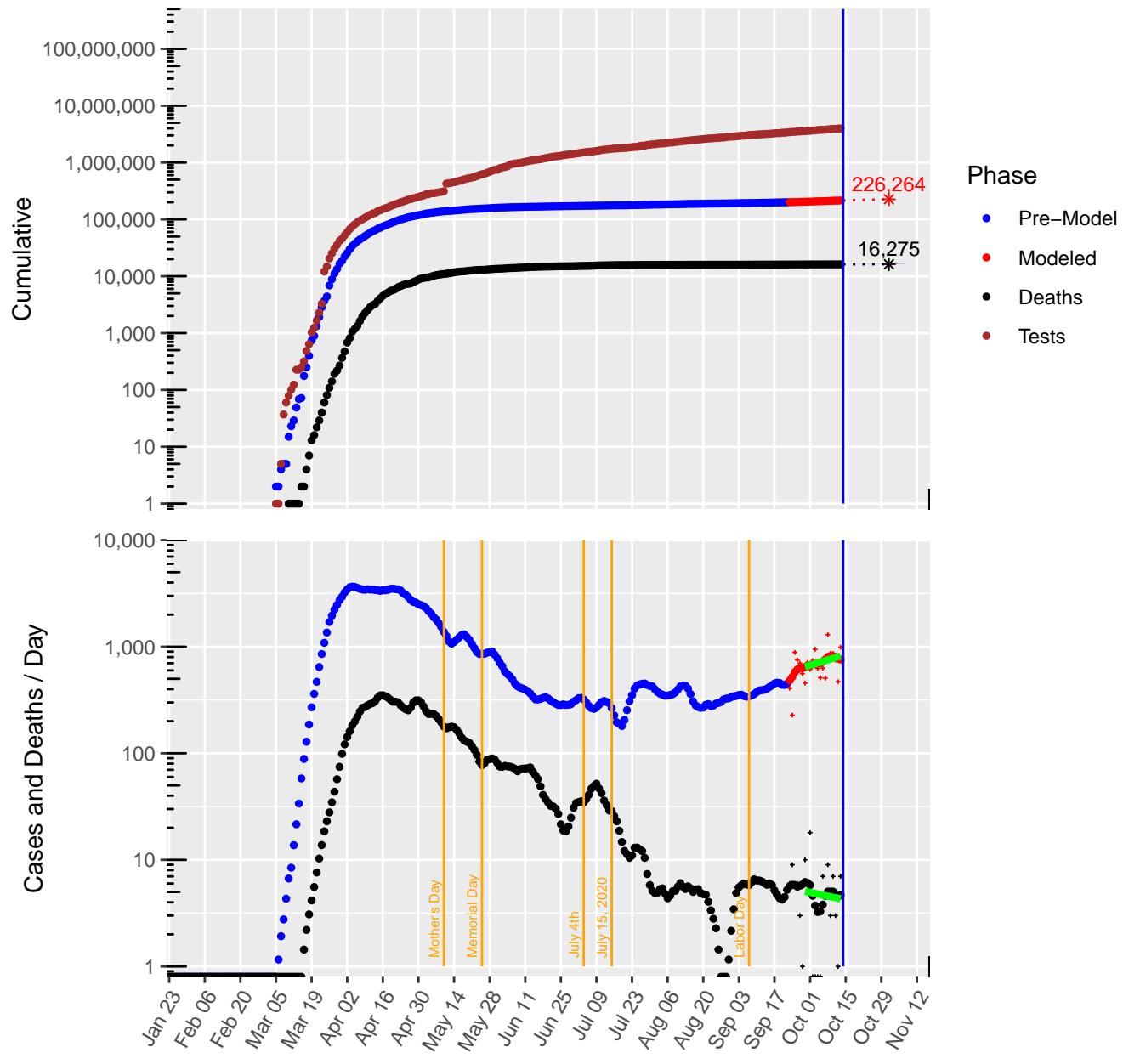


487) — Deaths: 1,674 (10) — Case Mortality: 1.9% — Daily Change: +0.8% Cases, +0.7% Deaths

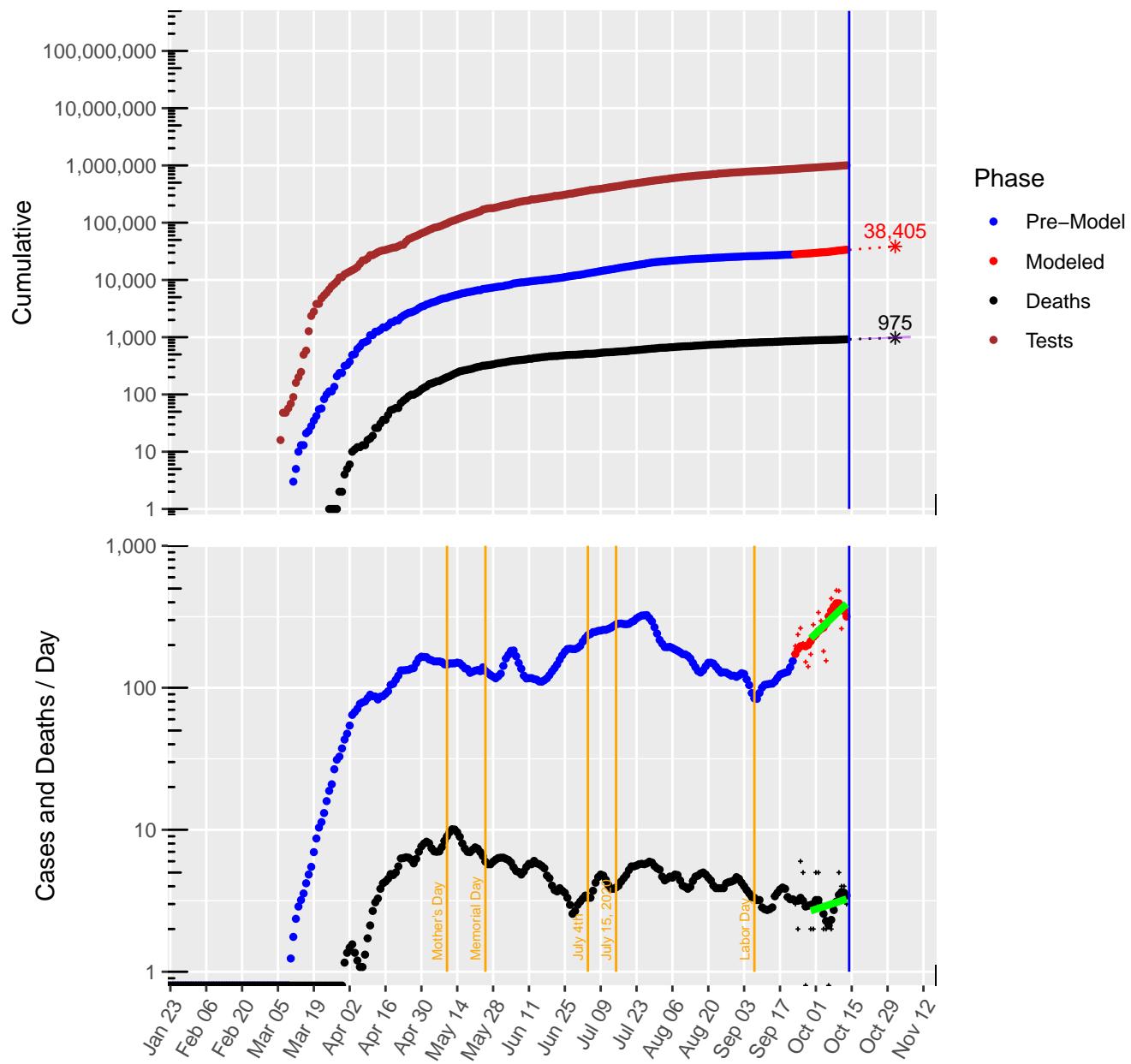
New Hampshire projection as of 2020-10-14



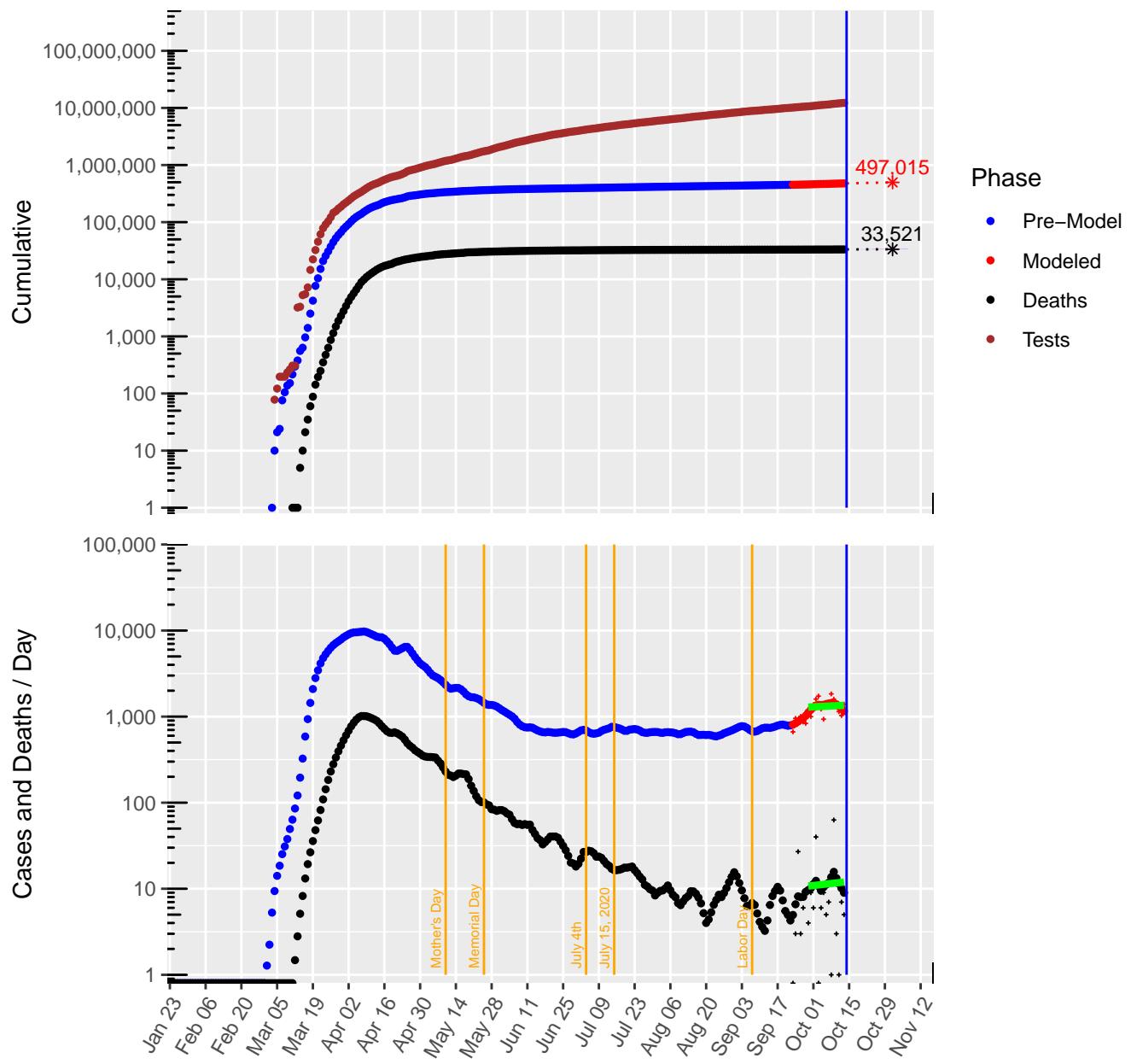
New Jersey projection as of 2020-10-14



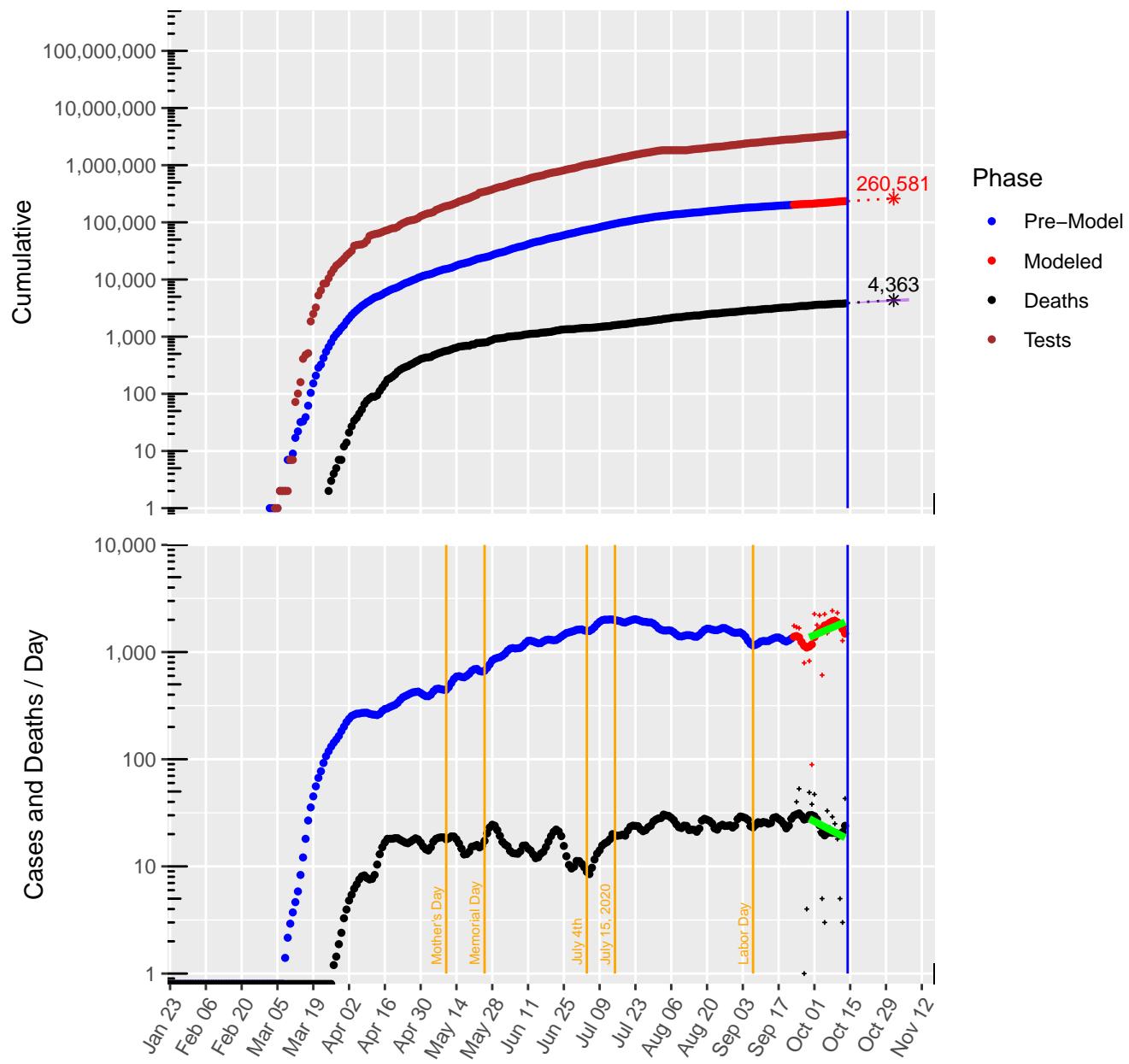
New Mexico projection as of 2020-10-14



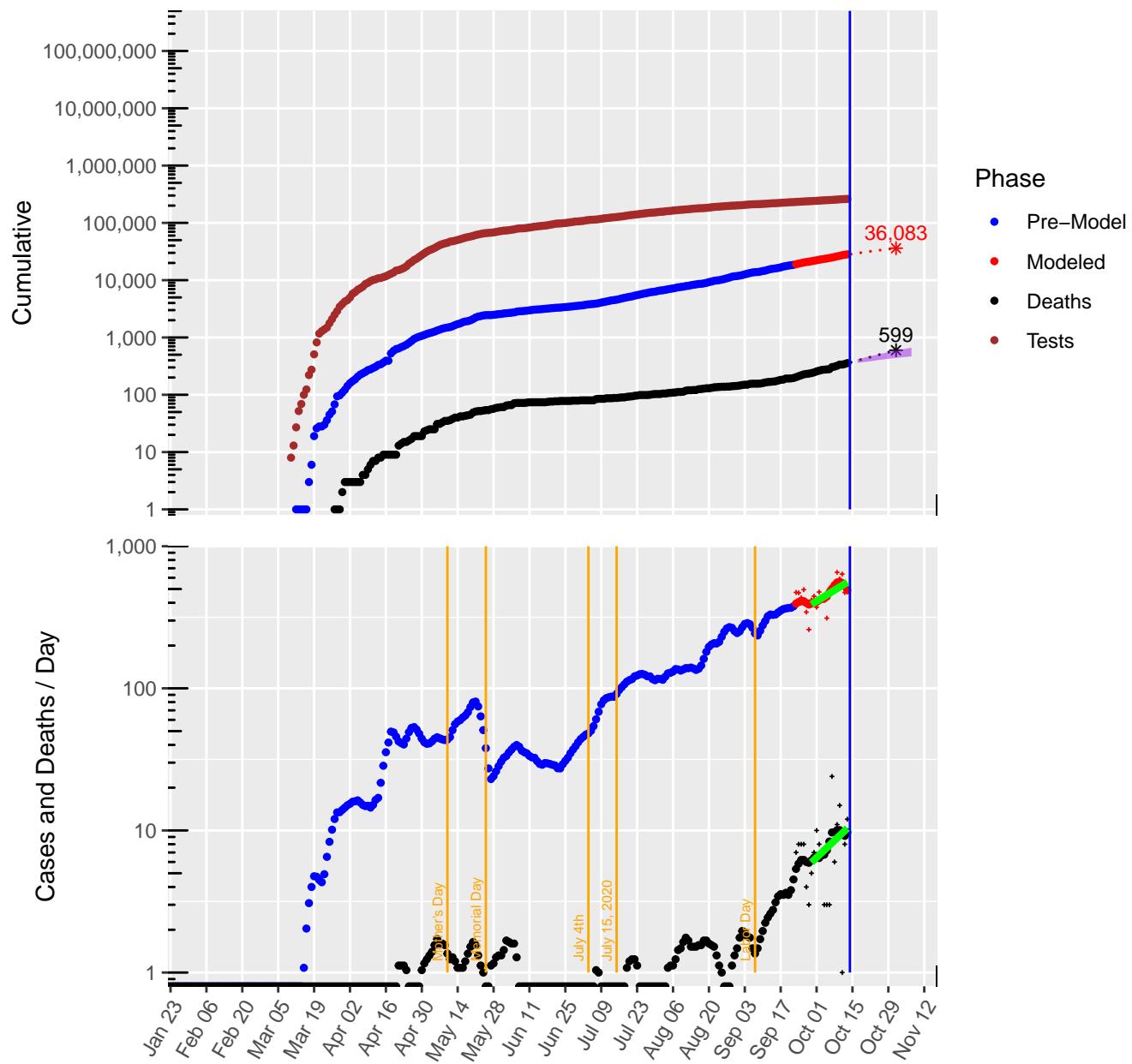
New York projection as of 2020-10-14



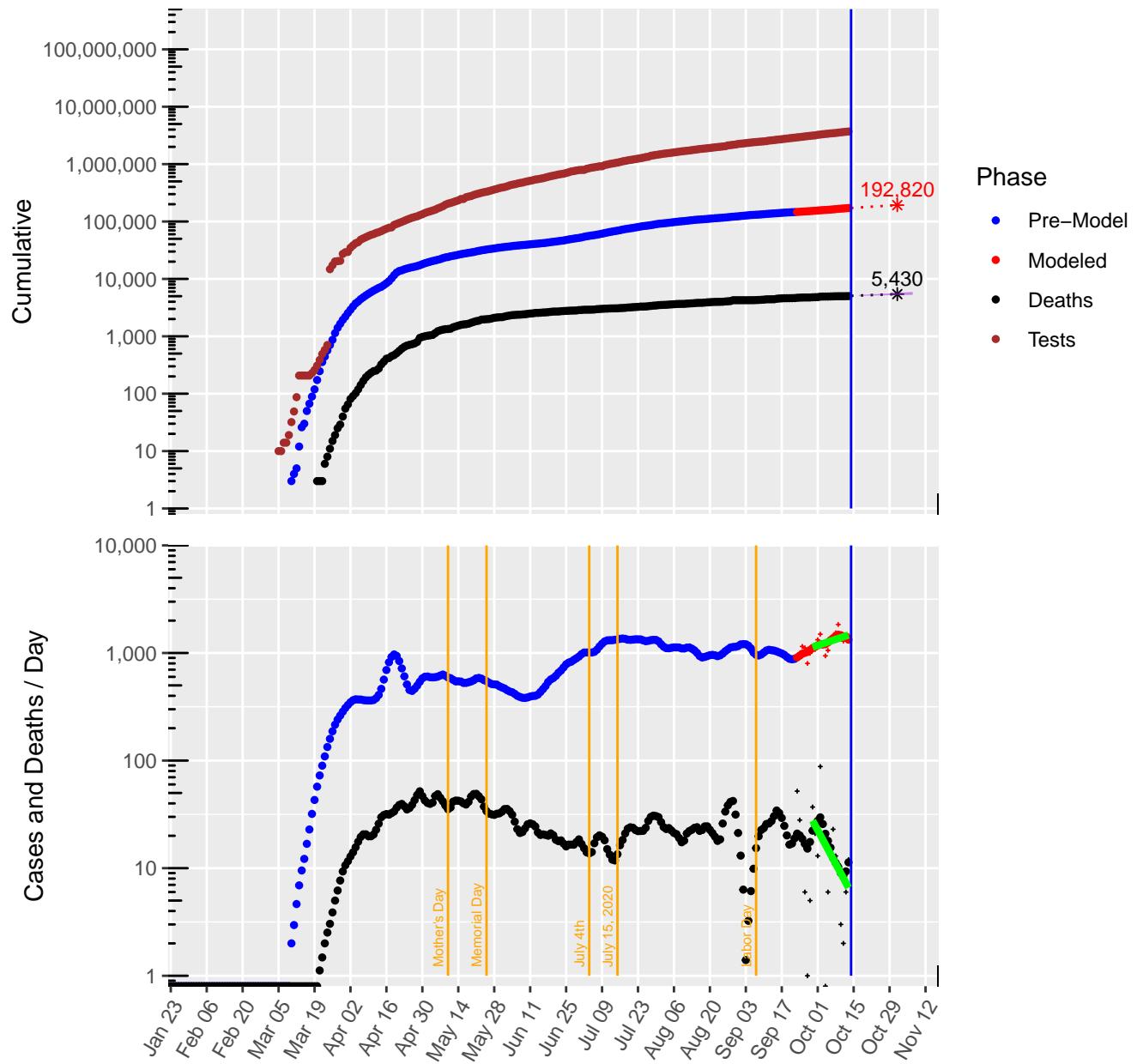
North Carolina projection as of 2020-10-14



North Dakota projection as of 2020-10-14

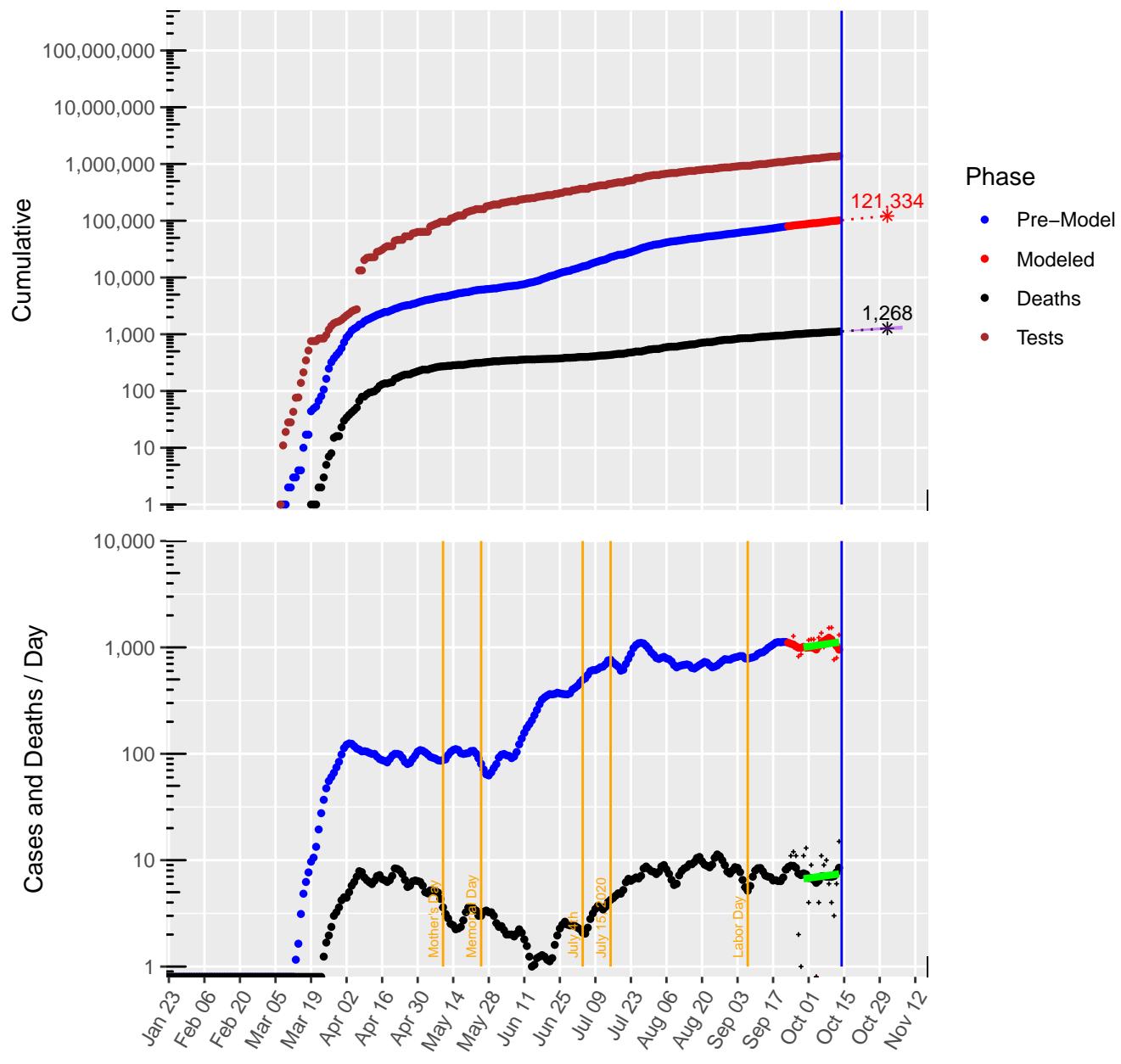


Ohio projection as of 2020-10-14

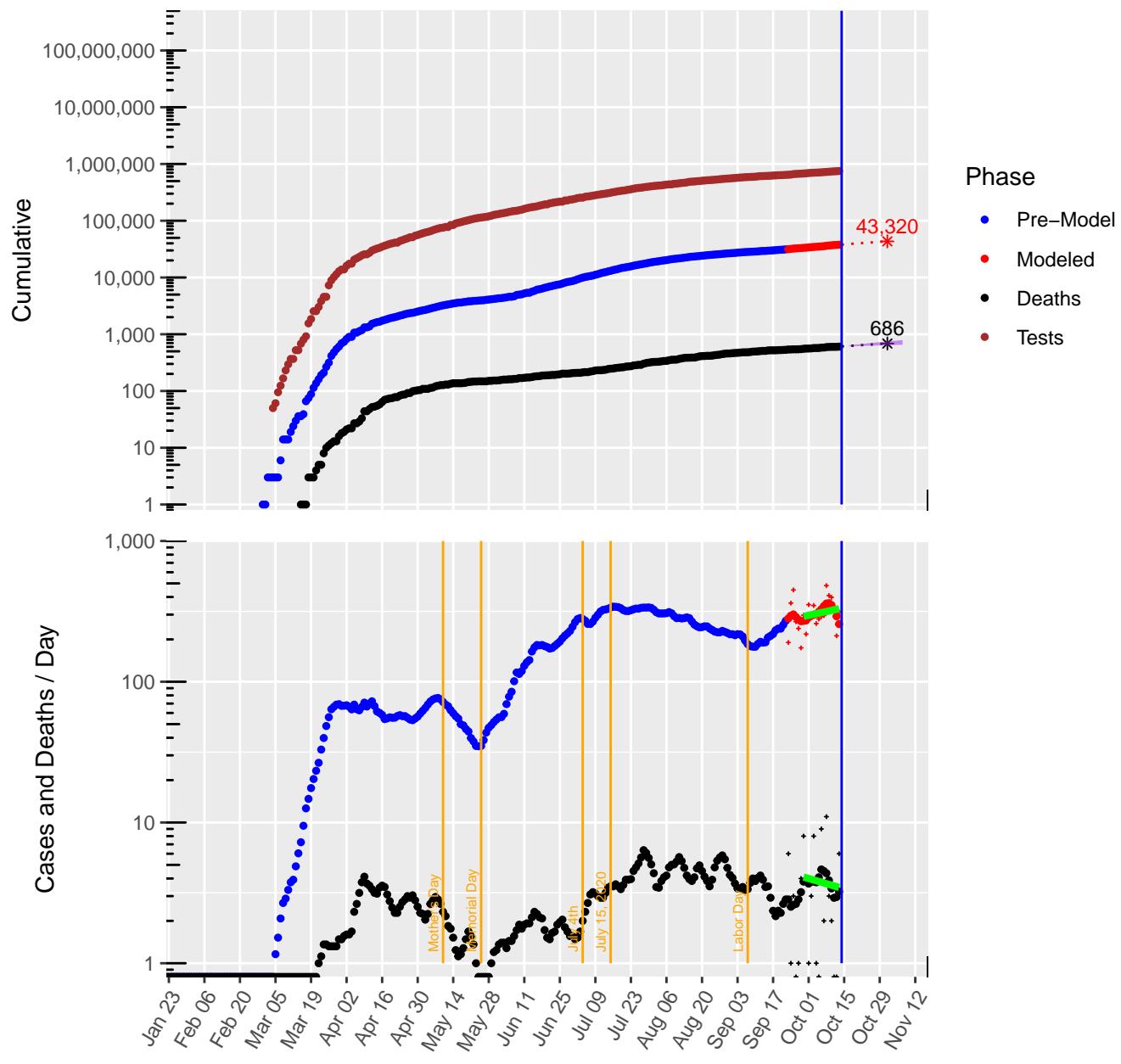


447) -- Deaths: 5,017 (12) -- Case Mortality: 2.9% -- Daily Change: +1.8% Cases, -8.8% Deaths

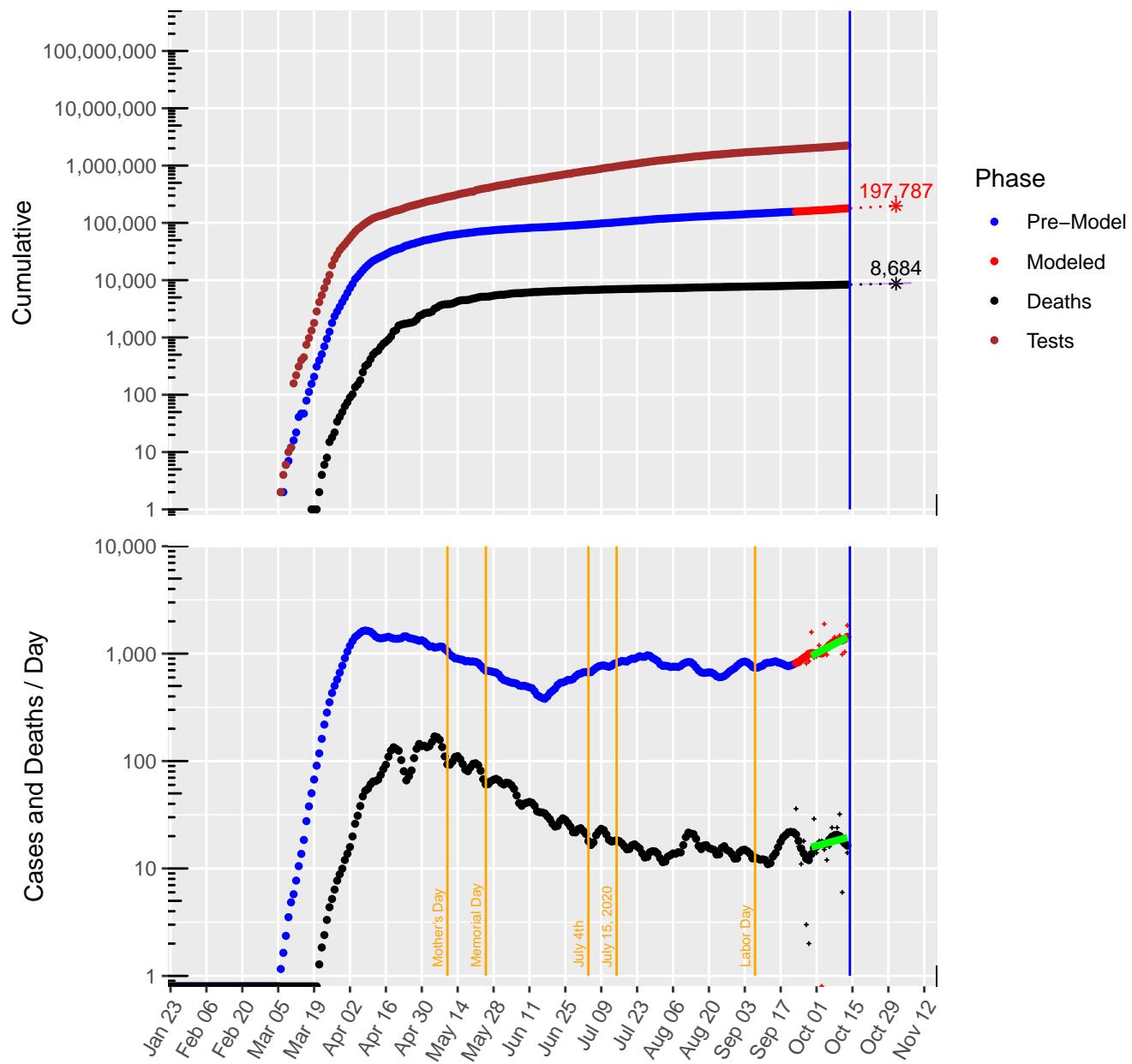
Oklahoma projection as of 2020-10-14



Oregon projection as of 2020-10-14

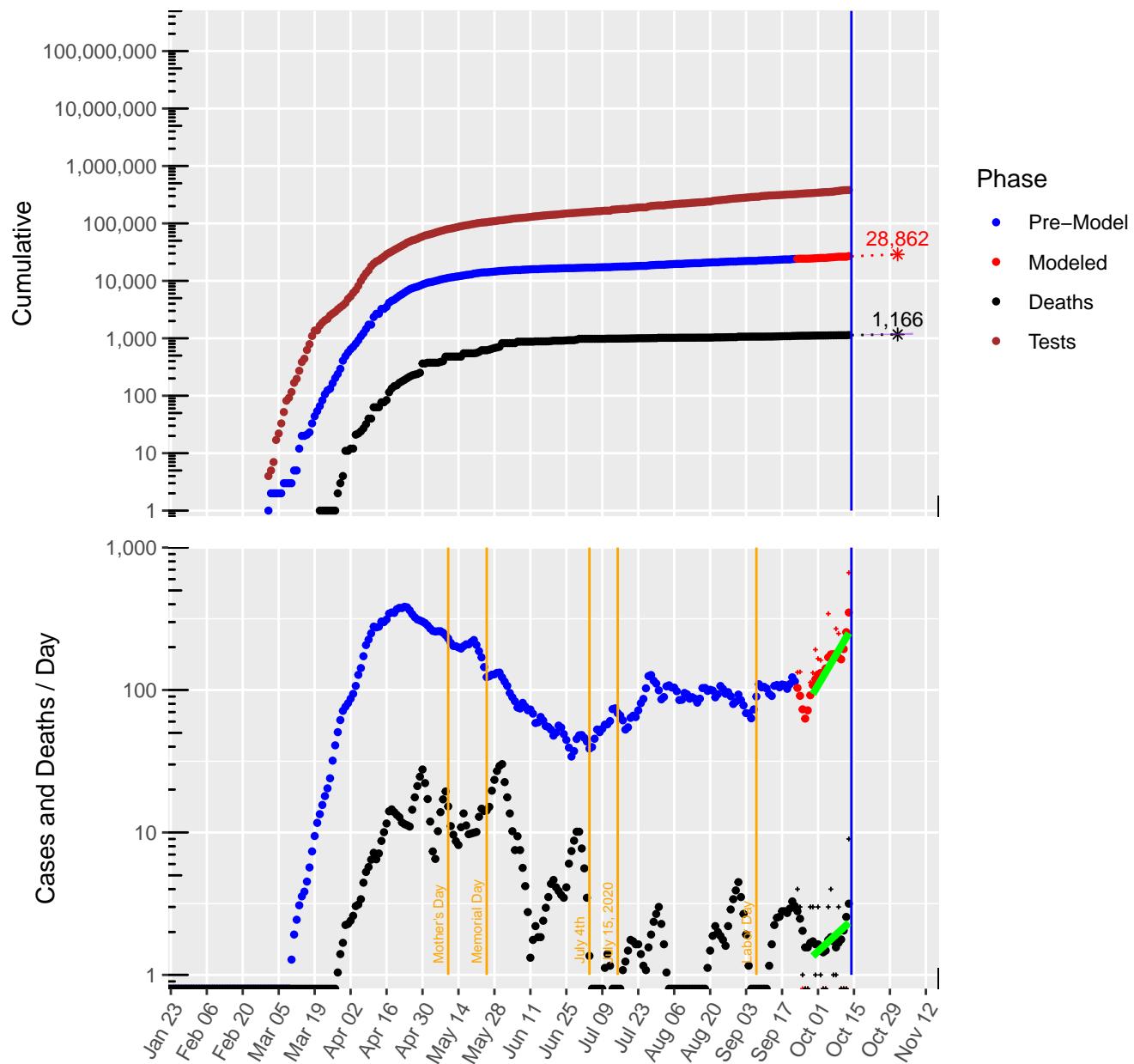


Pennsylvania projection as of 2020-10-14

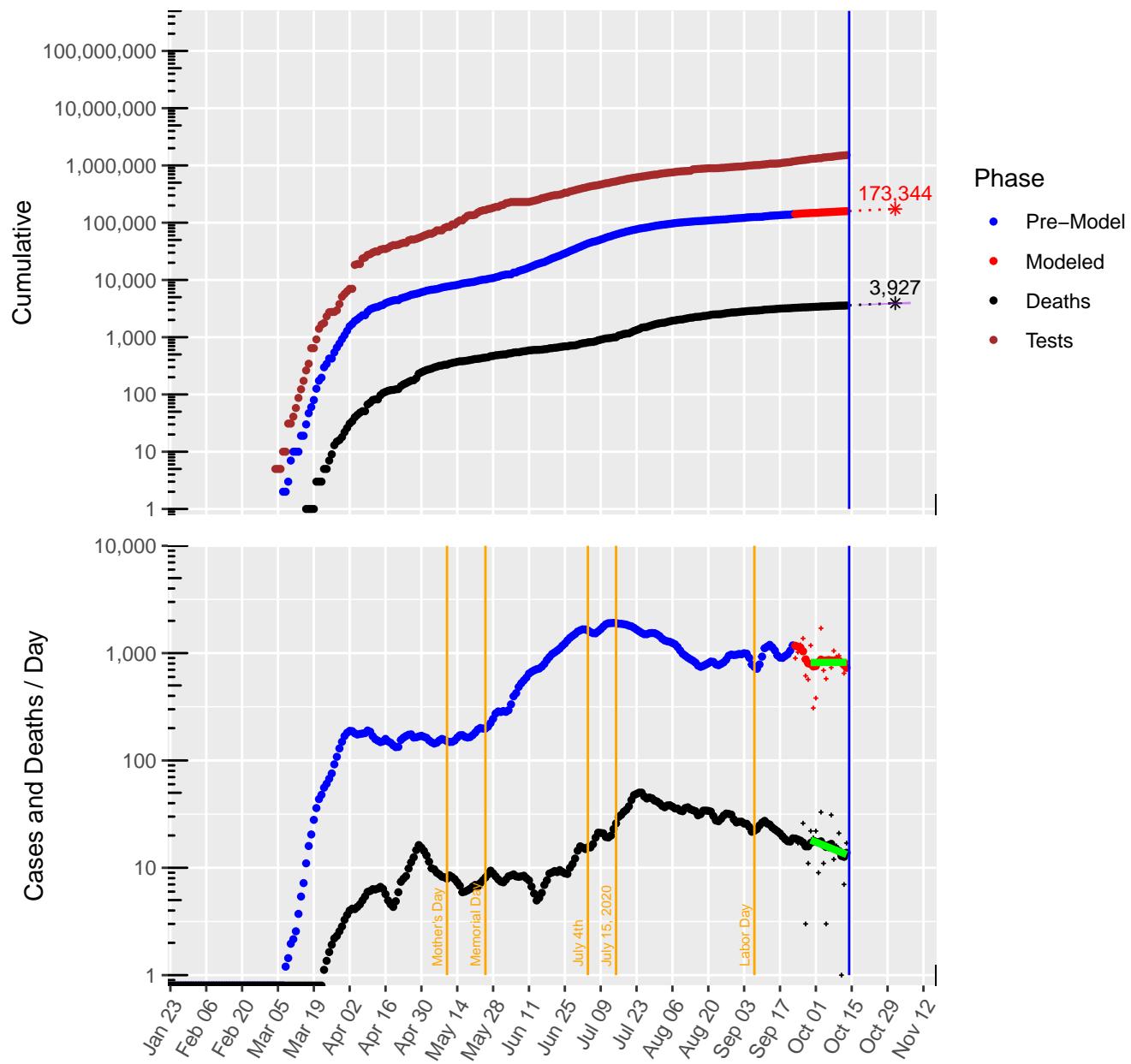


332) -- Deaths: 8,361 (14) -- Case Mortality: 4.7% -- Daily Change: +2.8% Cases, +1.5% Deaths

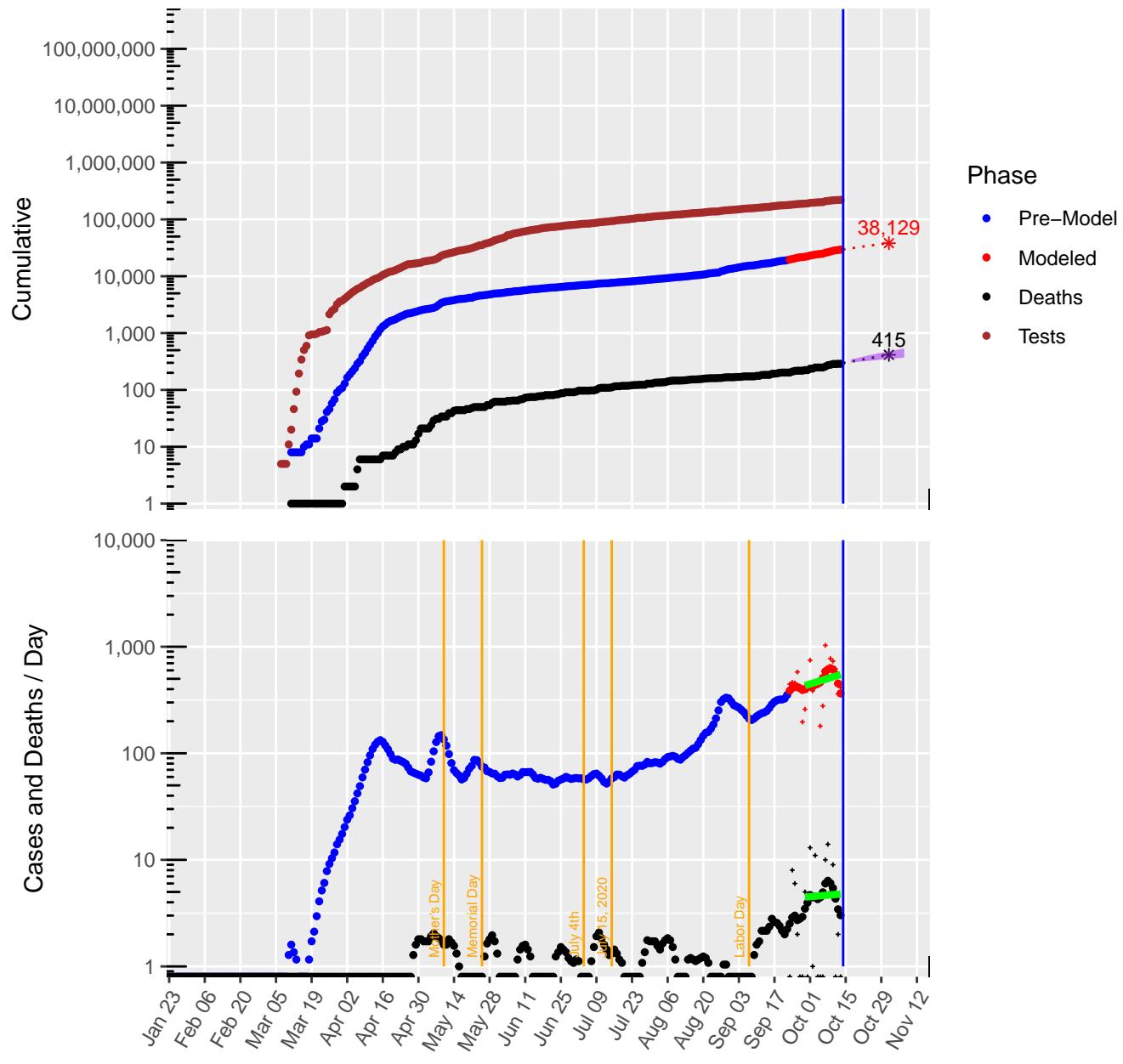
Rhode Island projection as of 2020-10-14



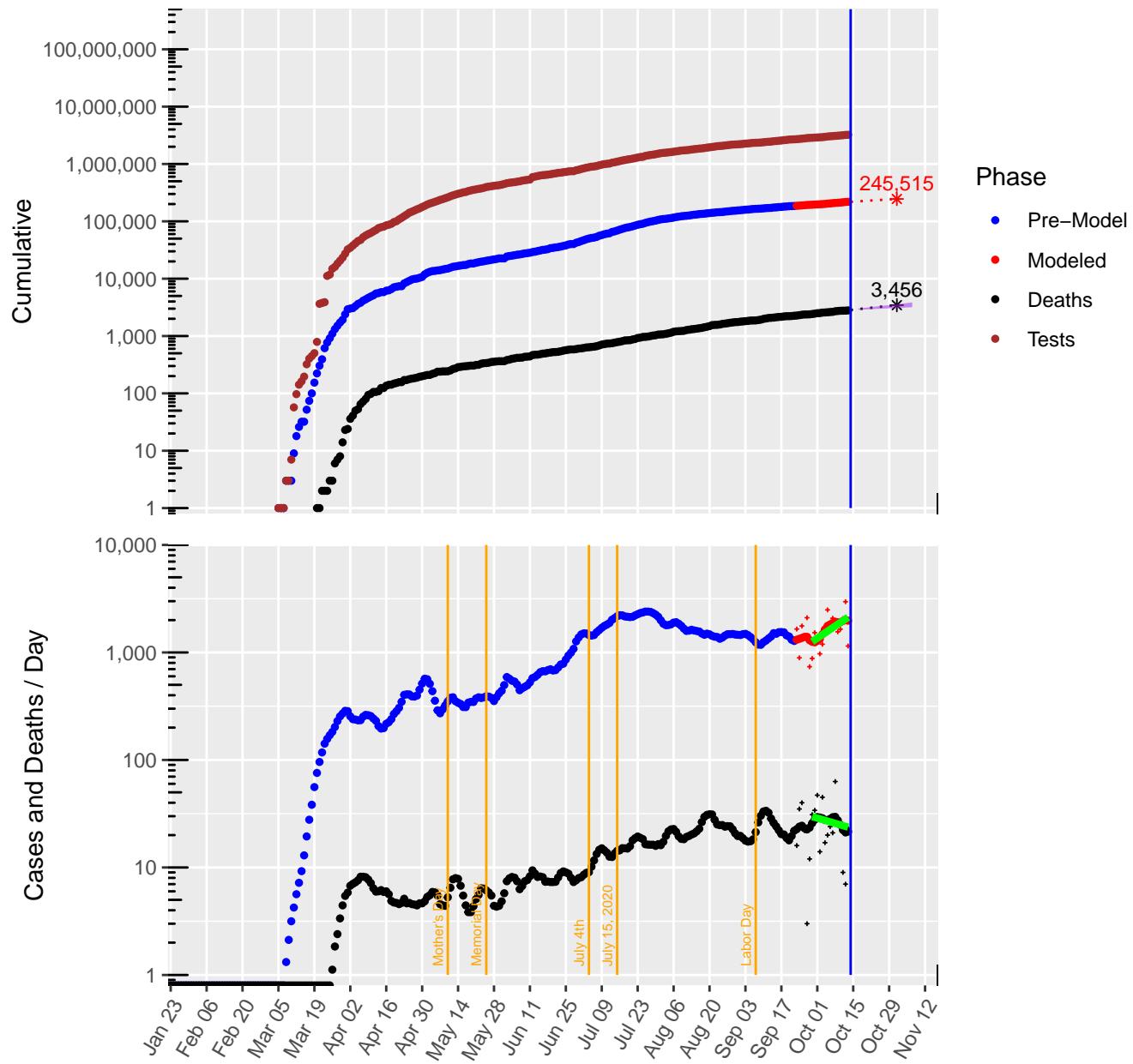
South Carolina projection as of 2020-10-14



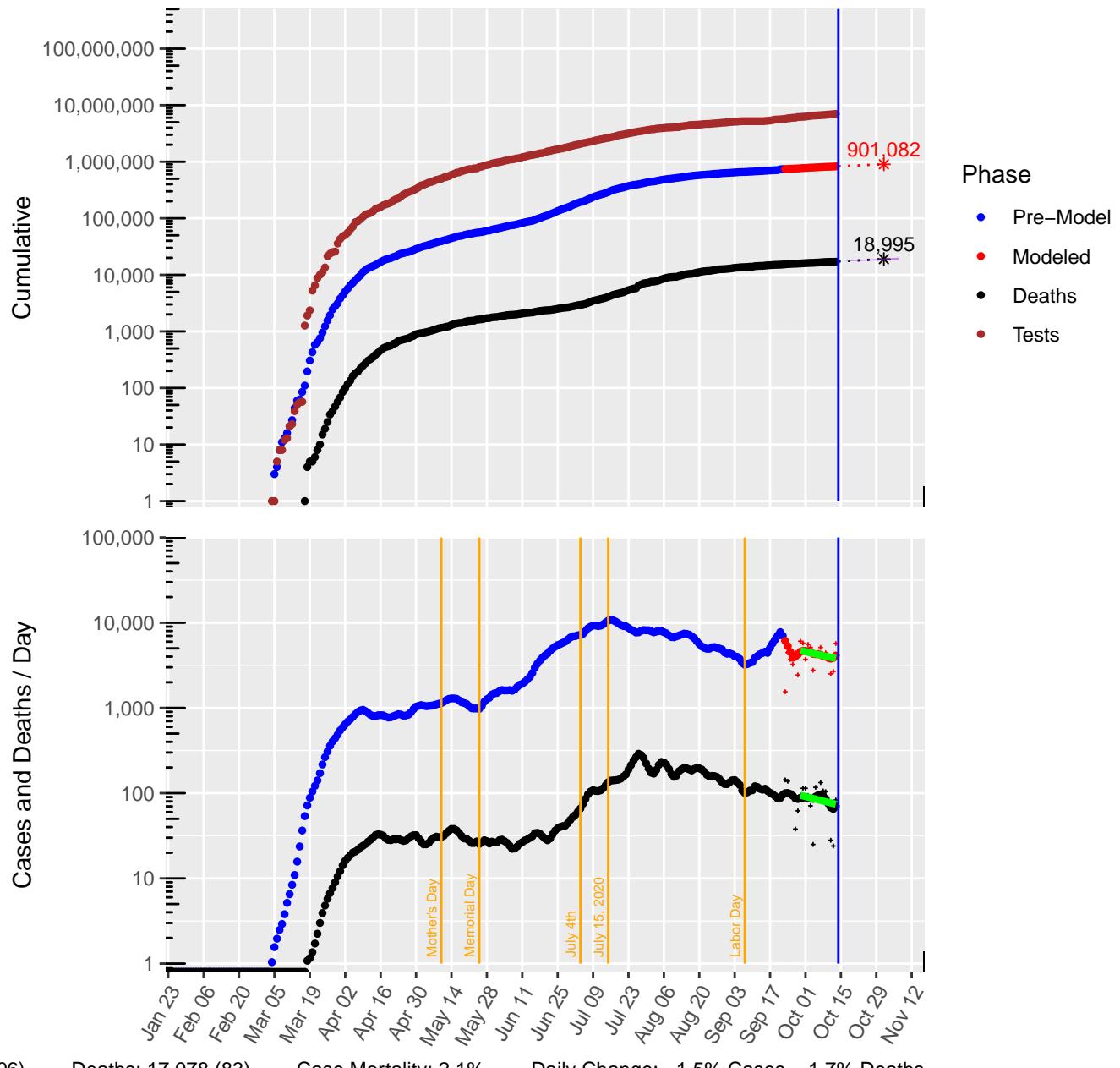
South Dakota projection as of 2020-10-14



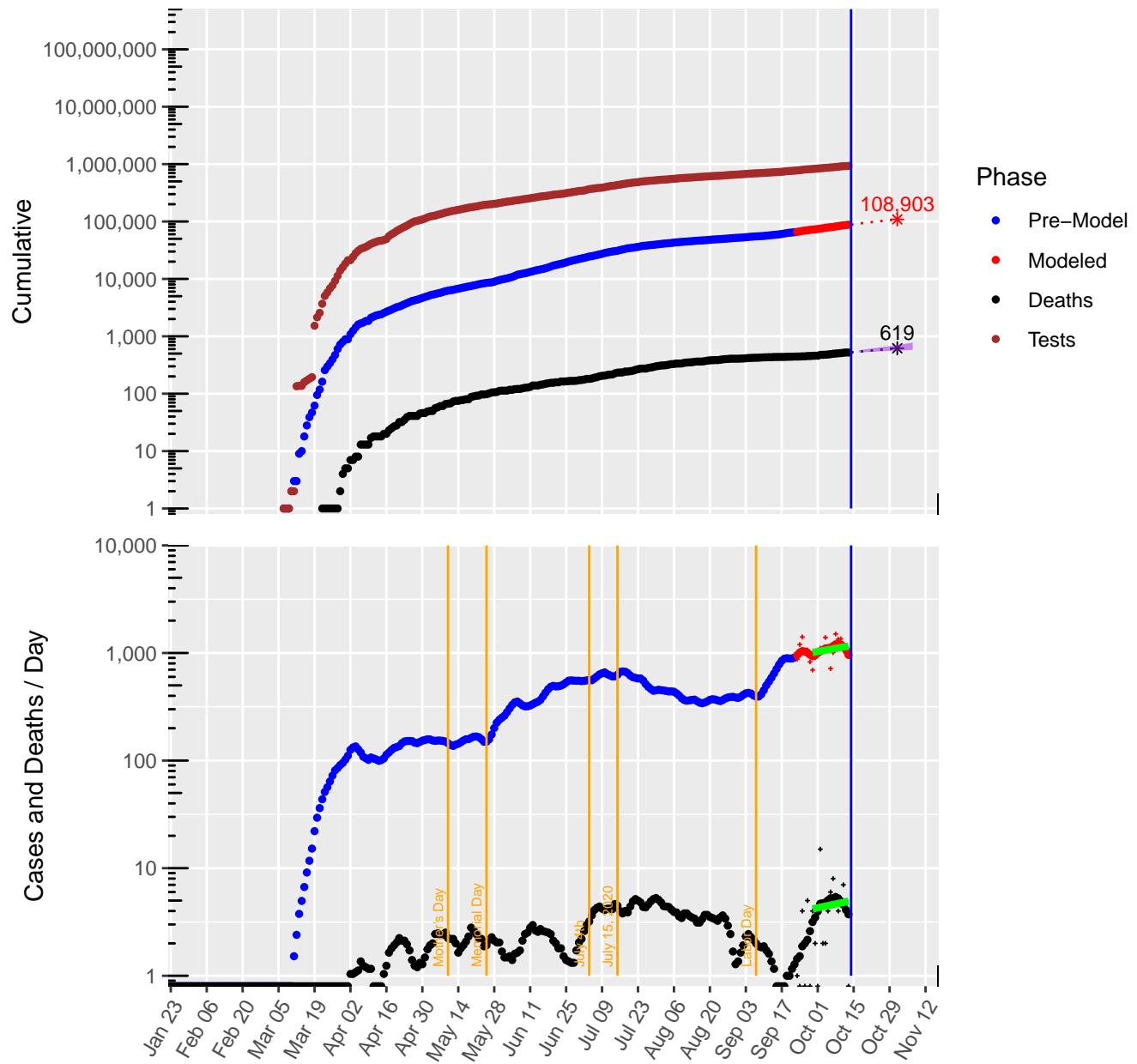
Tennessee projection as of 2020-10-14



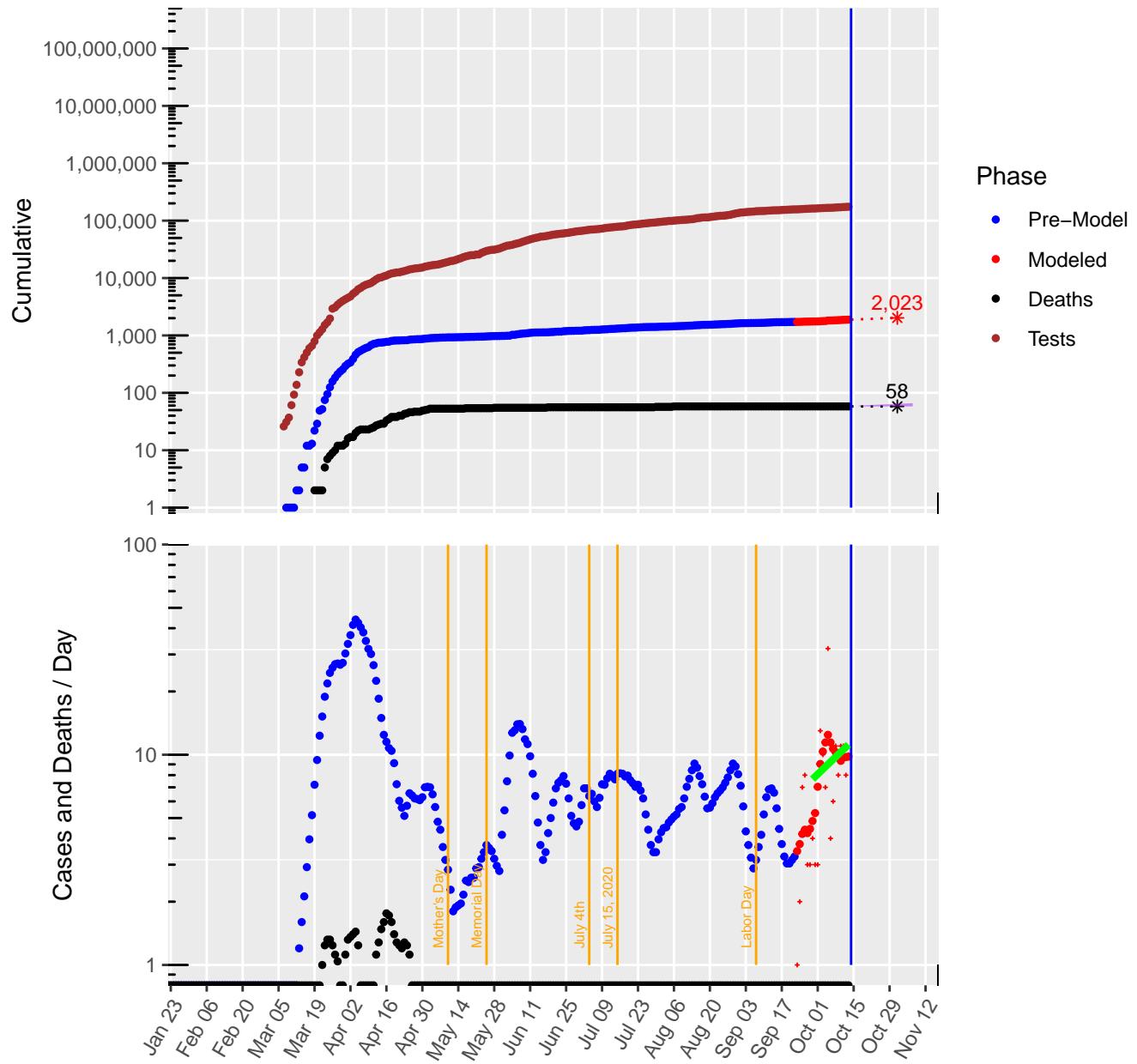
Texas projection as of 2020-10-14



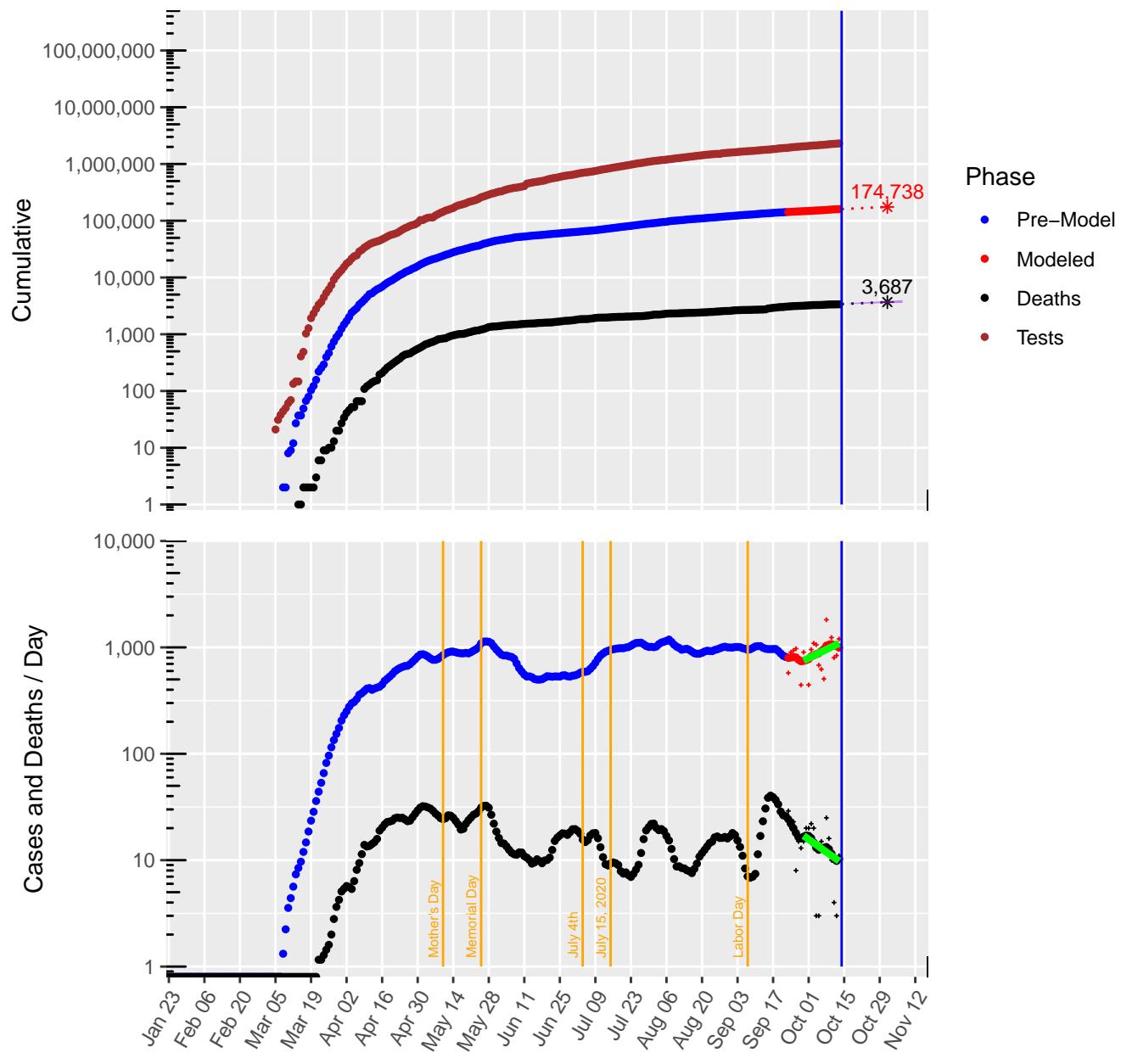
Utah projection as of 2020-10-14



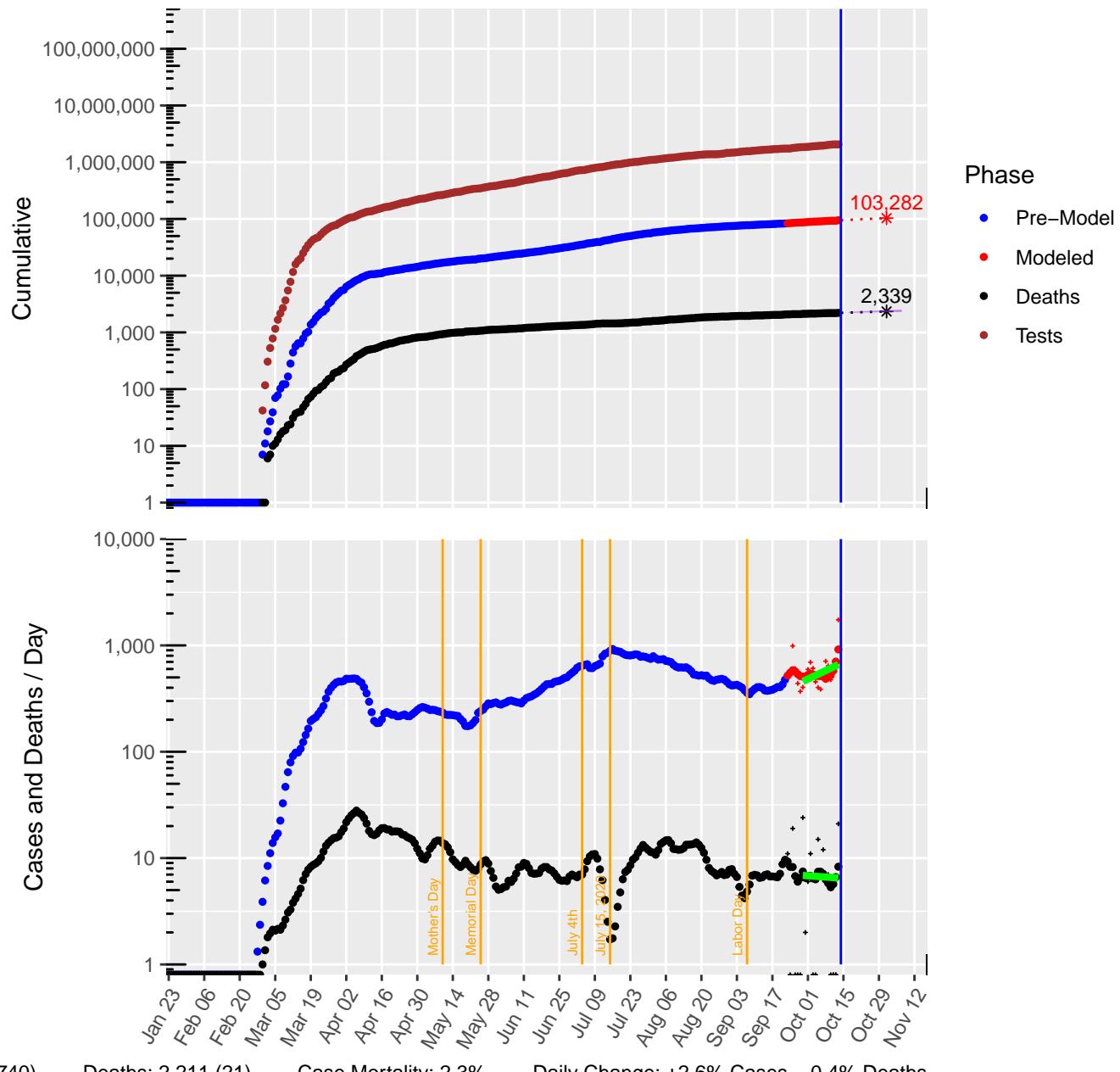
Vermont projection as of 2020-10-14



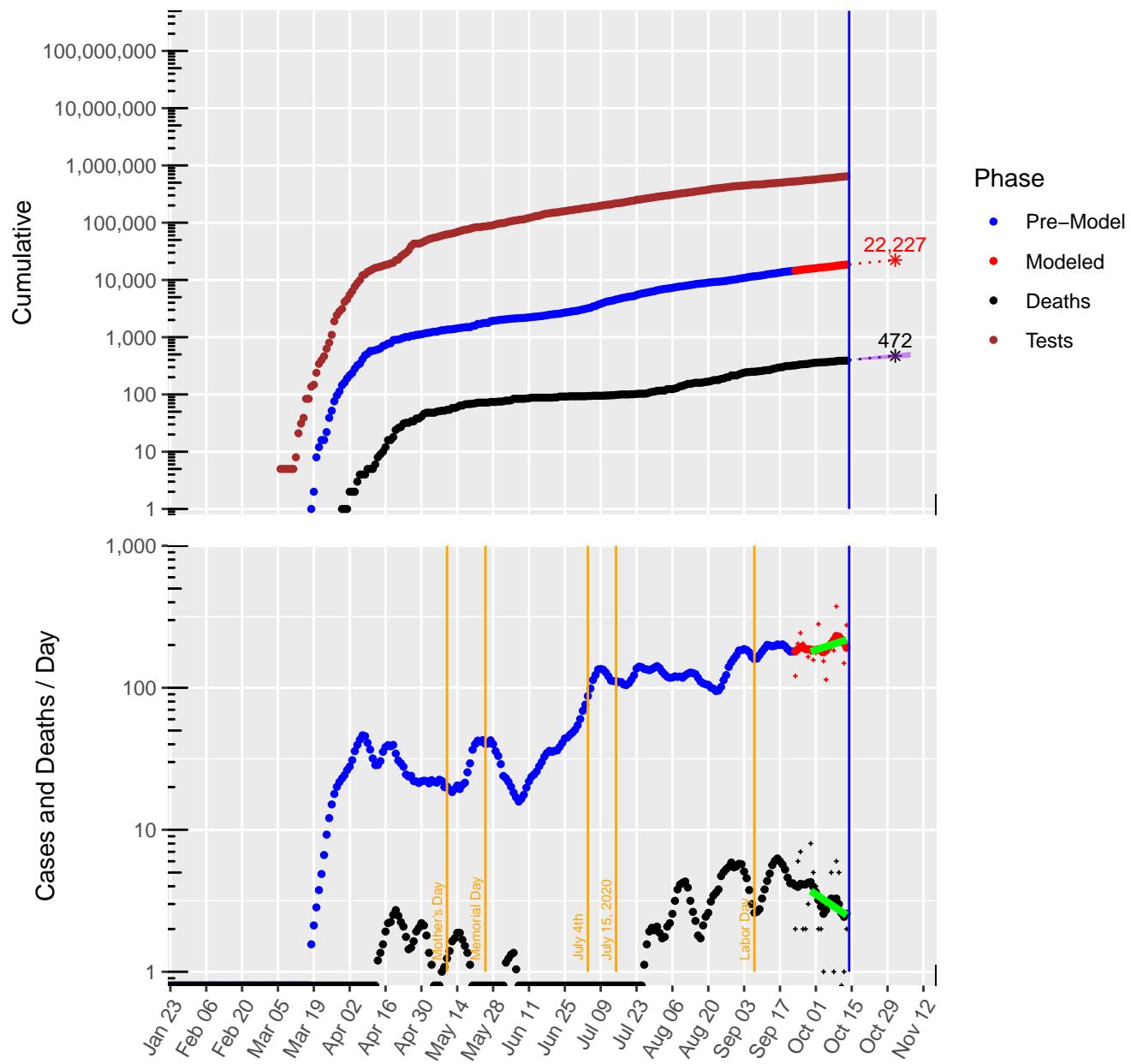
Virginia projection as of 2020-10-14



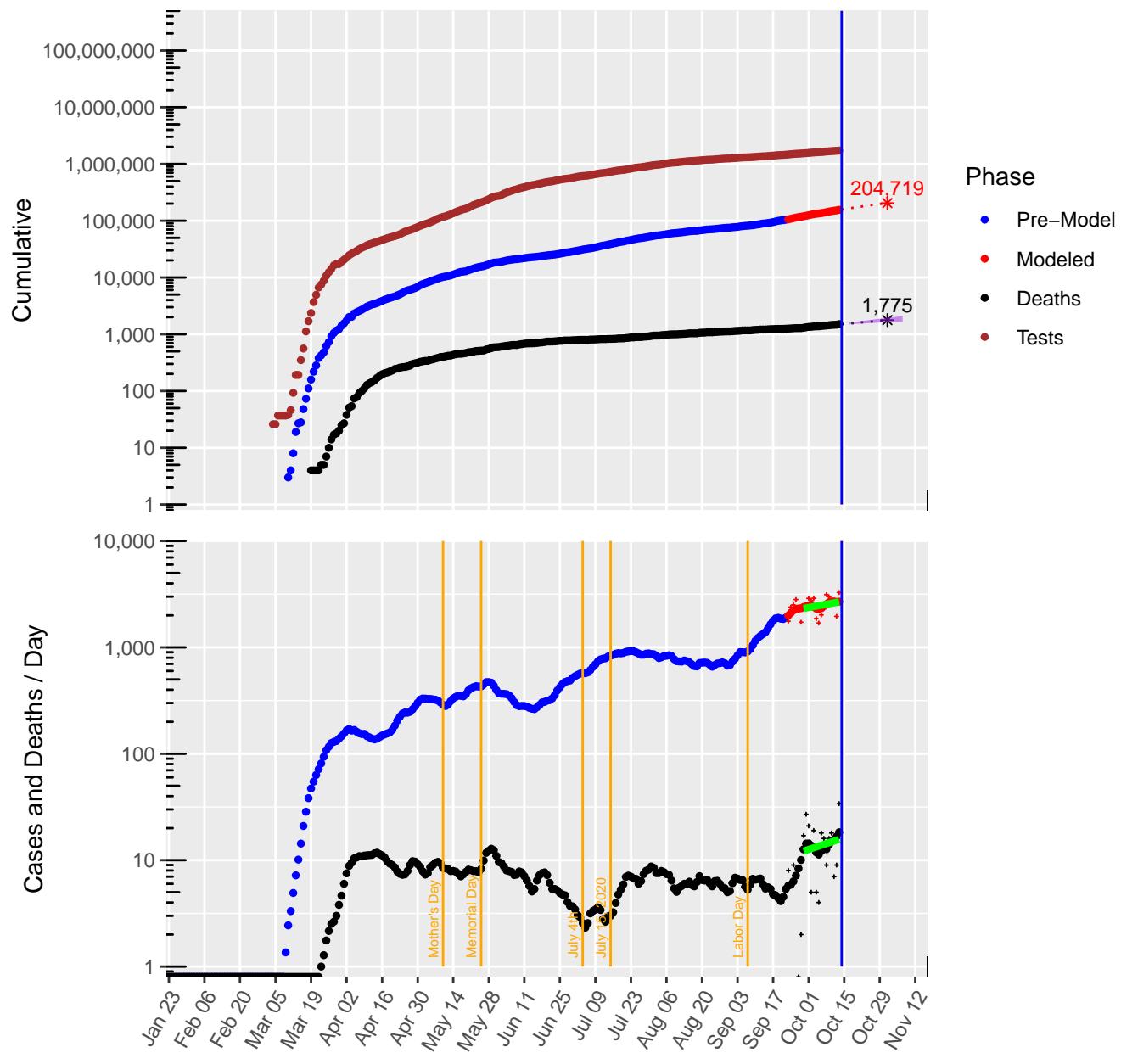
Washington projection as of 2020-10-14



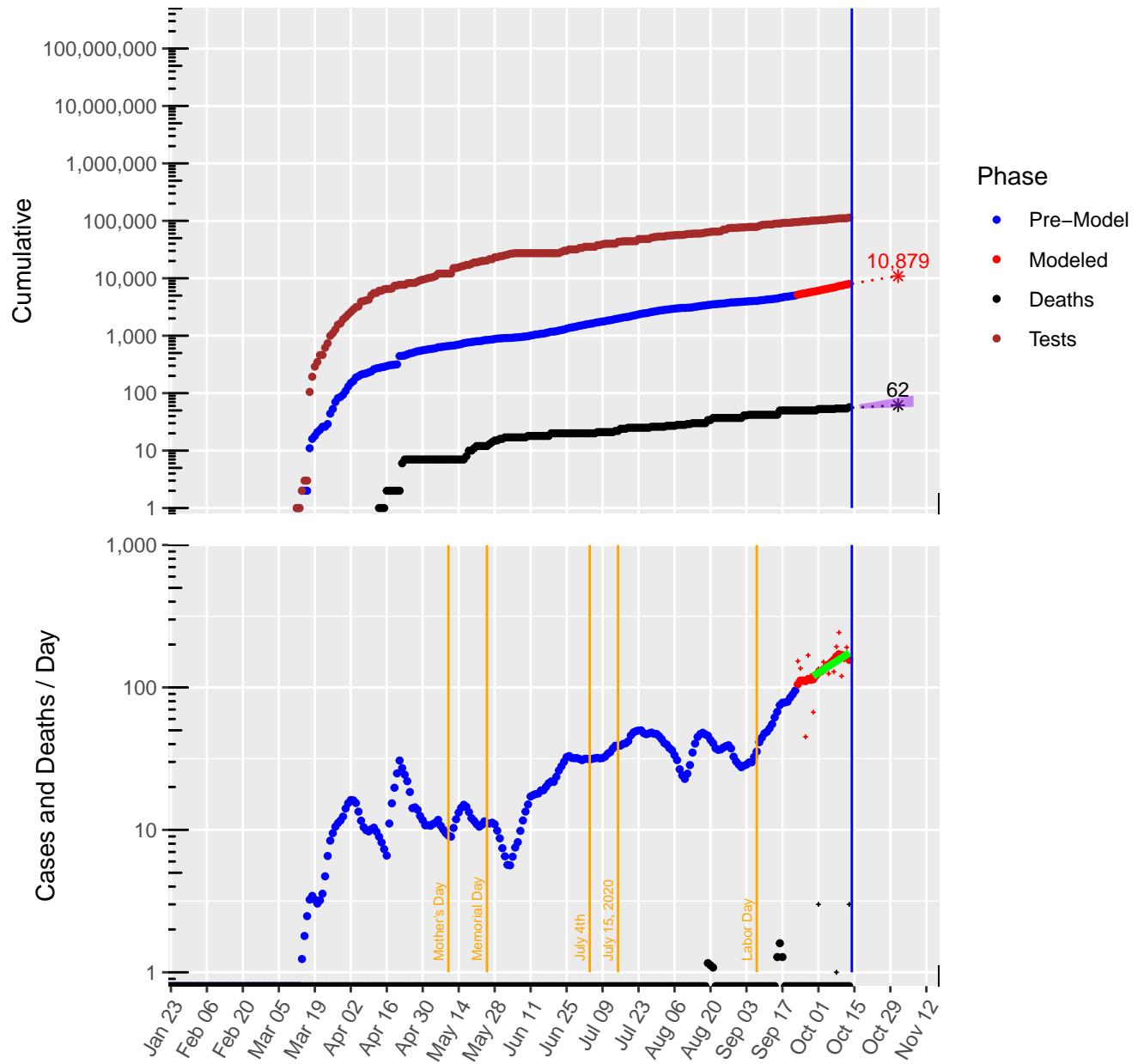
West Virginia projection as of 2020-10-14



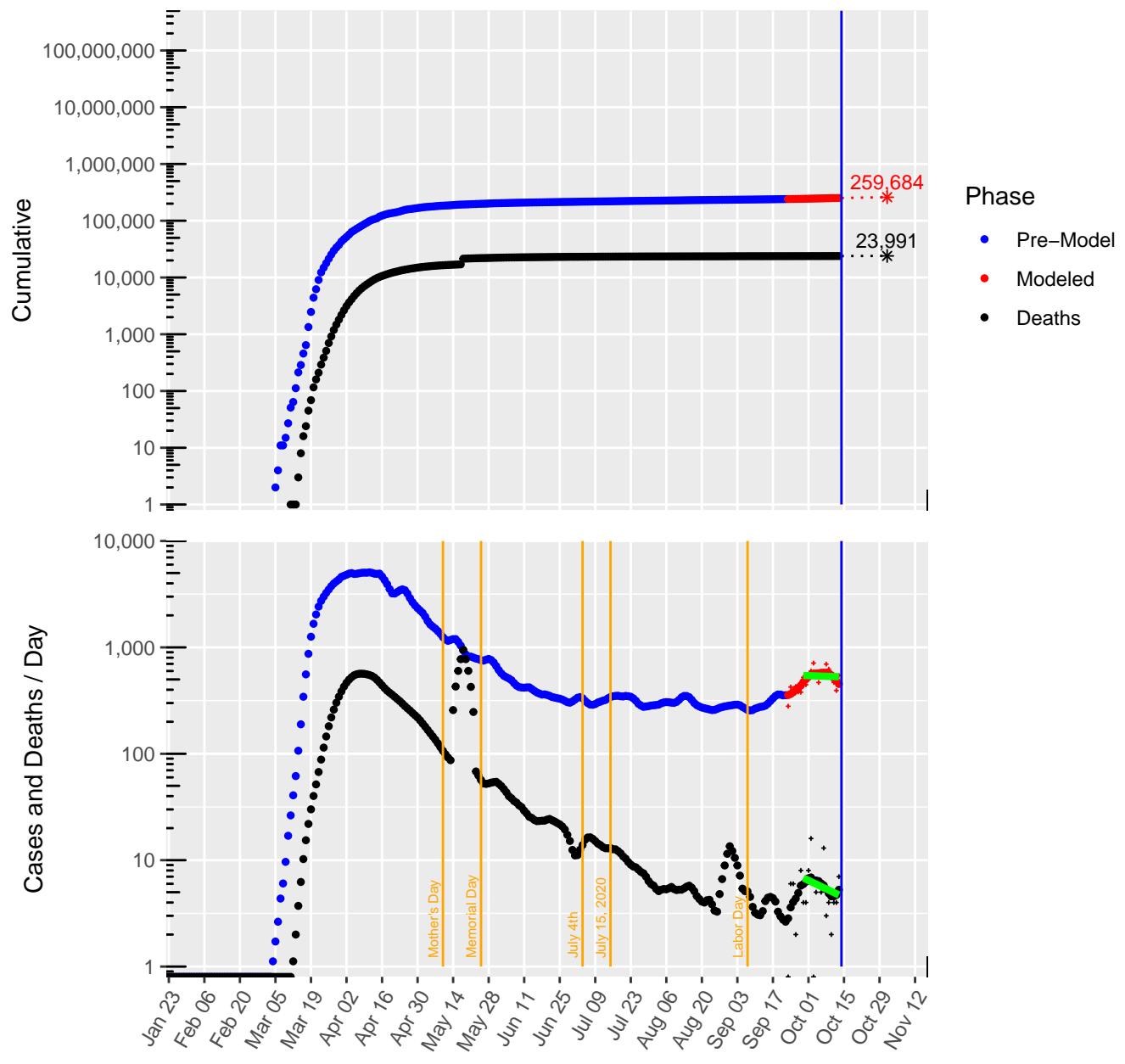
Wisconsin projection as of 2020-10-14



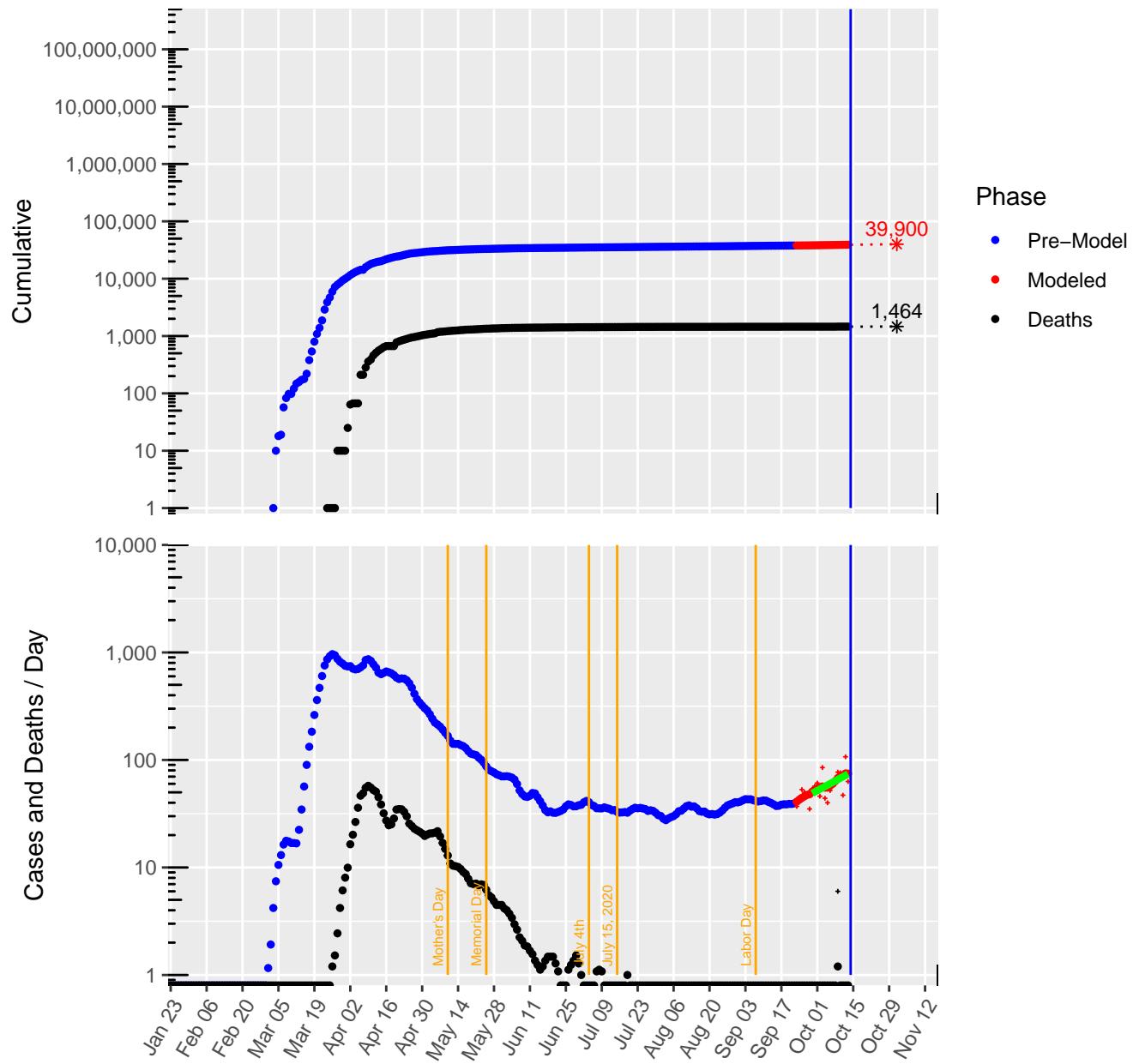
Wyoming projection as of 2020-10-14



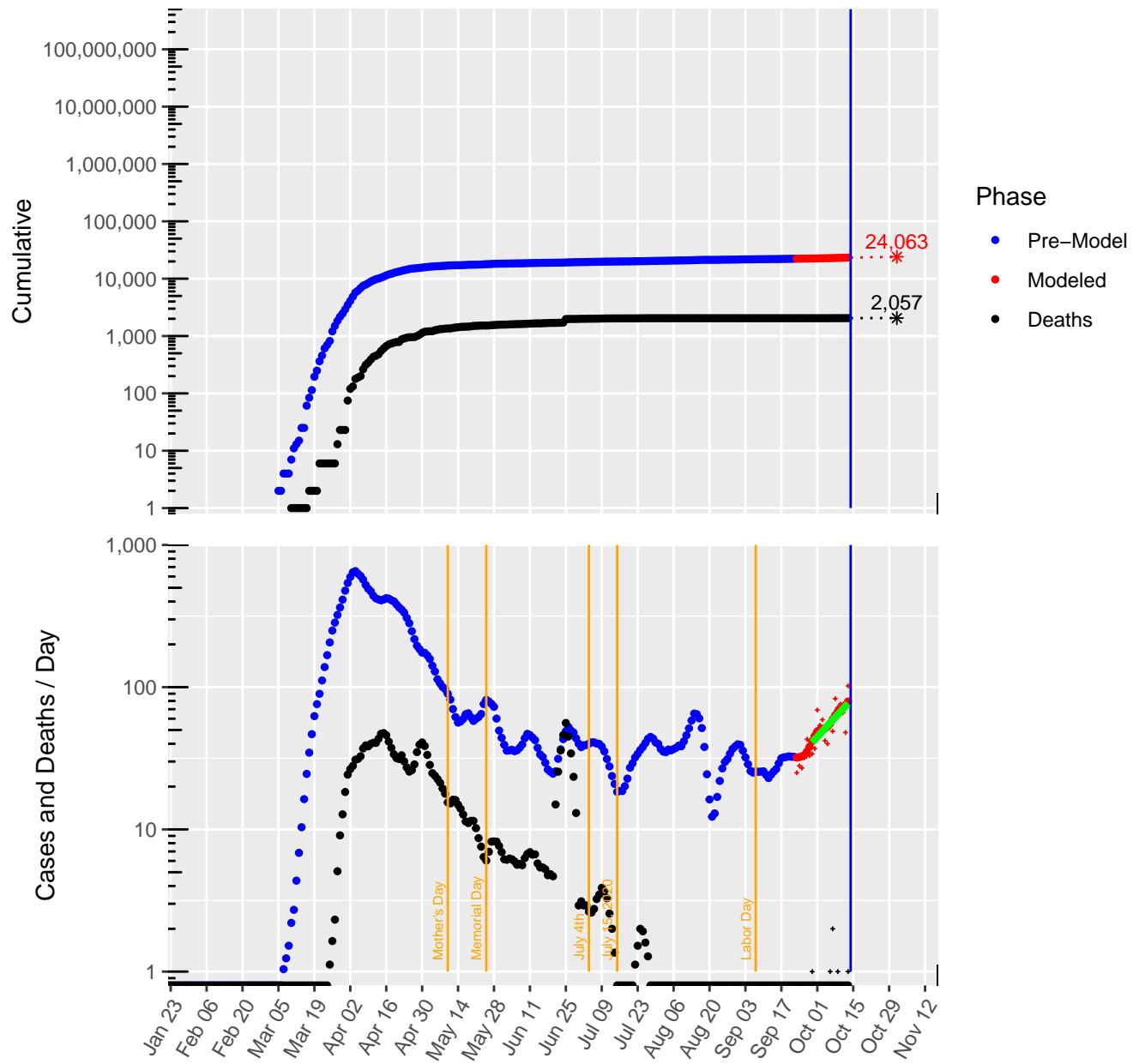
New York City projection as of 2020-10-14



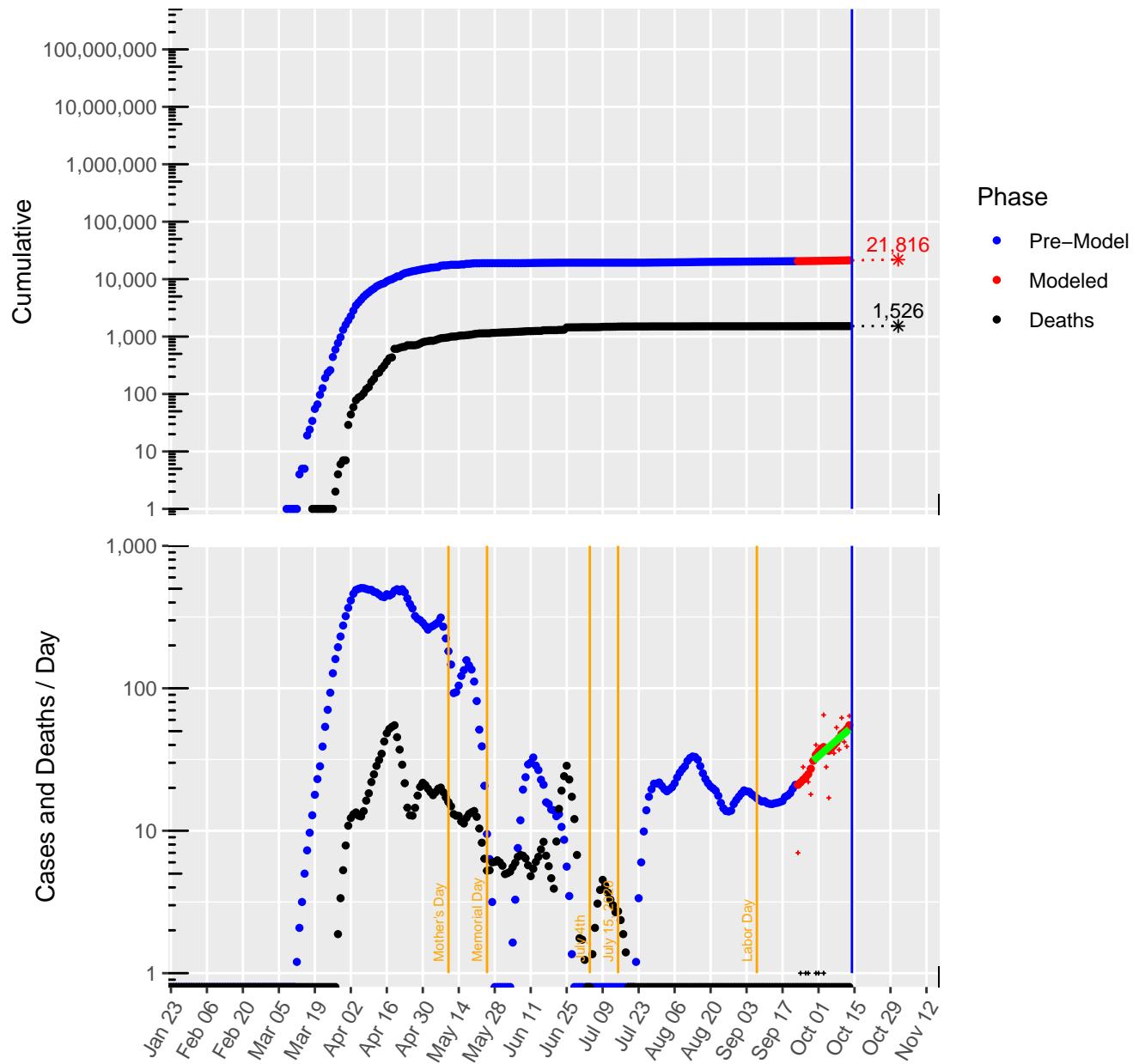
Westchester County, NY projection as of 2020-10-14



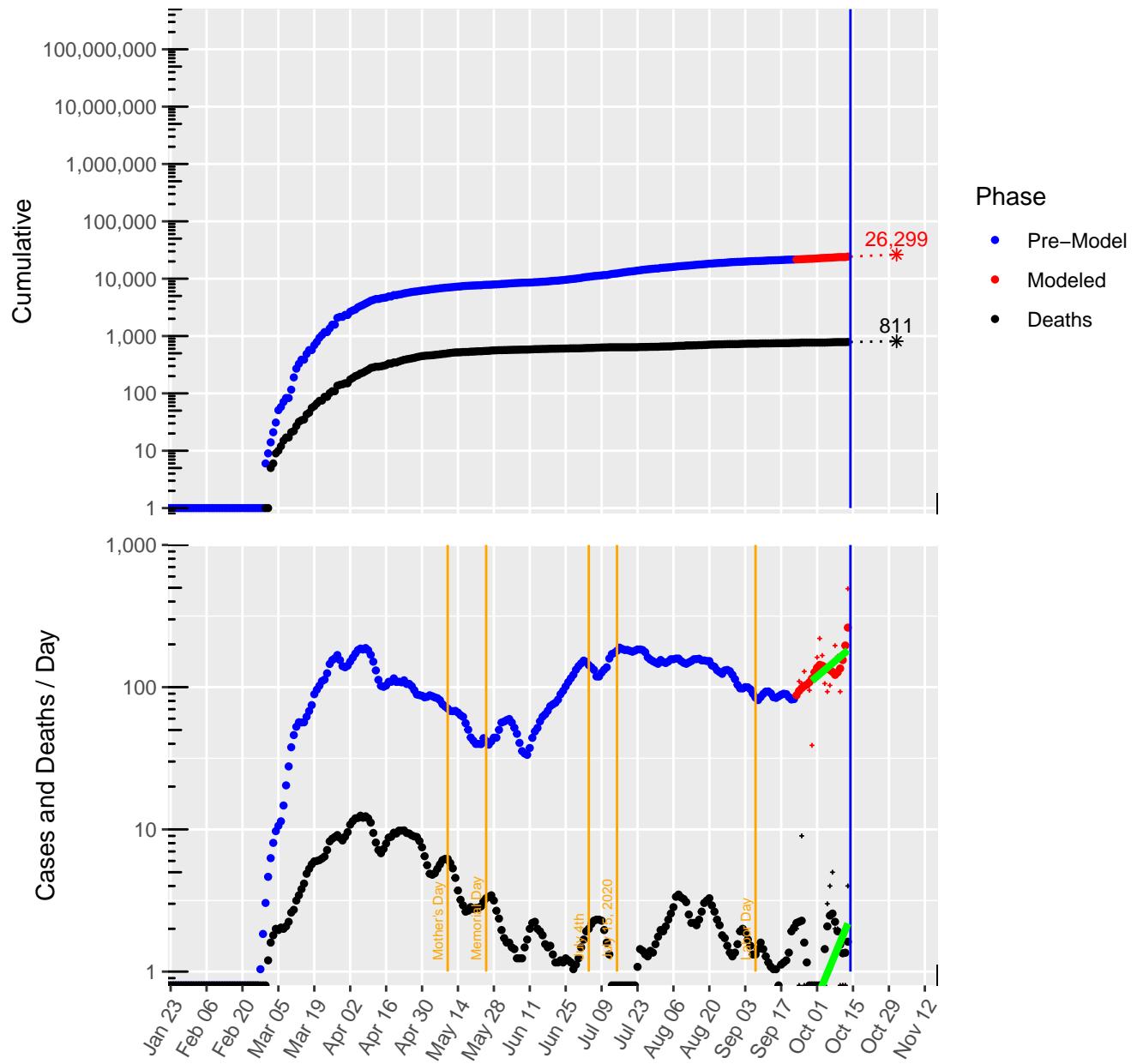
Bergen County, NJ projection as of 2020-10-14



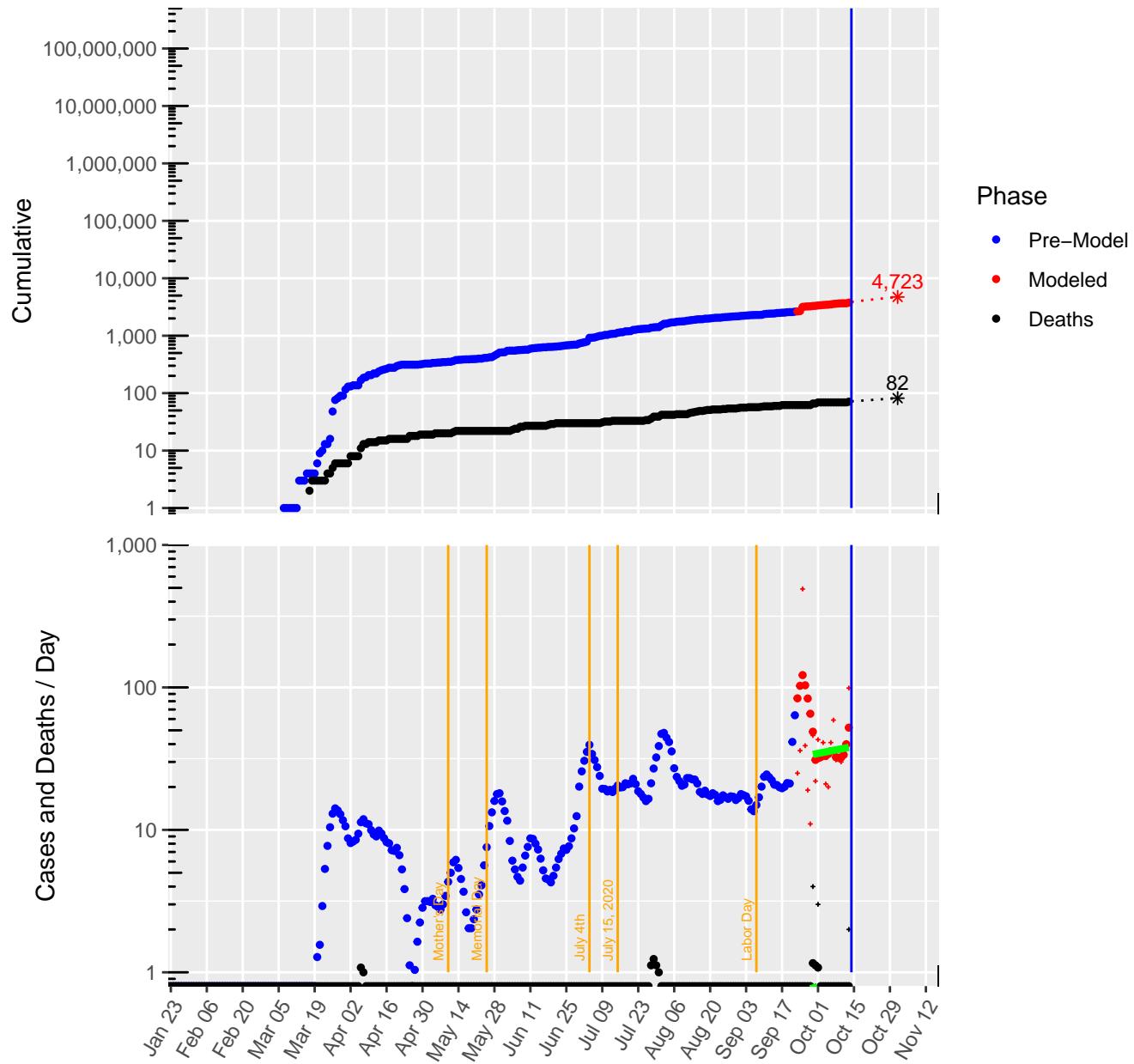
Hudson County, NJ projection as of 2020-10-14



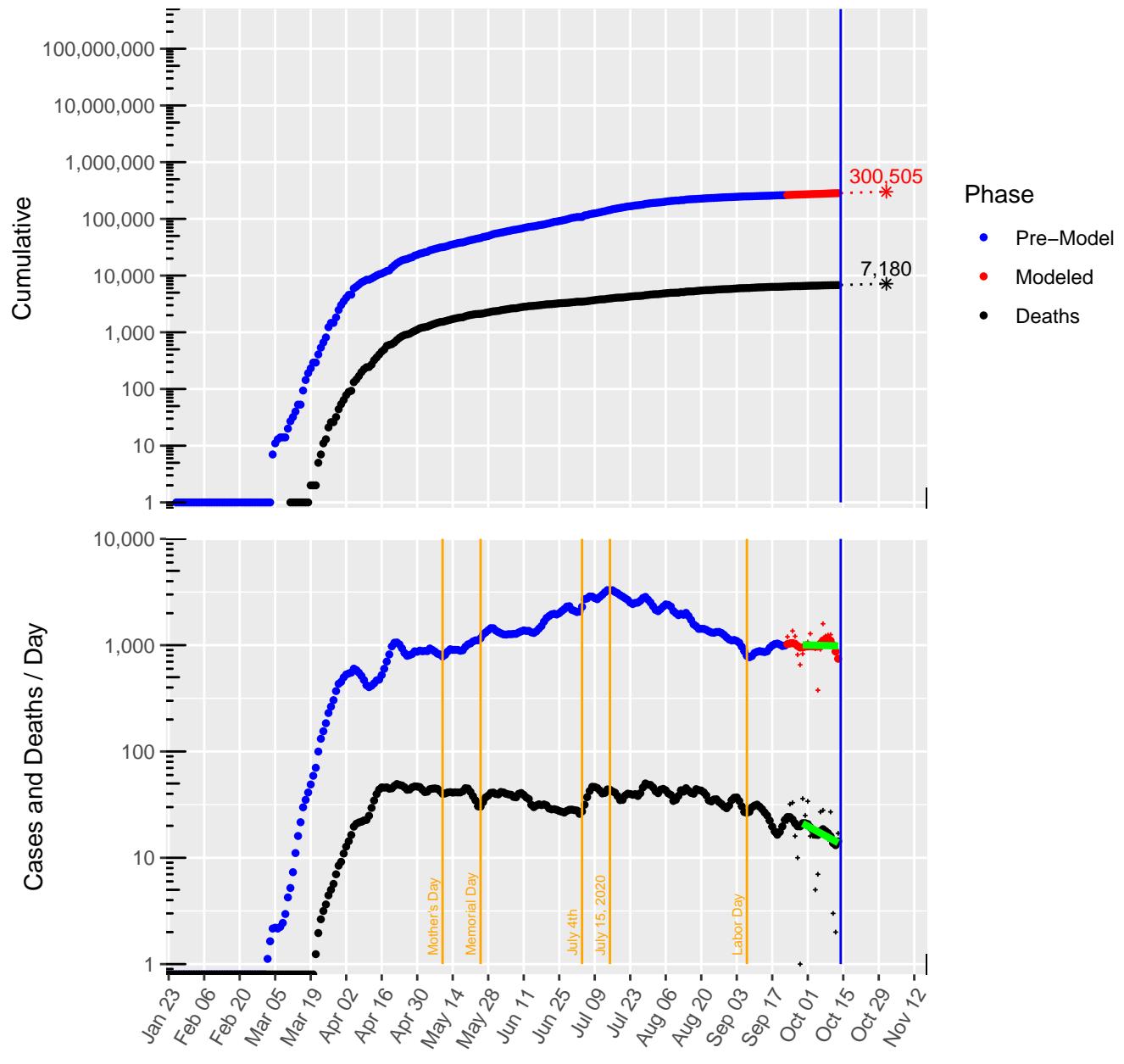
King County (Seattle) projection as of 2020-10-14



Clark County, Washington projection as of 2020-10-14

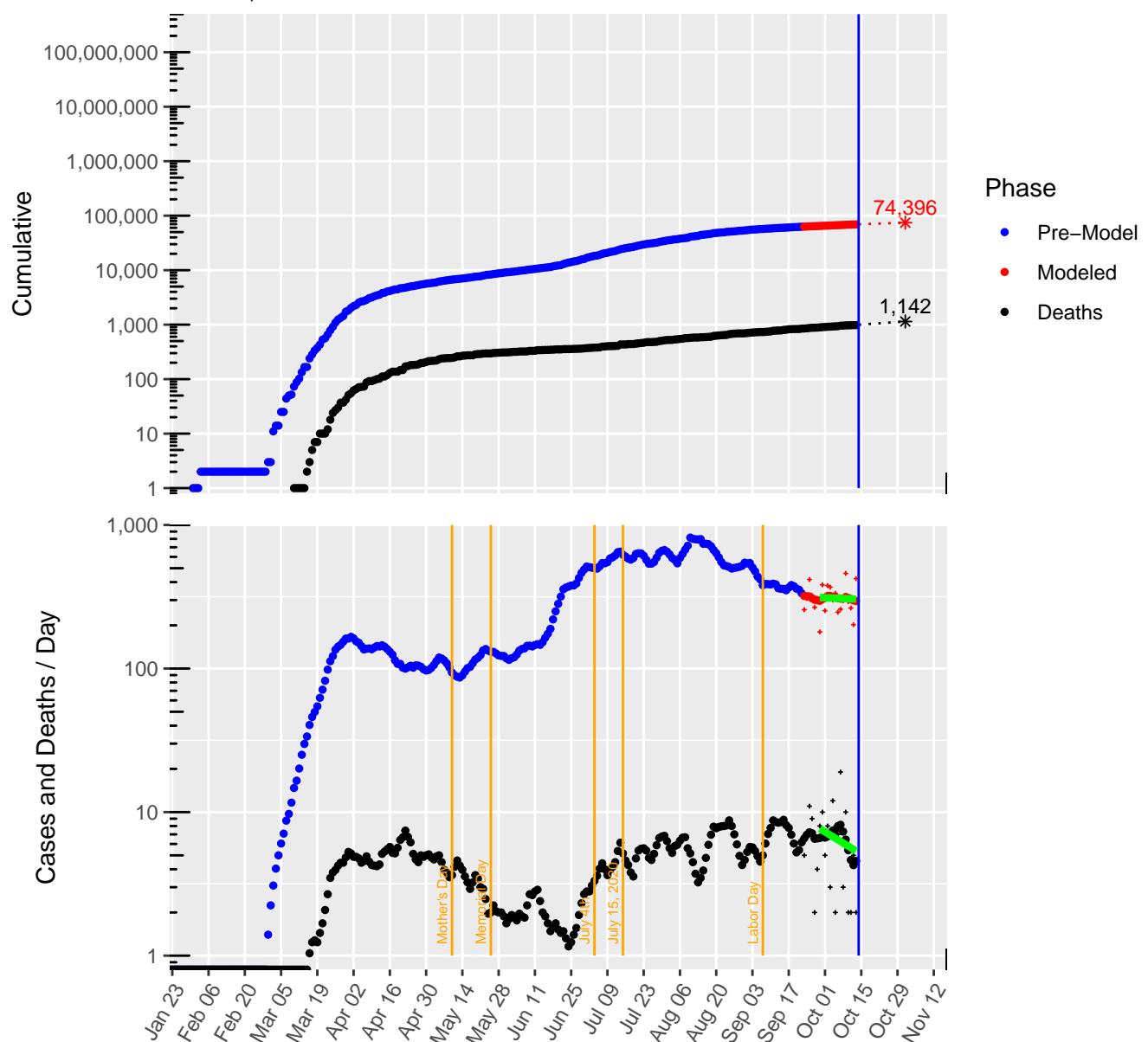


Los Angeles projection as of 2020-10-14



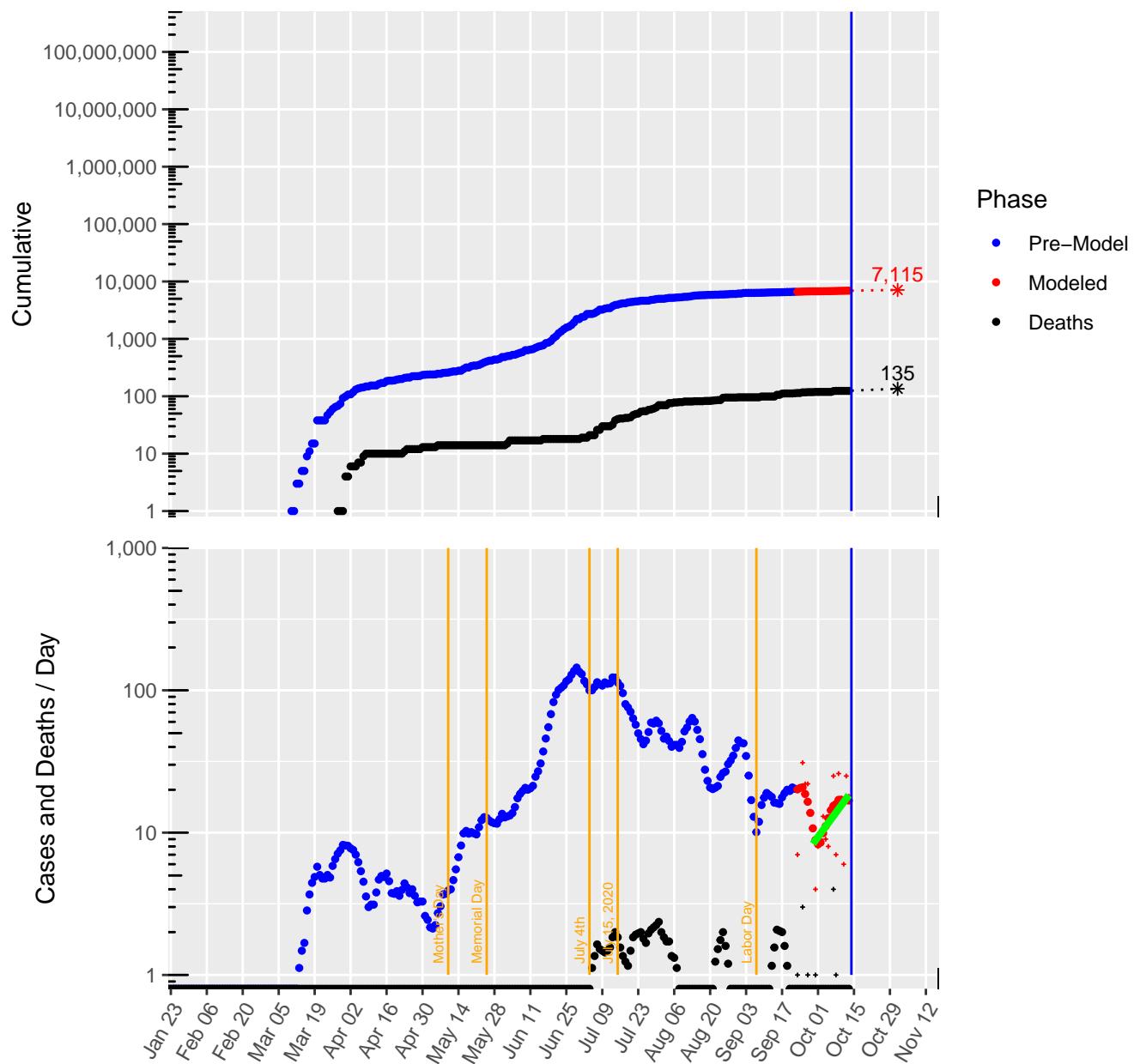
Bay Area projection as of 2020-10-14

Marin, Napa, San Mateo, San Francisco, Santa Clara, Solano, and Sonoma Counties

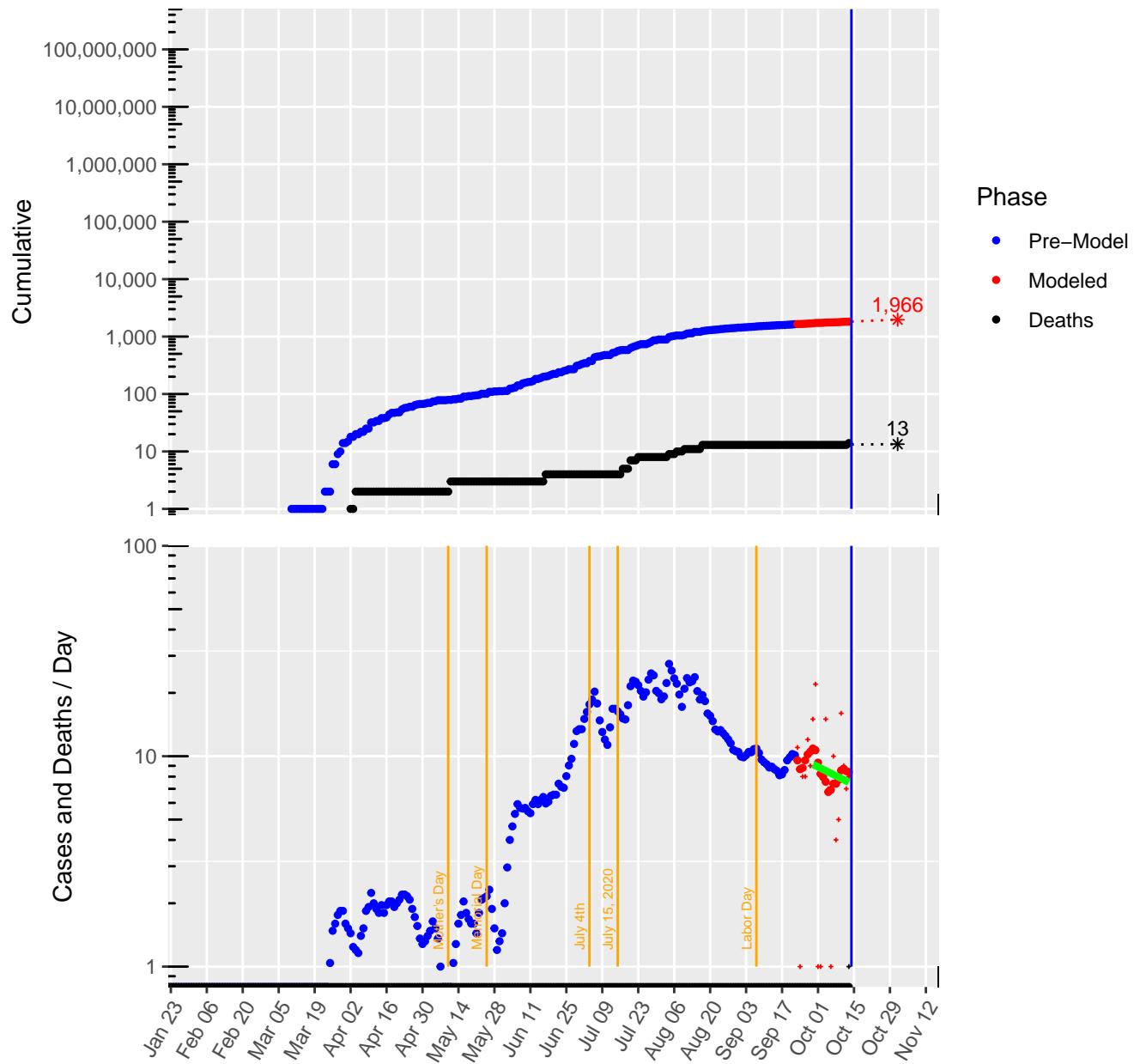


6 (423) — Deaths: 981 (2) — Case Mortality: 1.4% — Daily Change: -0.2% Cases, -2.5% Deaths

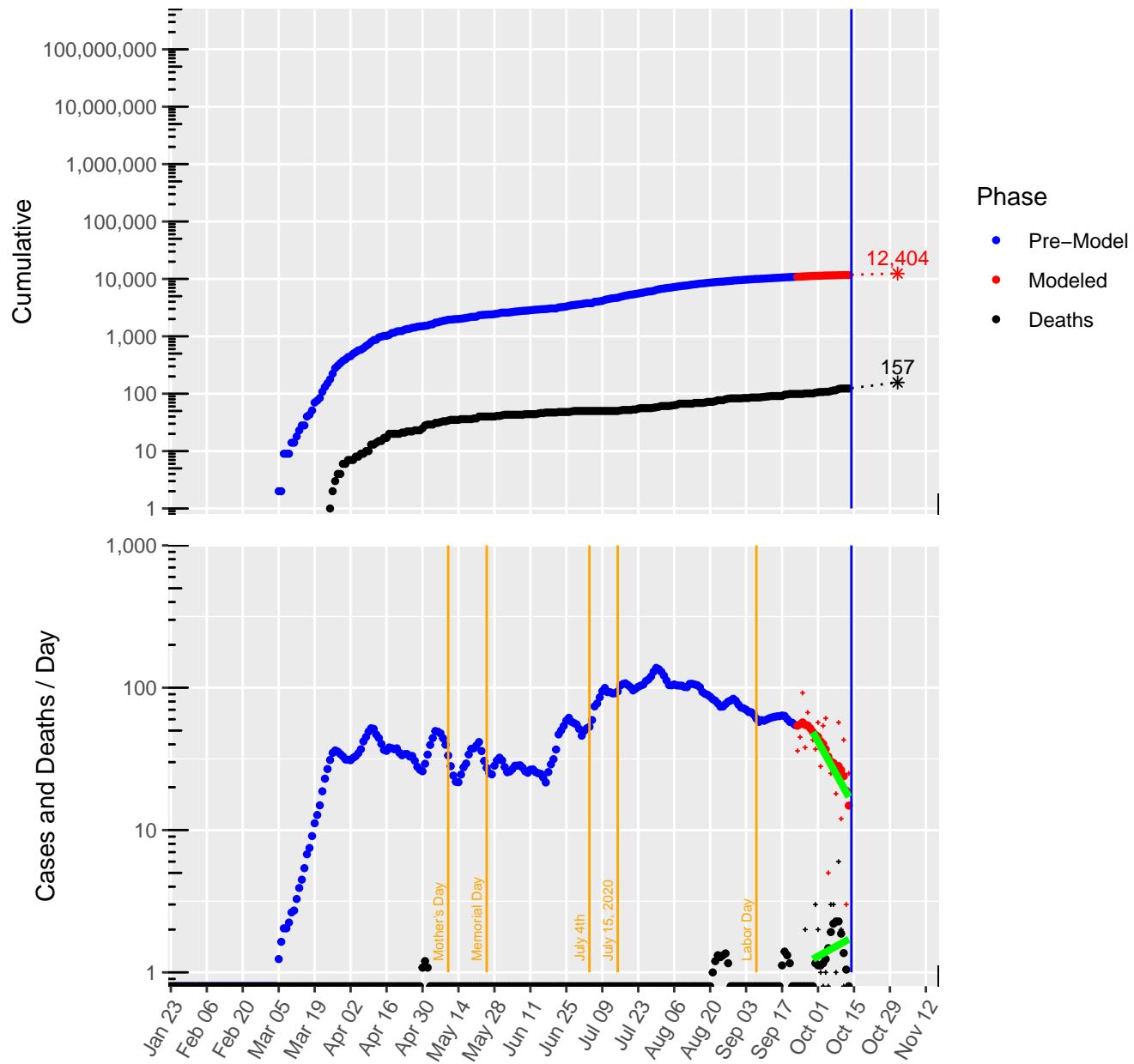
Marin County, California projection as of 2020-10-14



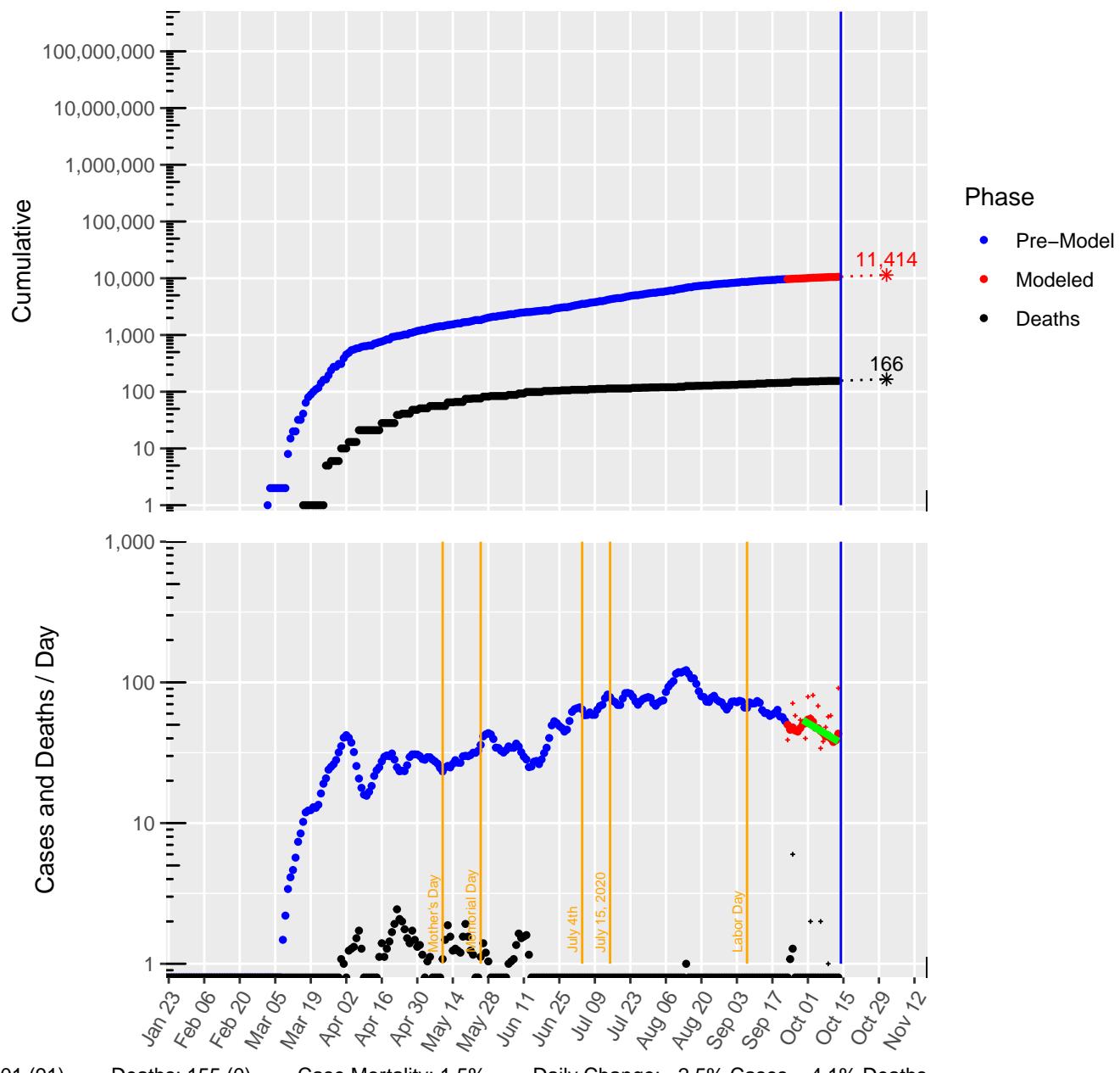
Napa County, California projection as of 2020-10-14



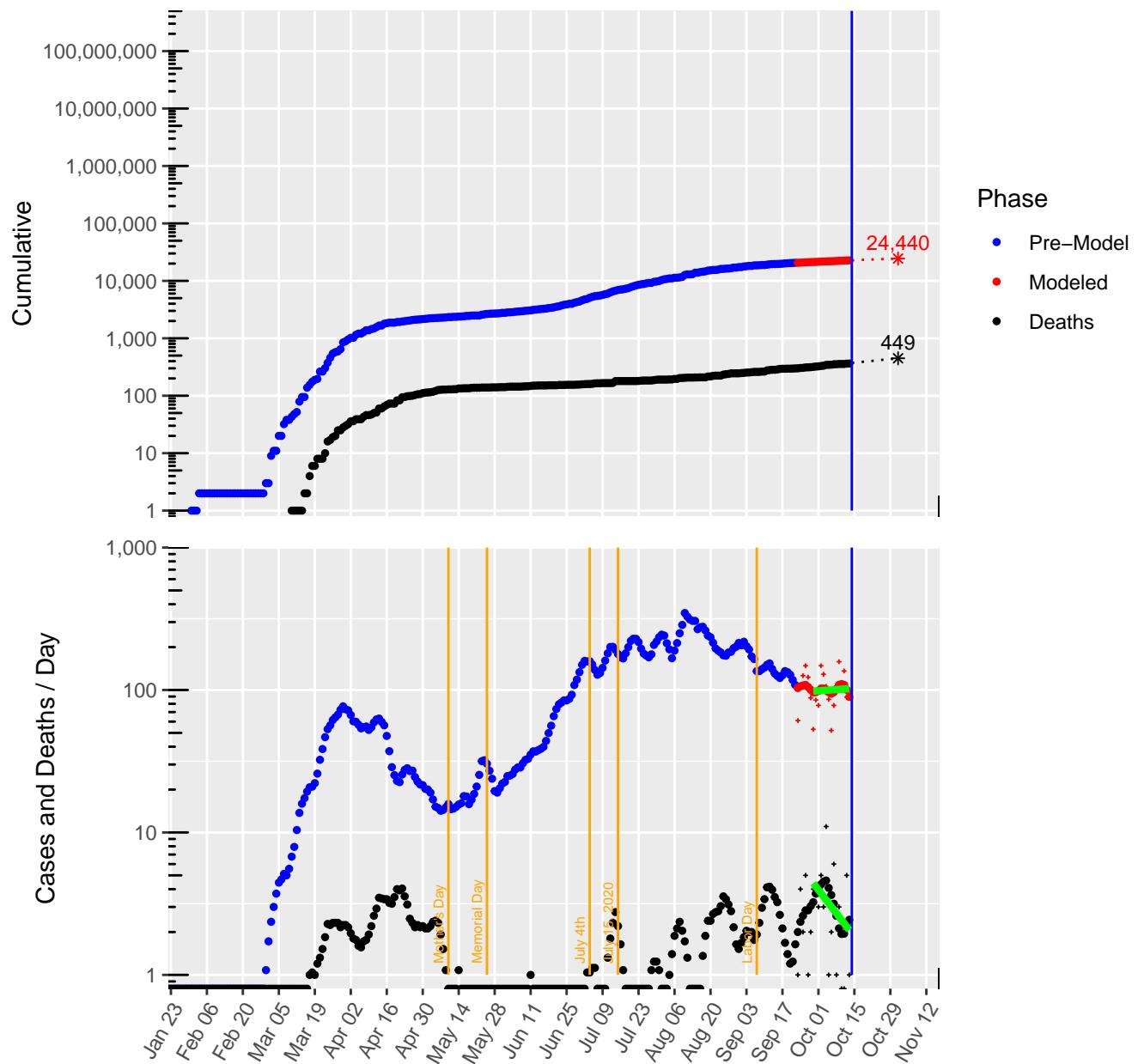
San Francisco projection as of 2020-10-14



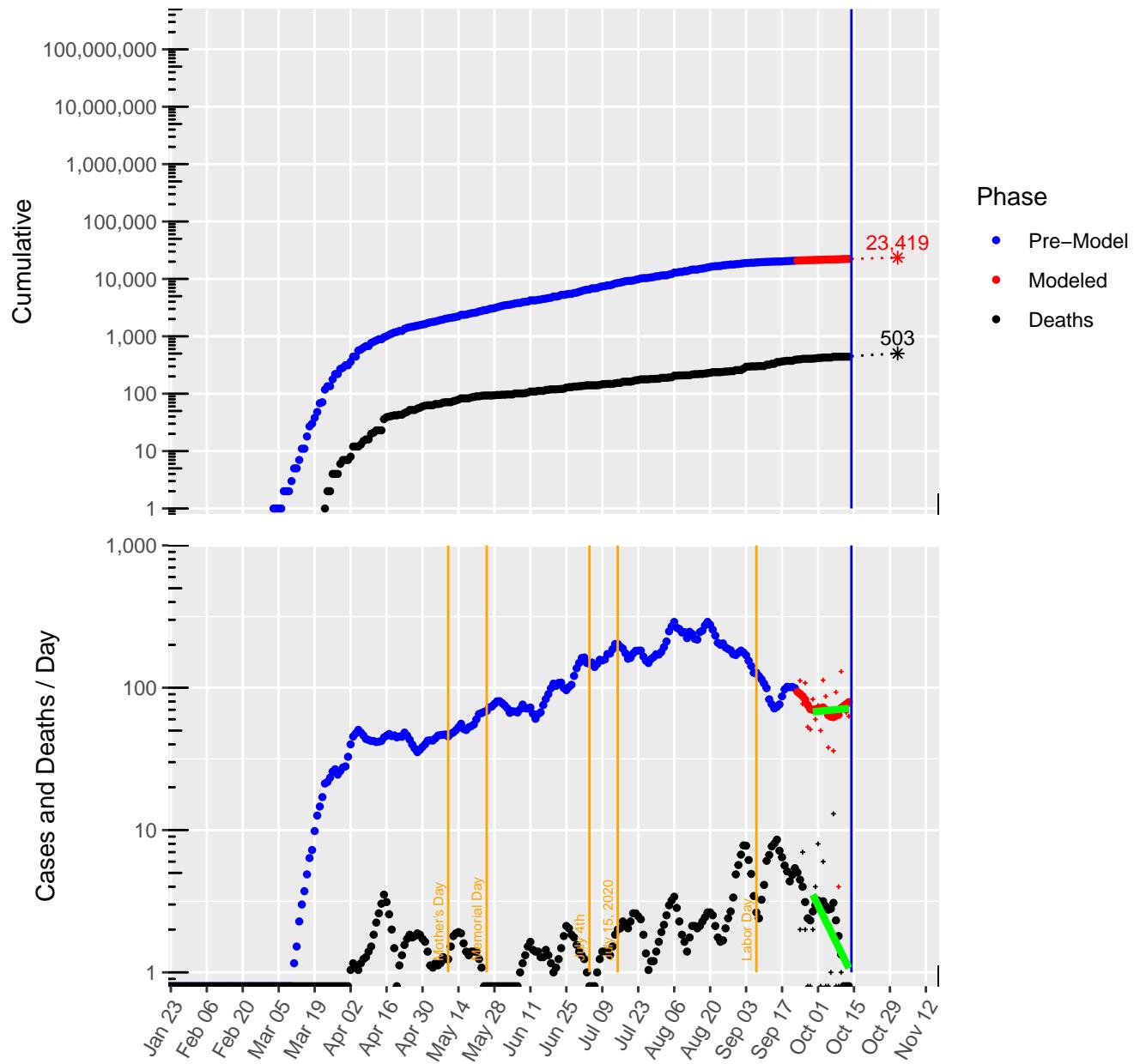
San Mateo County, California projection as of 2020-10-14



Santa Clara County, California projection as of 2020-10-14

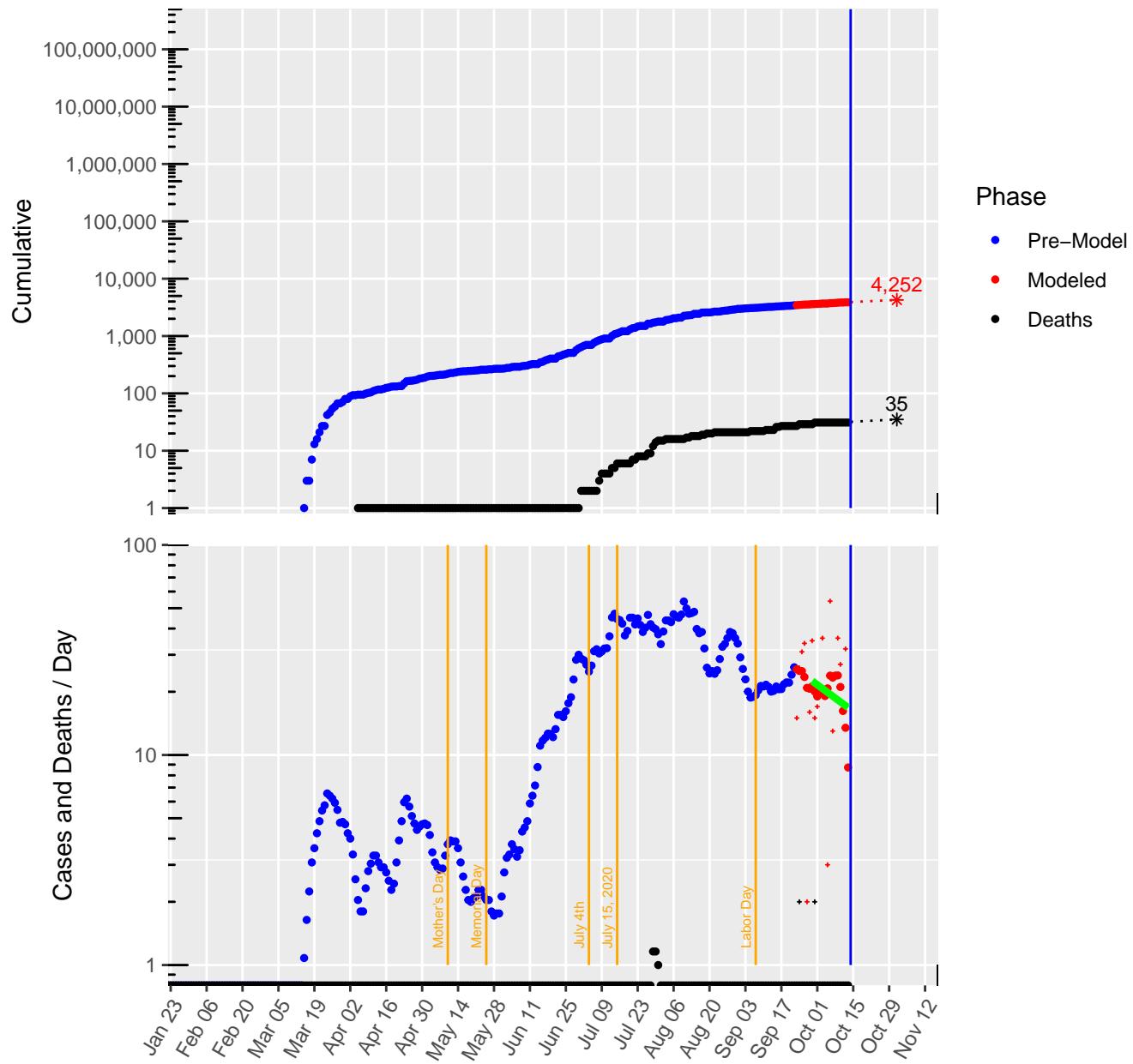


Alameda County, California projection as of 2020-10-14

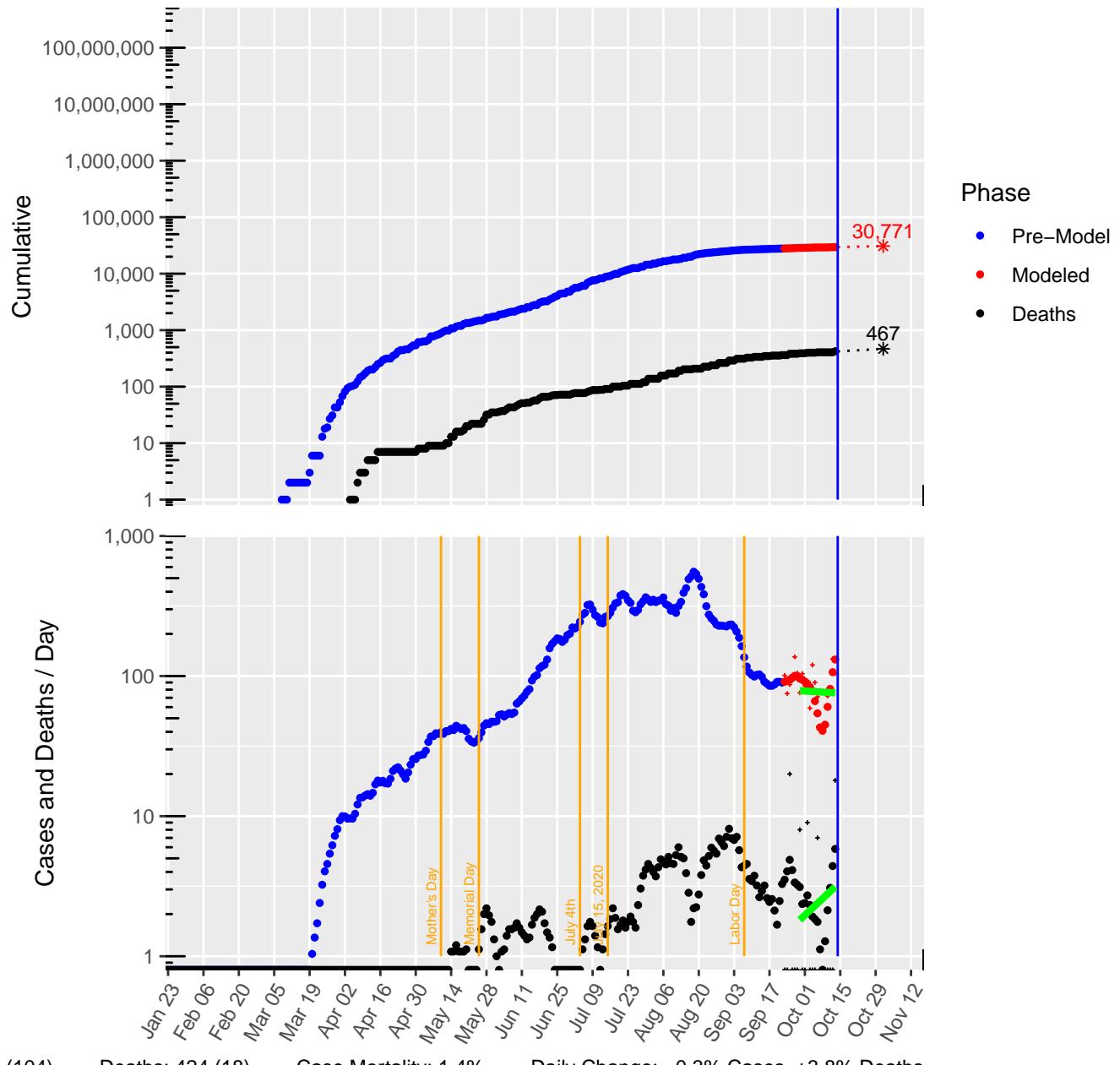


79 (63) — Deaths: 441 (0) — Case Mortality: 2.0% — Daily Change: +0.4% Cases, -7.6% Deaths

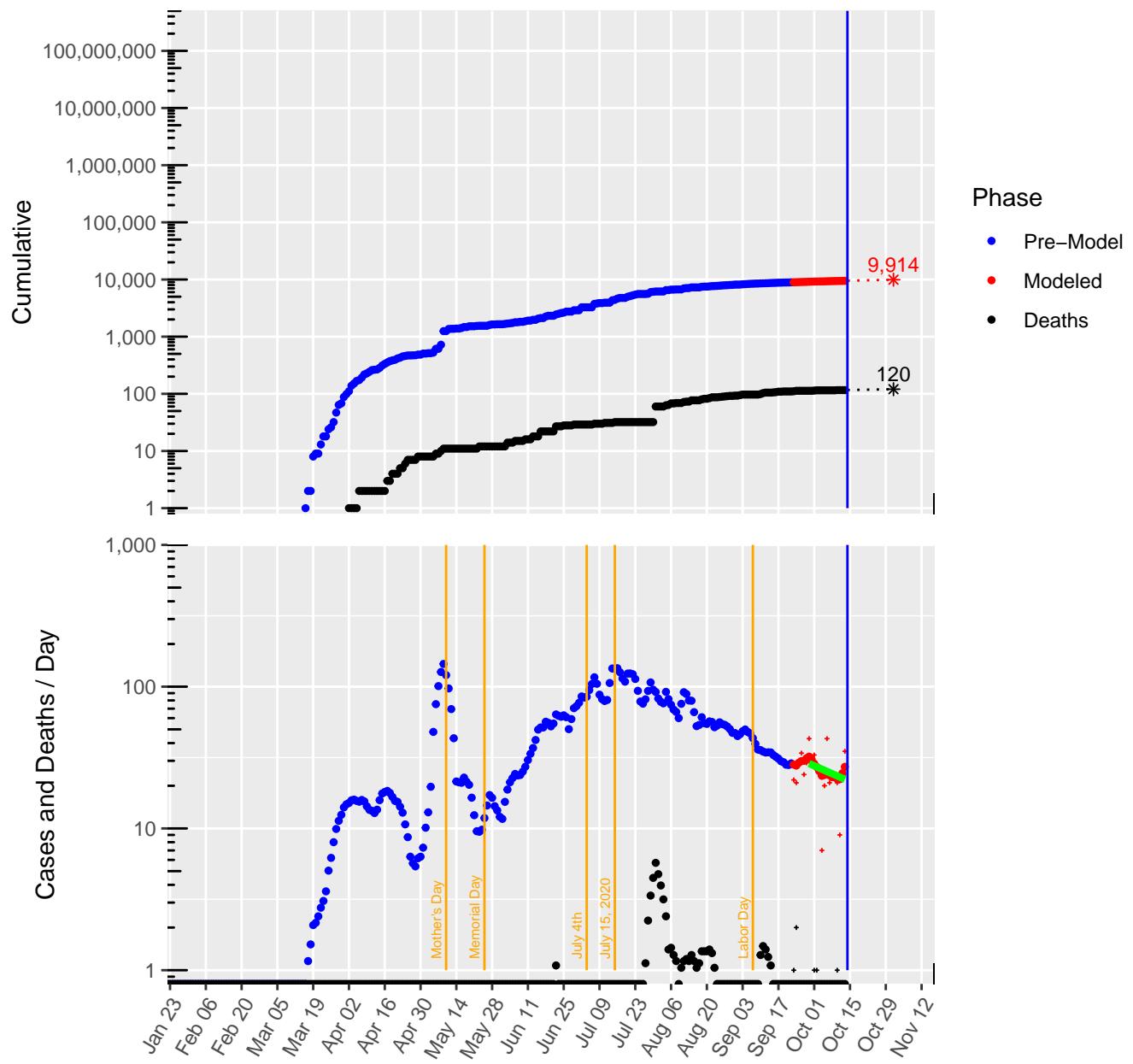
San Luis Obispo, California projection as of 2020-10-14



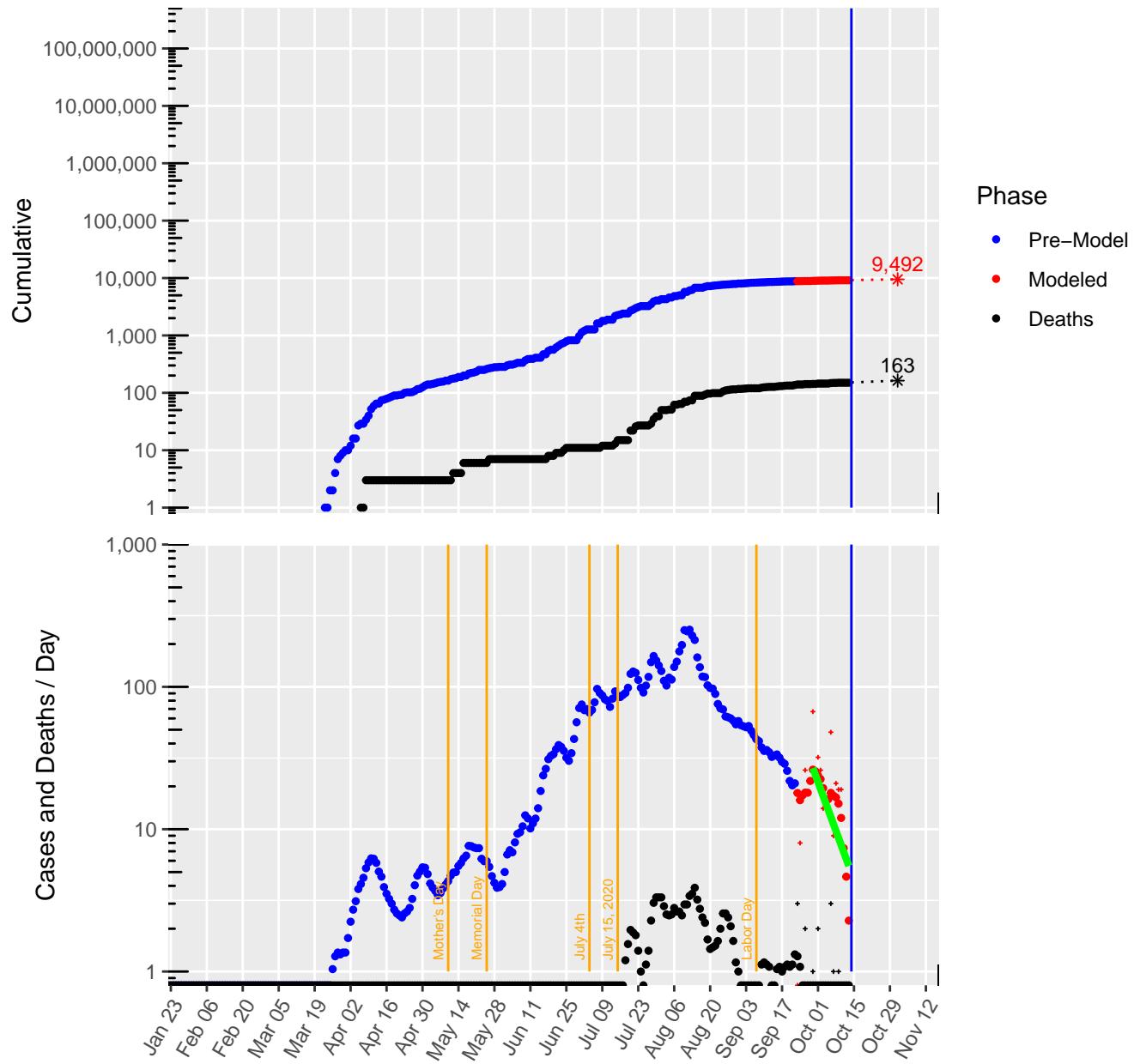
Fresno, California projection as of 2020-10-14



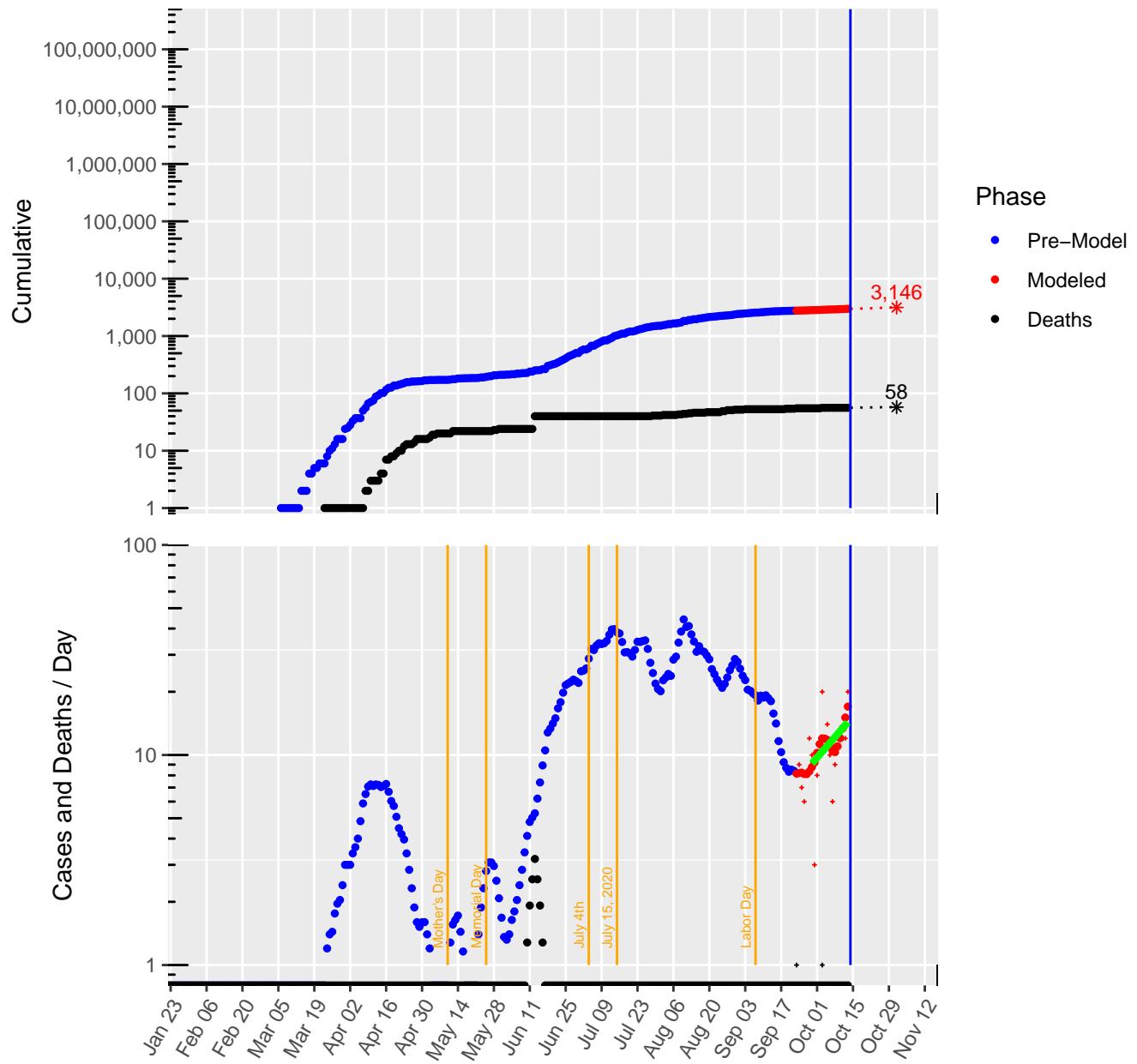
Santa Barbara County, California projection as of 2020-10-14



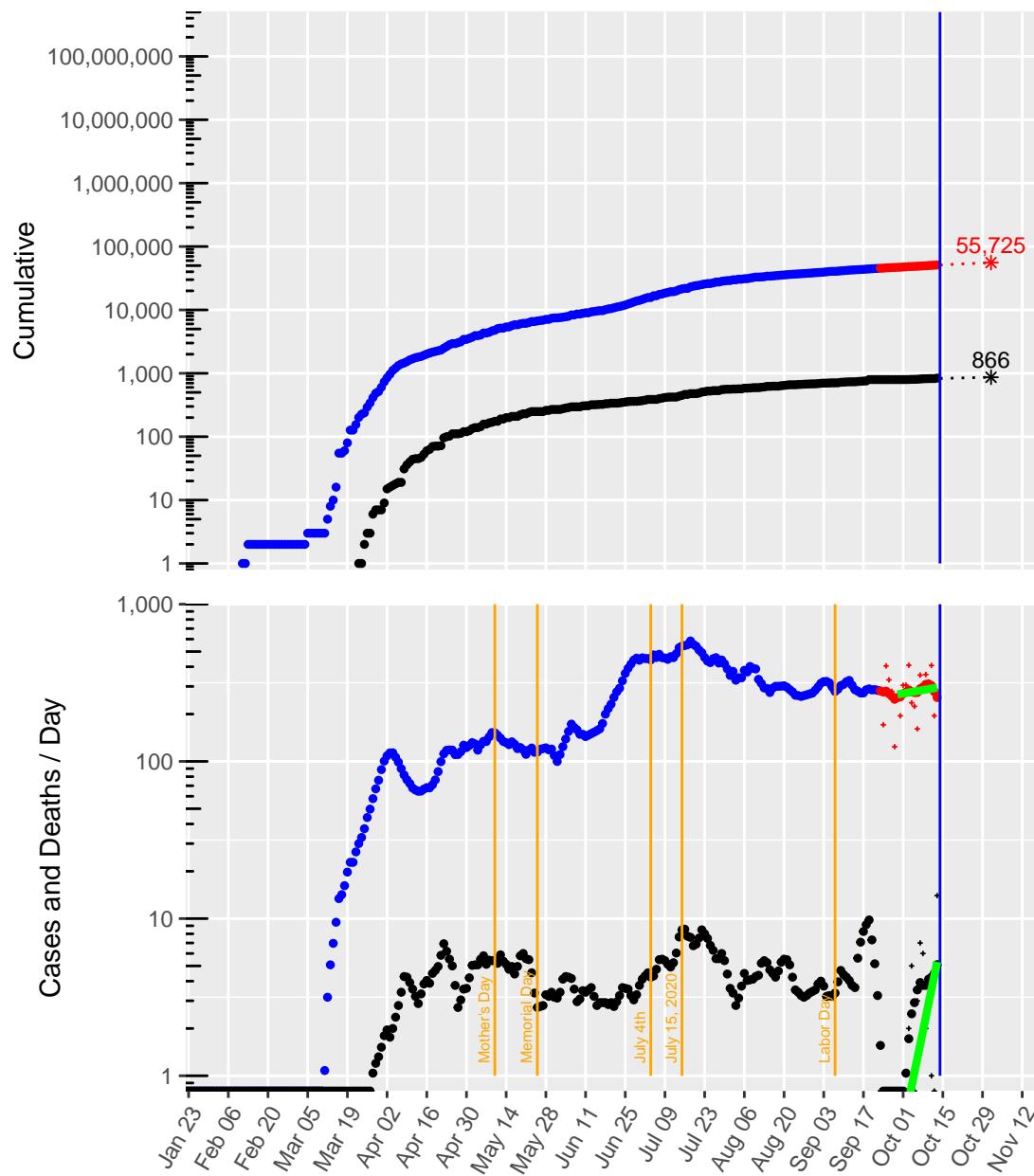
Merced County, California projection as of 2020-10-14



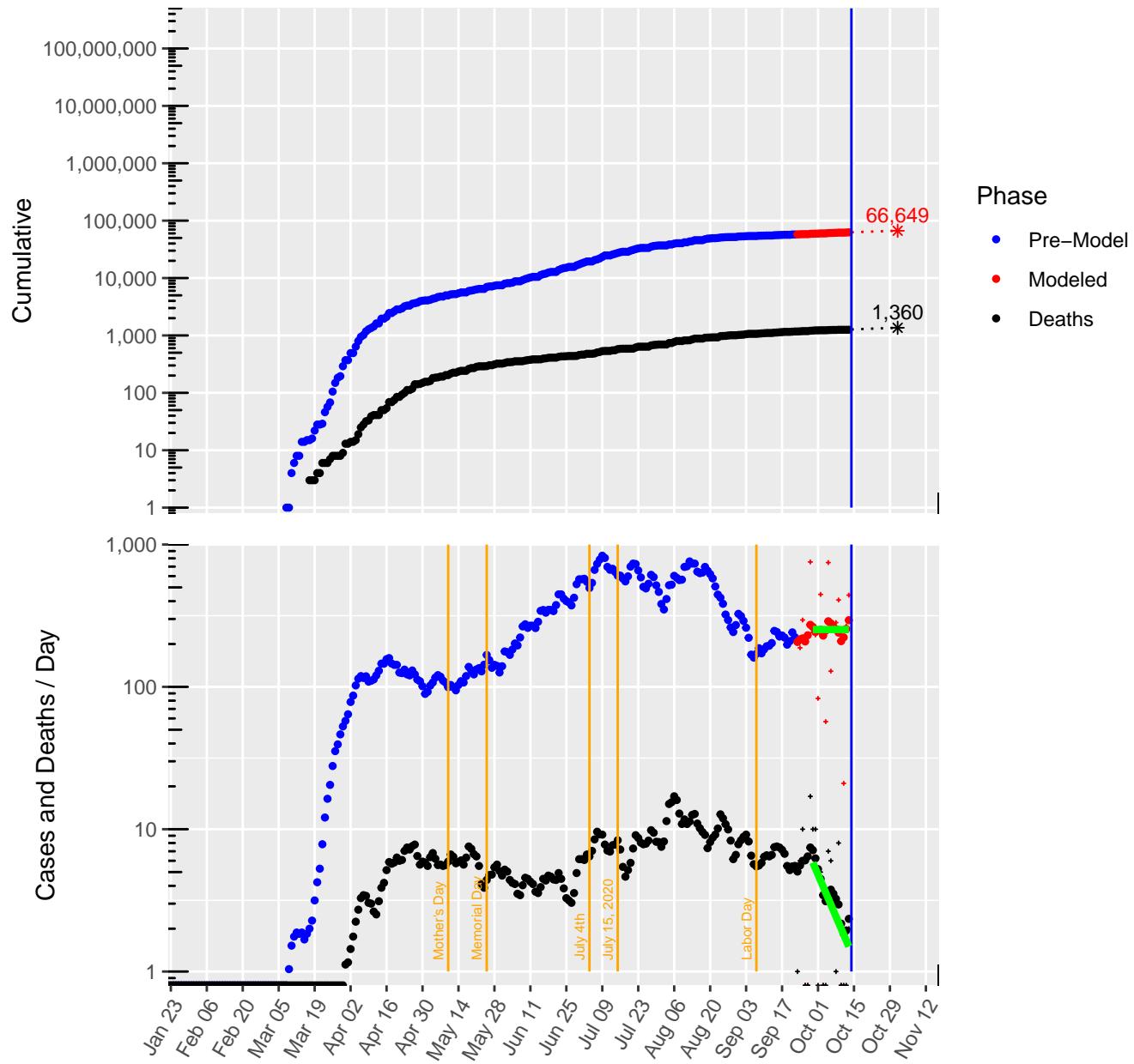
Yolo County, California projection as of 2020-10-14



San Diego County projection as of 2020-10-14

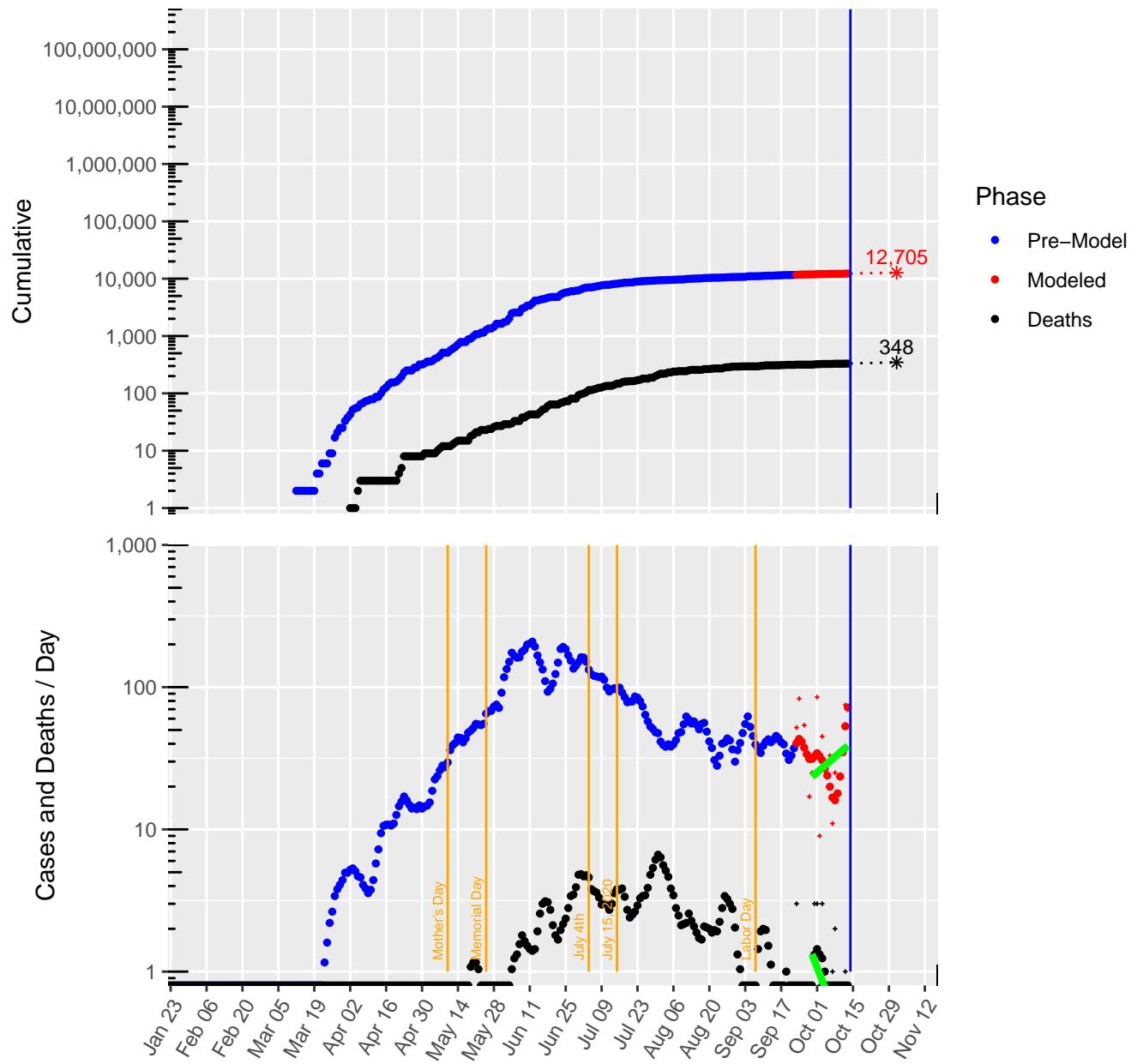


Riverside County projection as of 2020-10-14

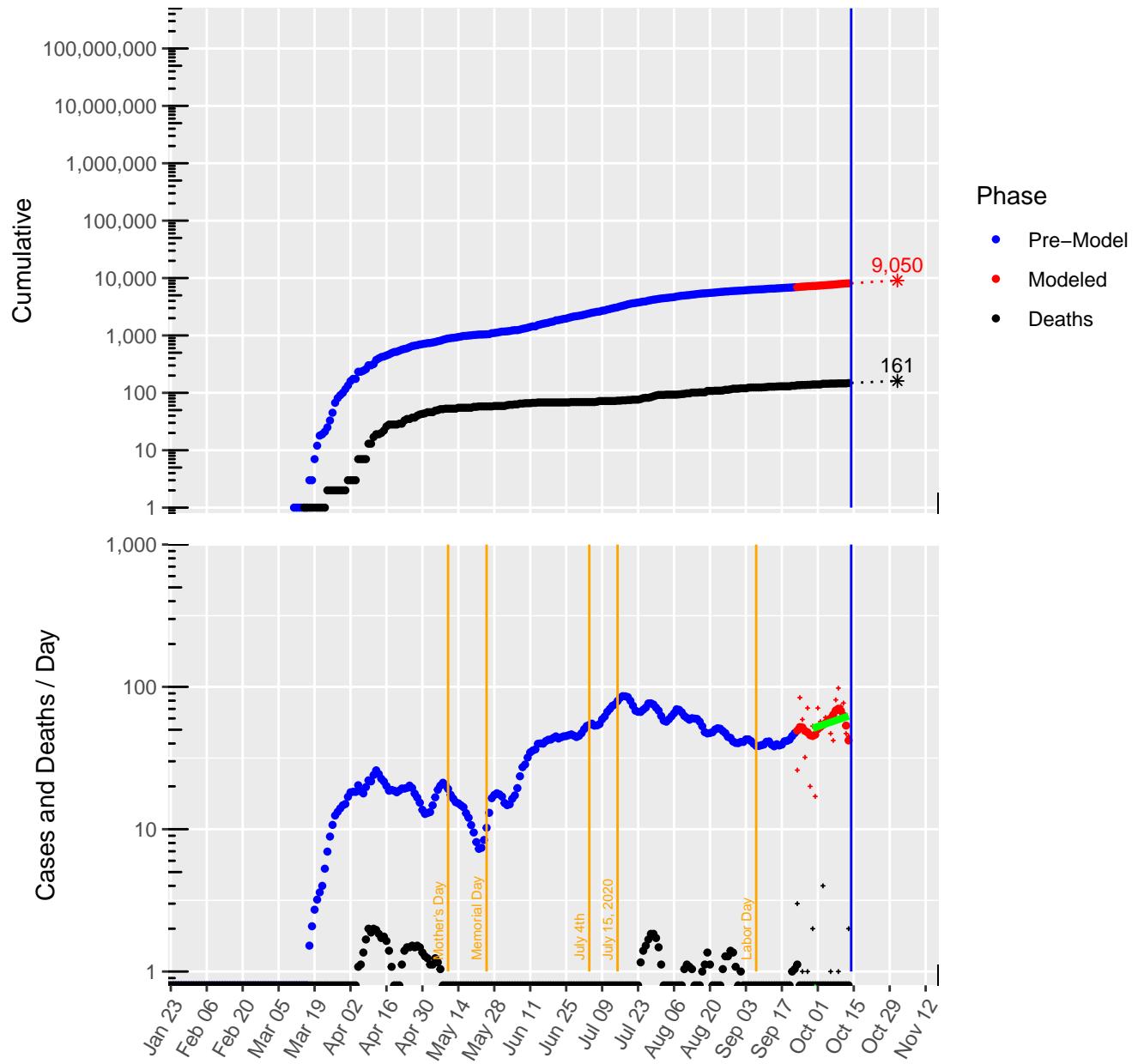


(441) -- Deaths: 1,258 (2) -- Case Mortality: 2.0% -- Daily Change: -0.0% Cases, -8.4% Deaths

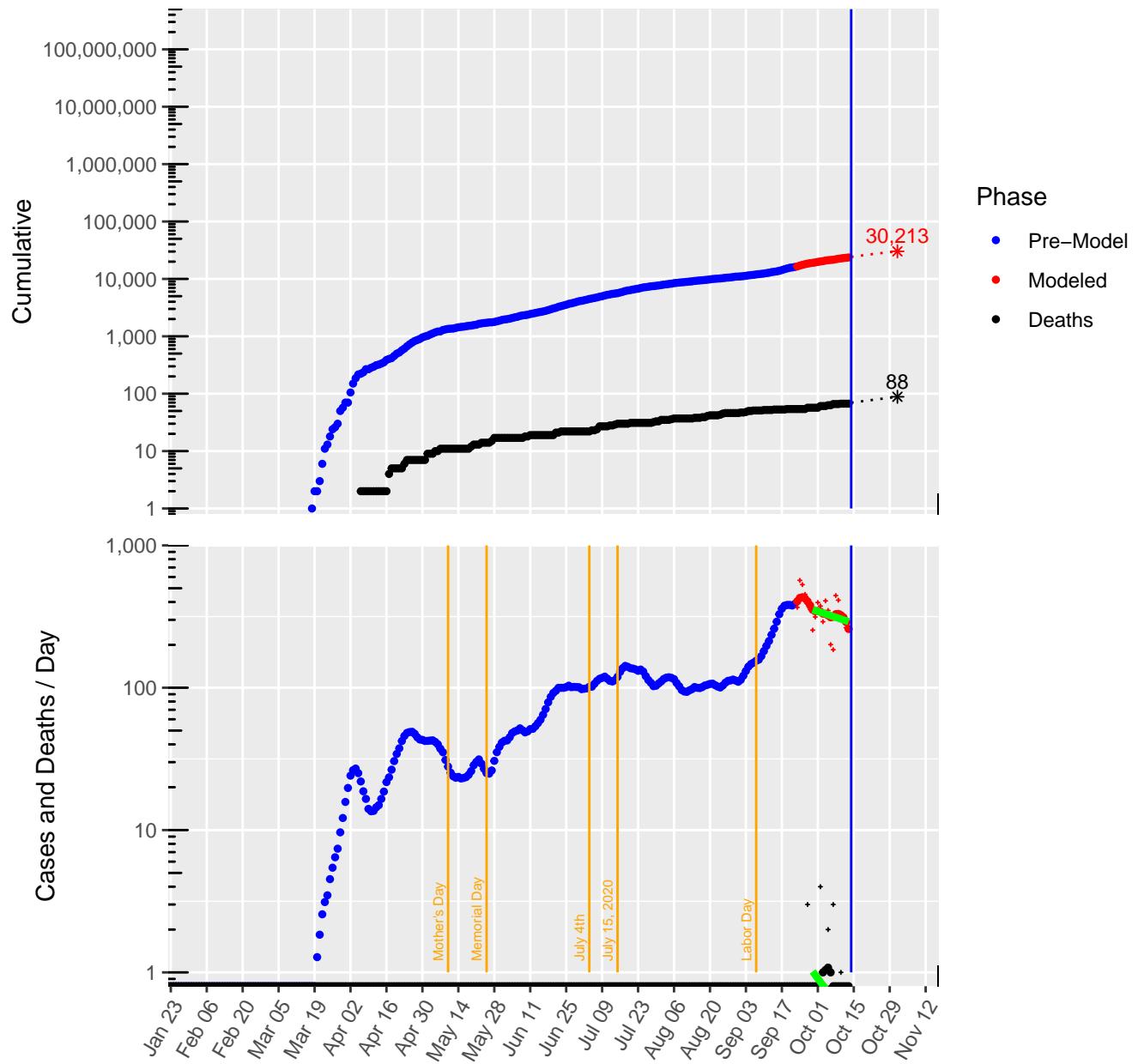
Imperial County projection as of 2020-10-14



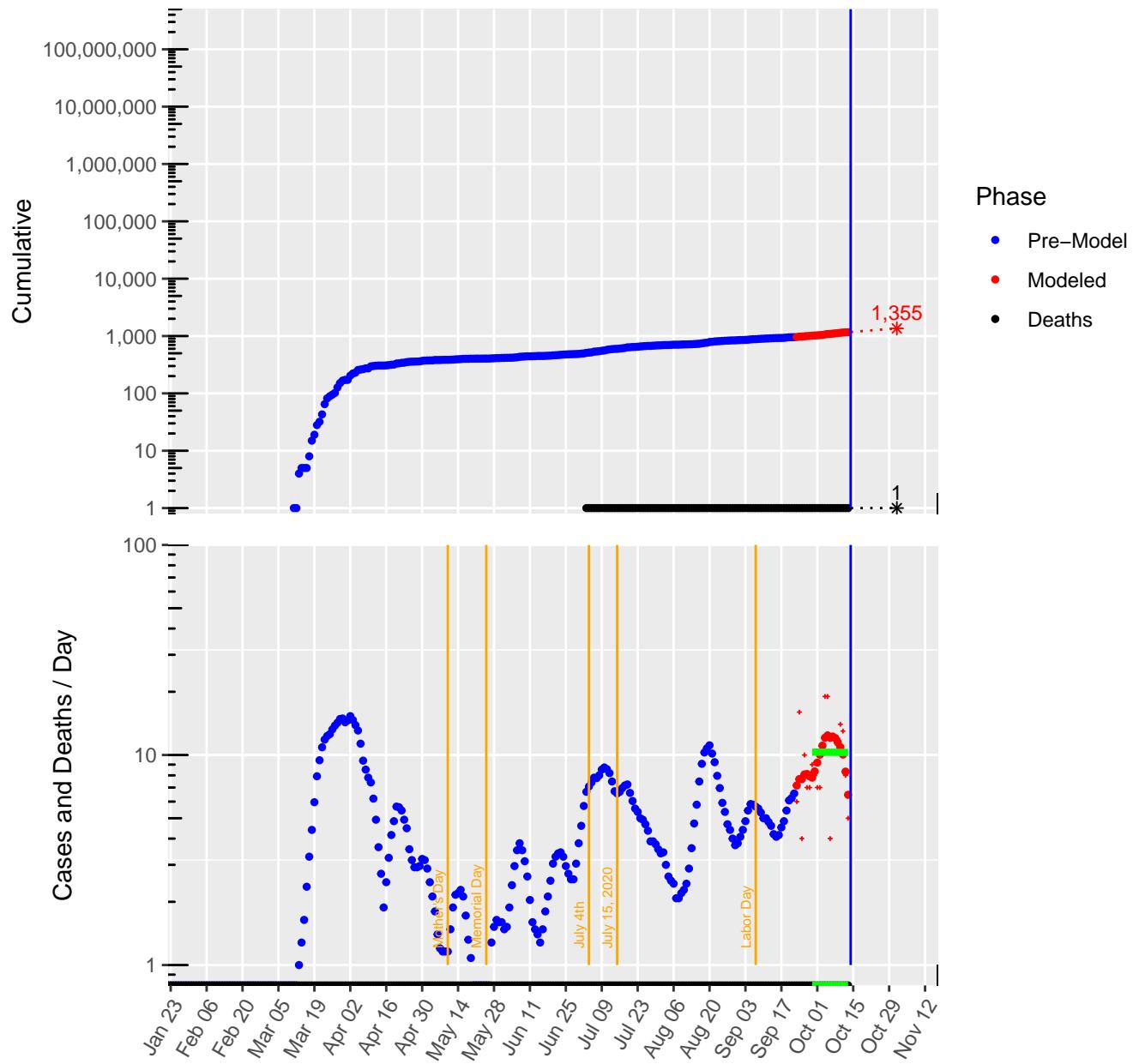
Multnomah County (Portland) projection as of 2020-10-14



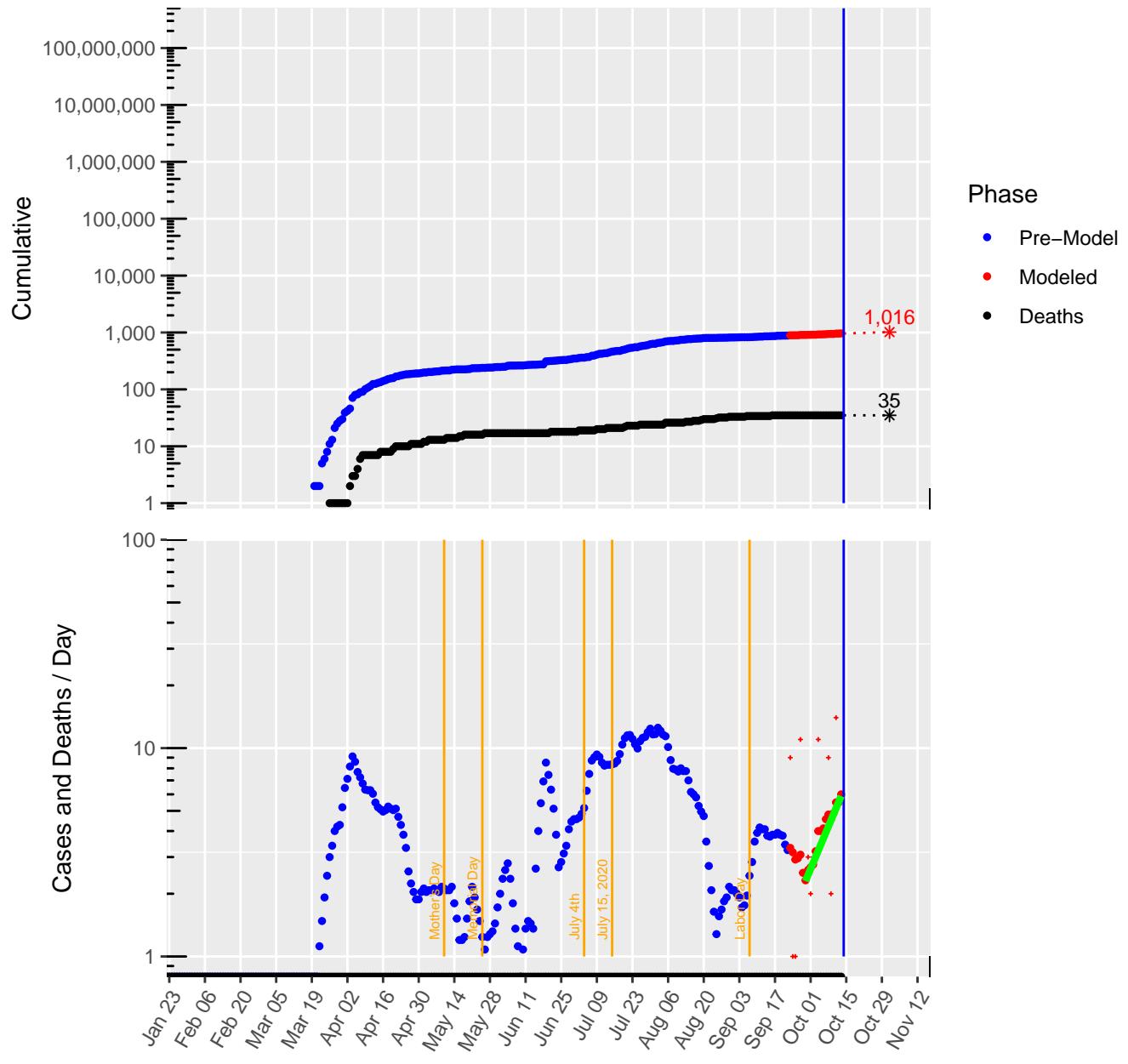
Utah County projection as of 2020-10-14



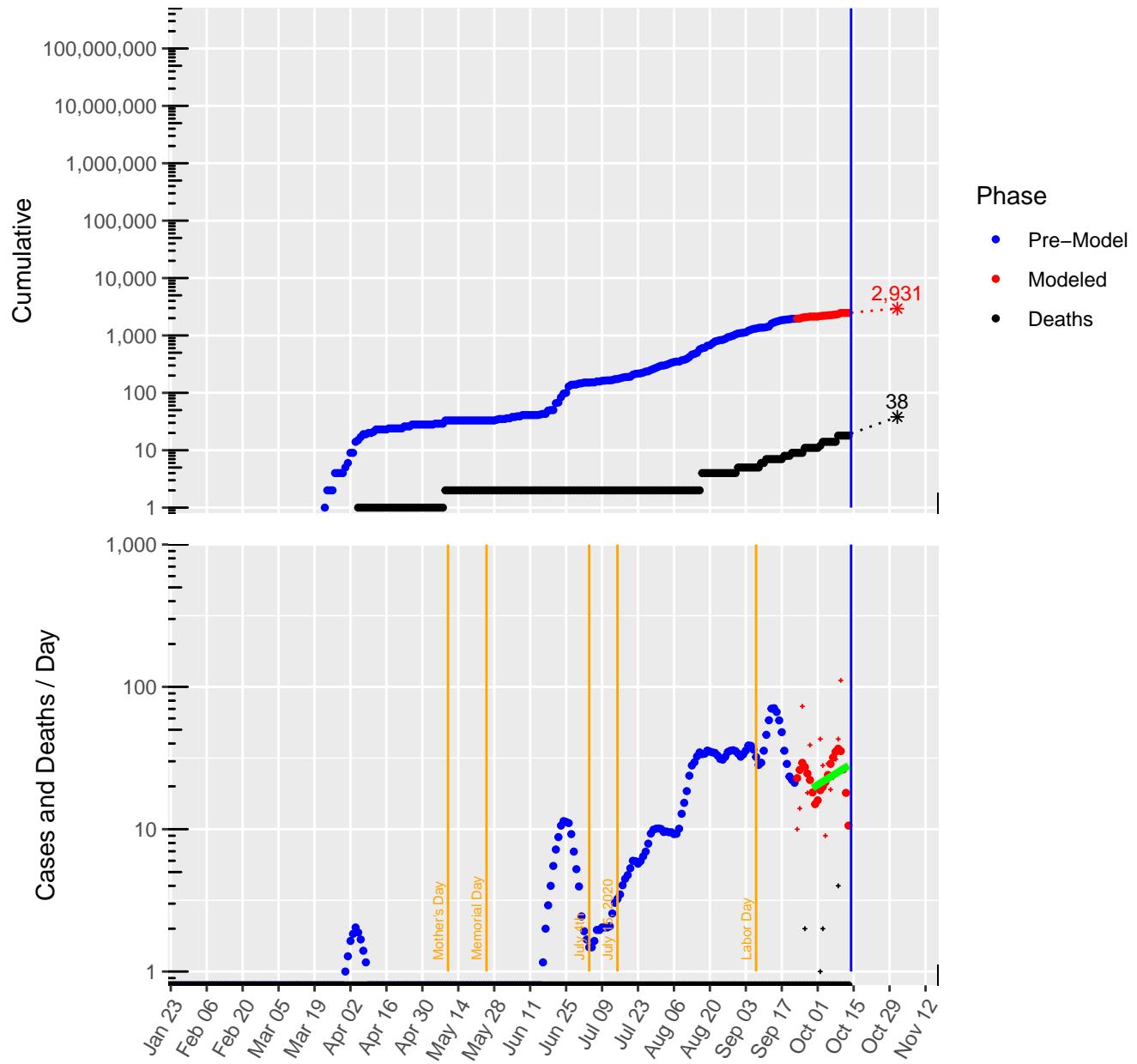
Summit County, Utah projection as of 2020-10-14



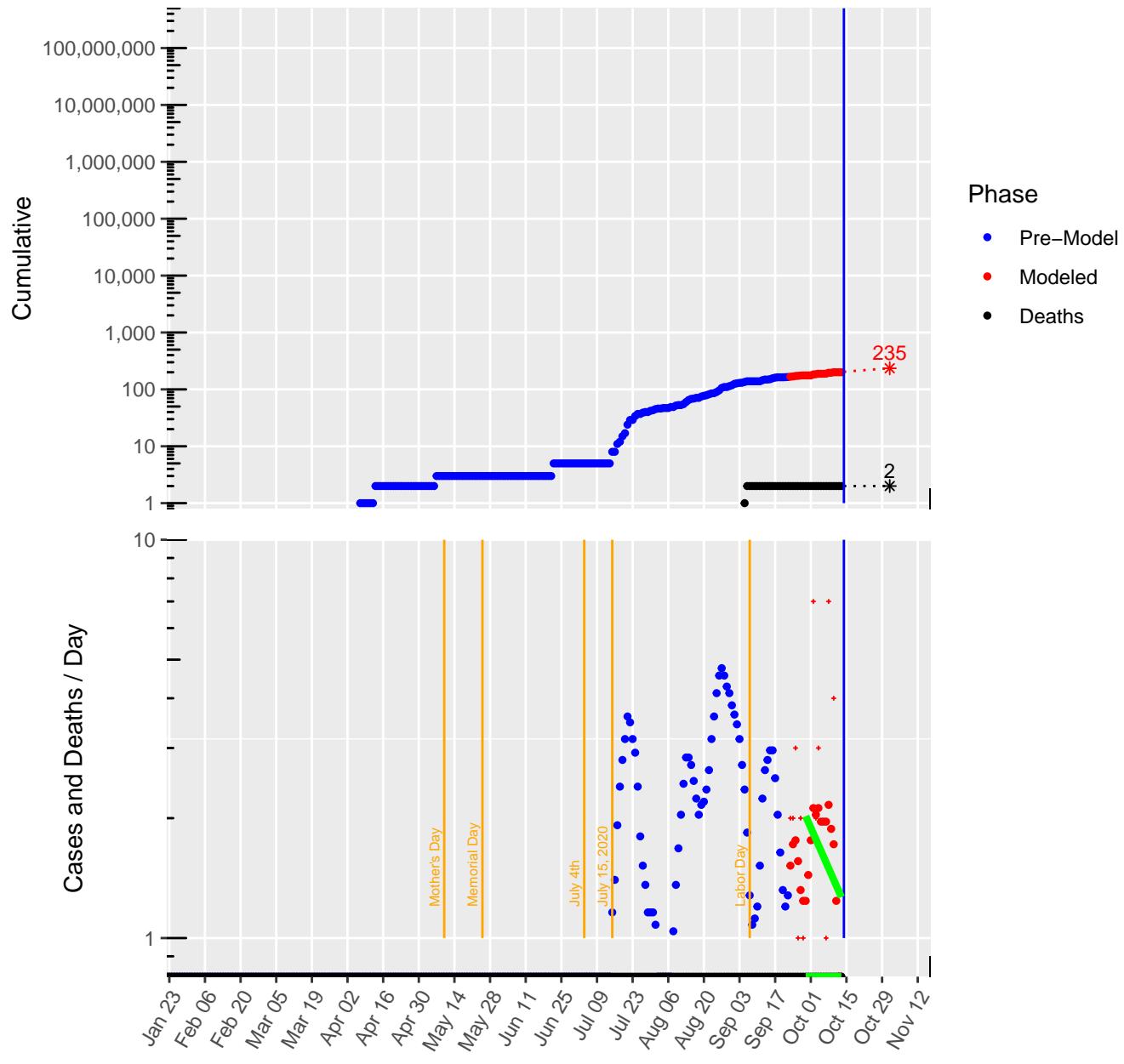
De Soto Parish, Louisiana projection as of 2020-10-14



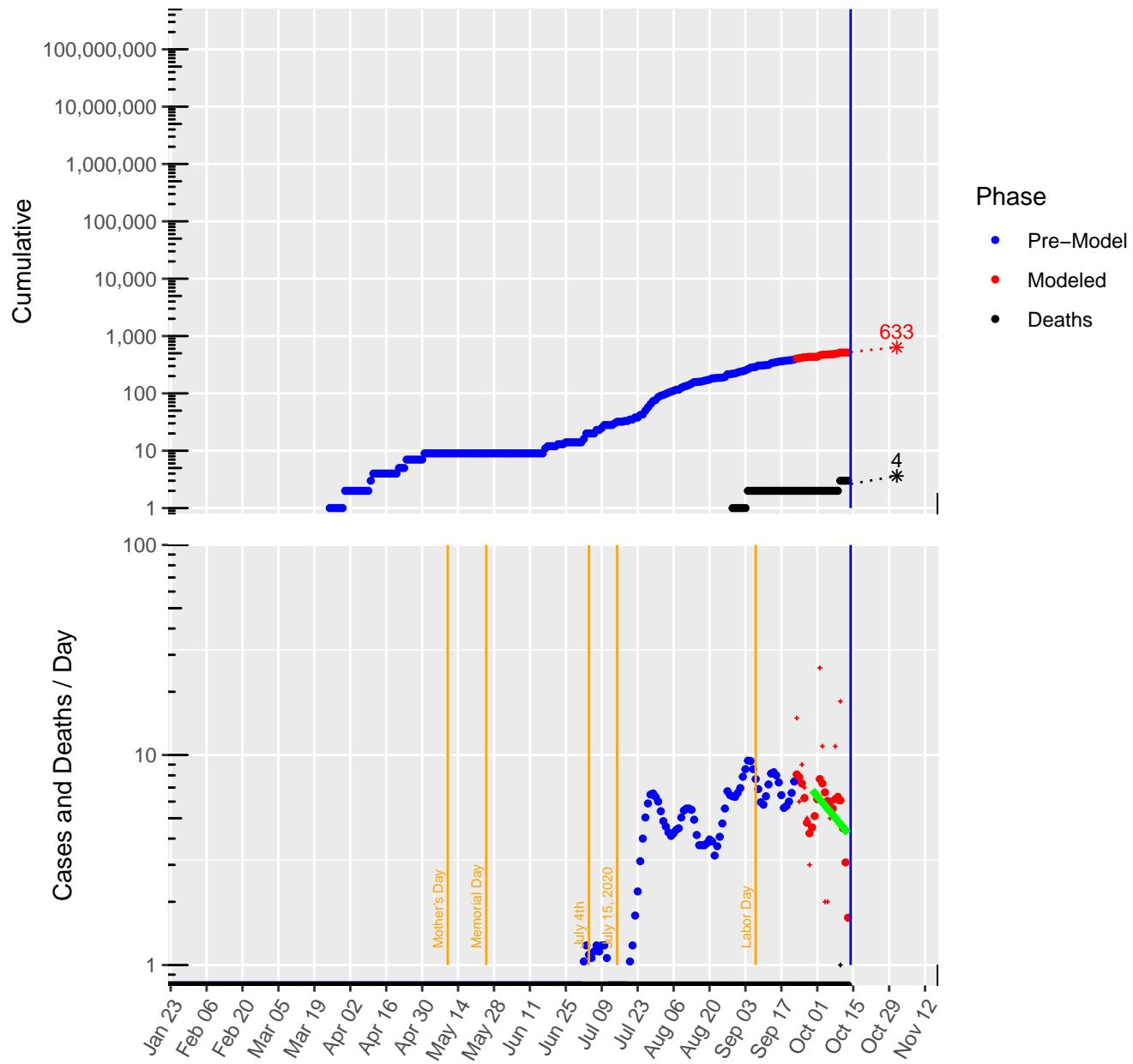
St. Francois County, Missouri projection as of 2020-10-14



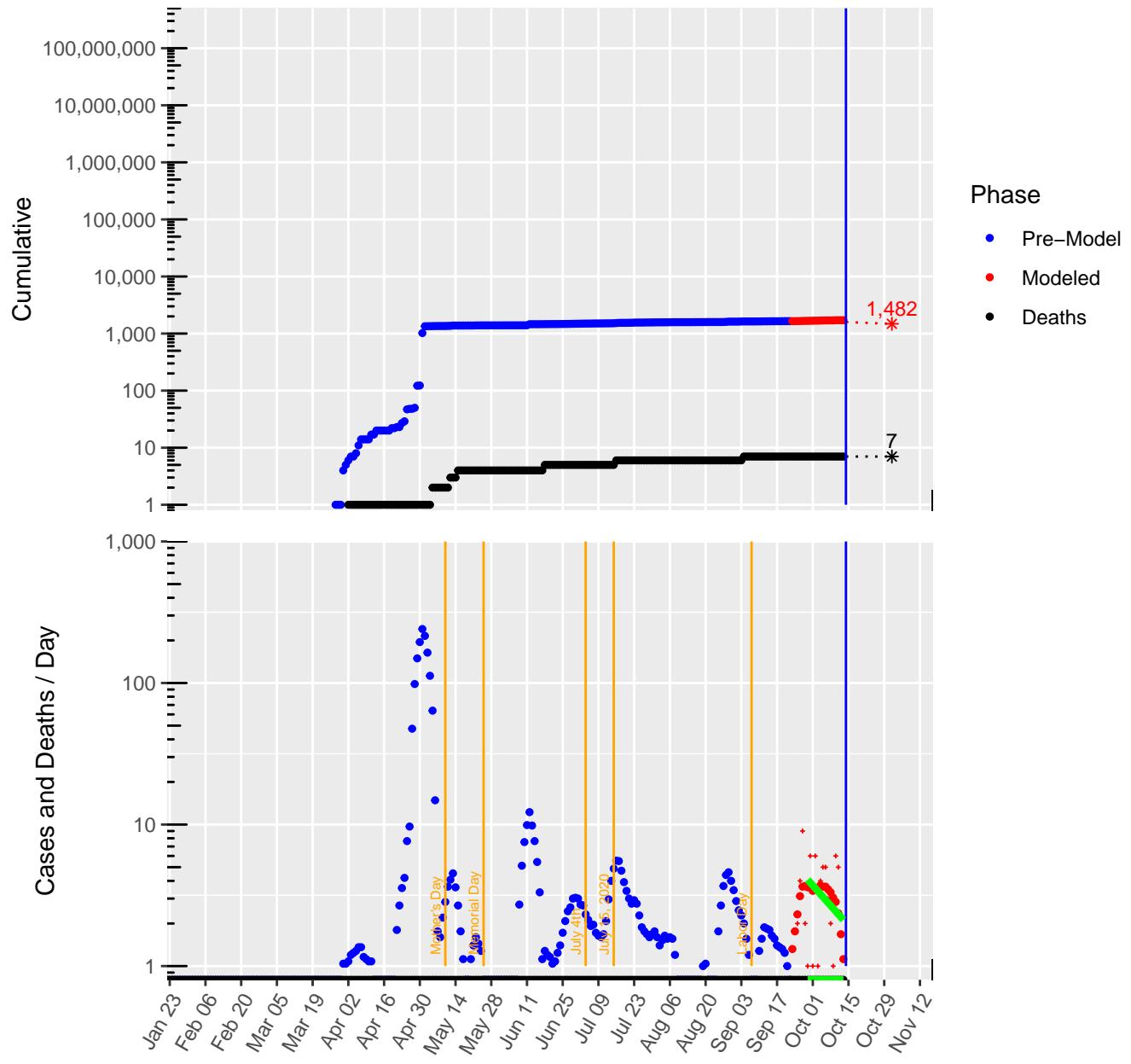
Howard County, Missouri projection as of 2020-10-14



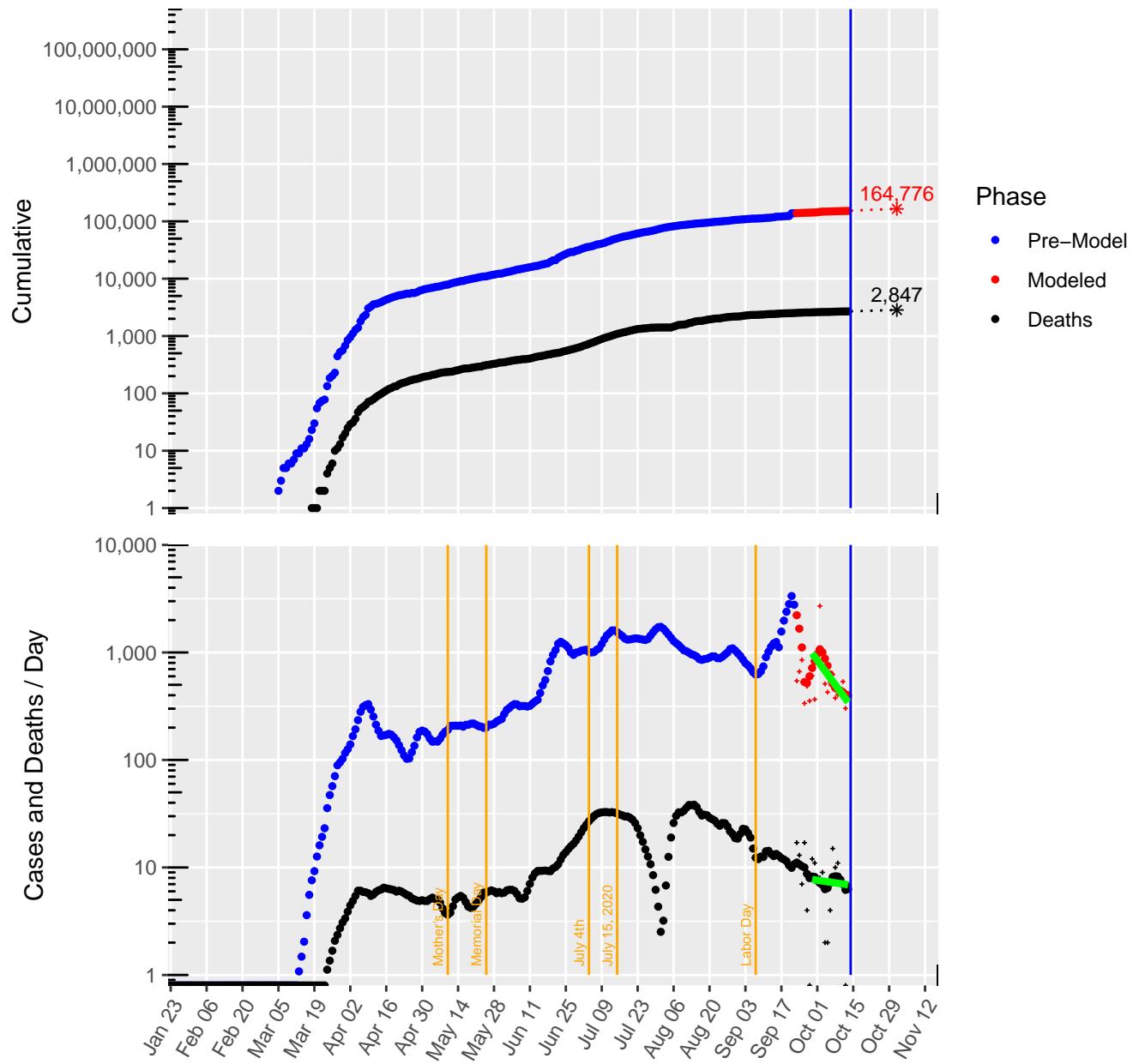
Cooper County, Missouri projection as of 2020-10-14



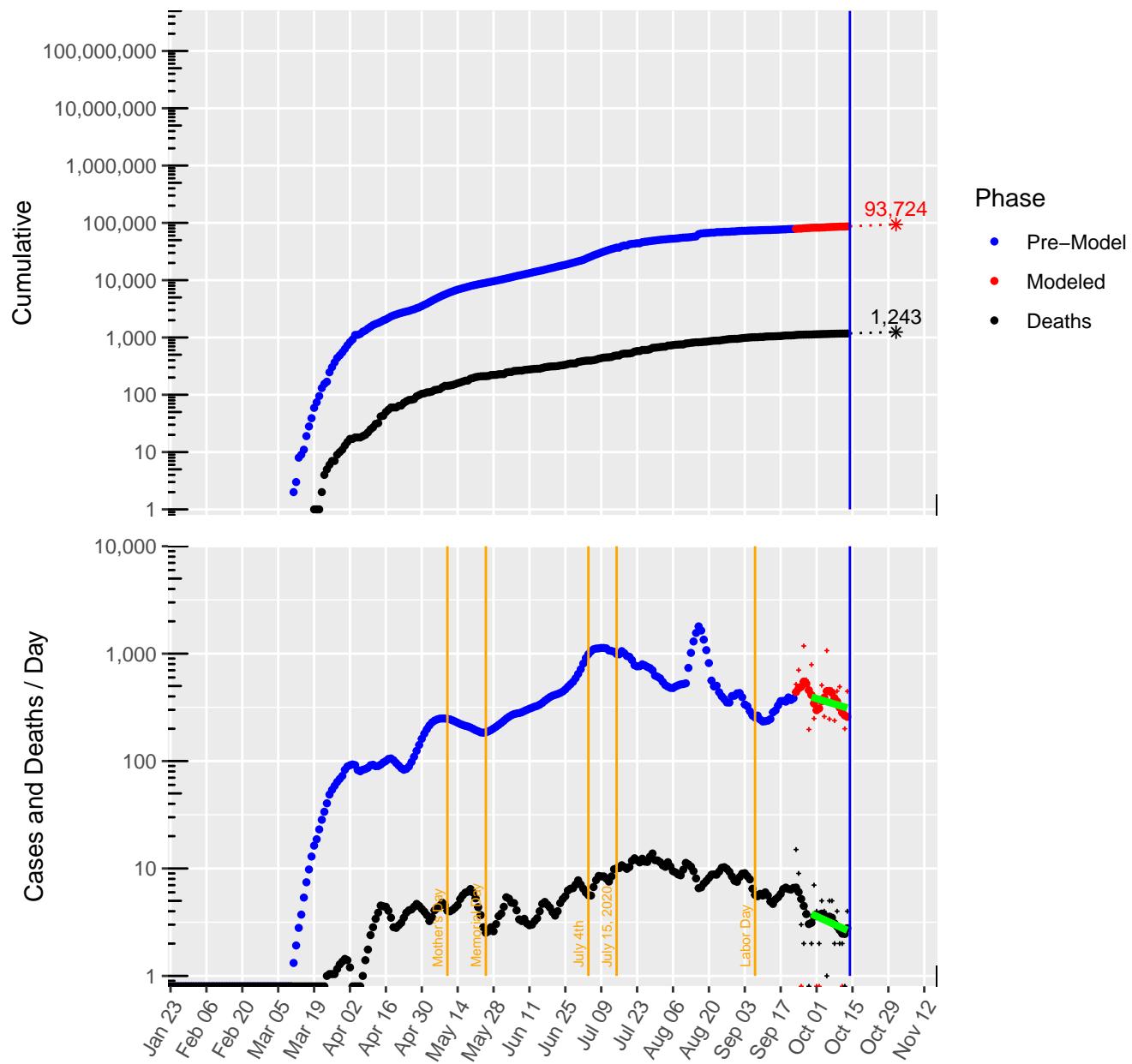
Trousdale County, Tennessee projection as of 2020-10-14



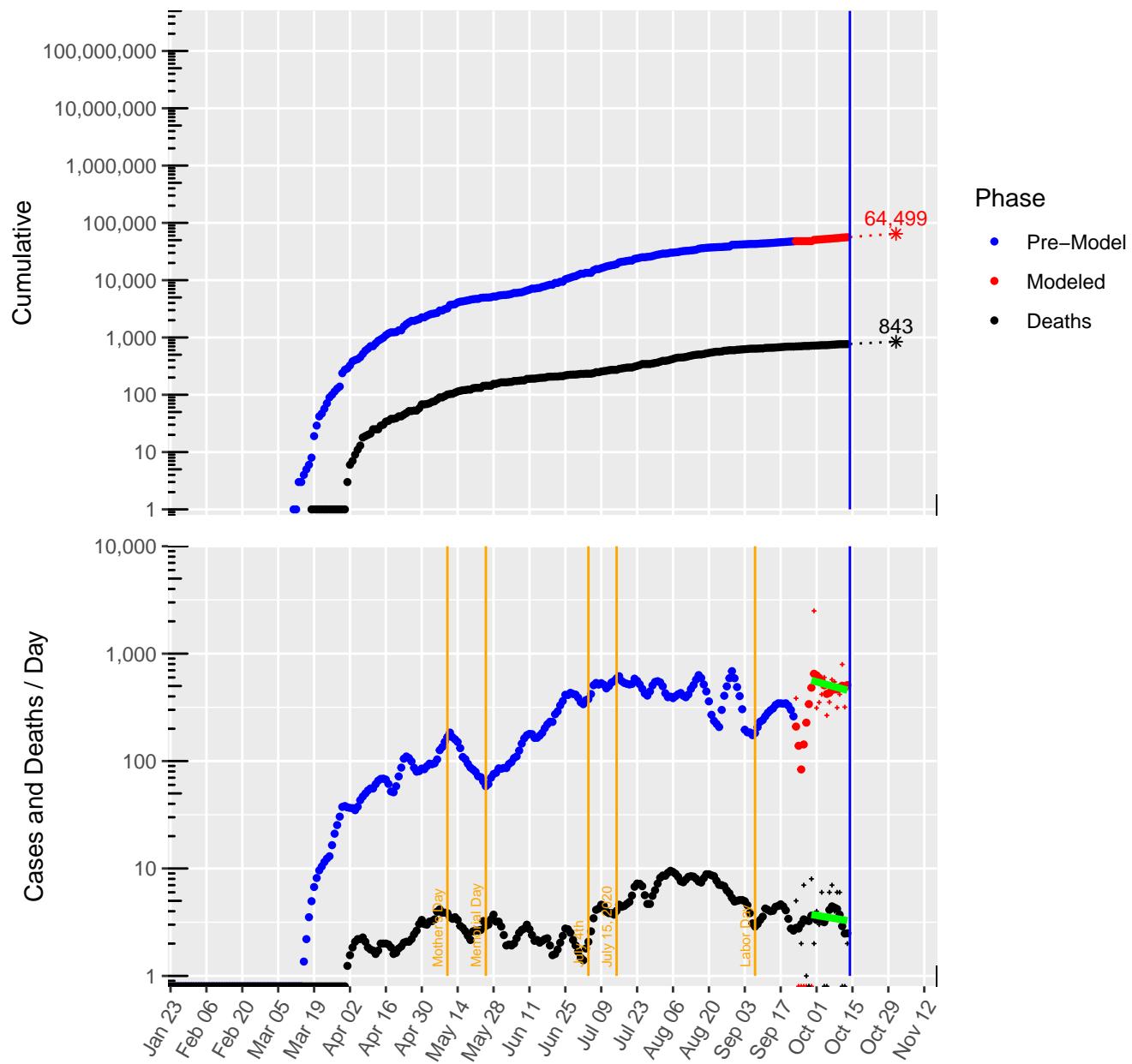
Harris County (Houston) projection as of 2020-10-14



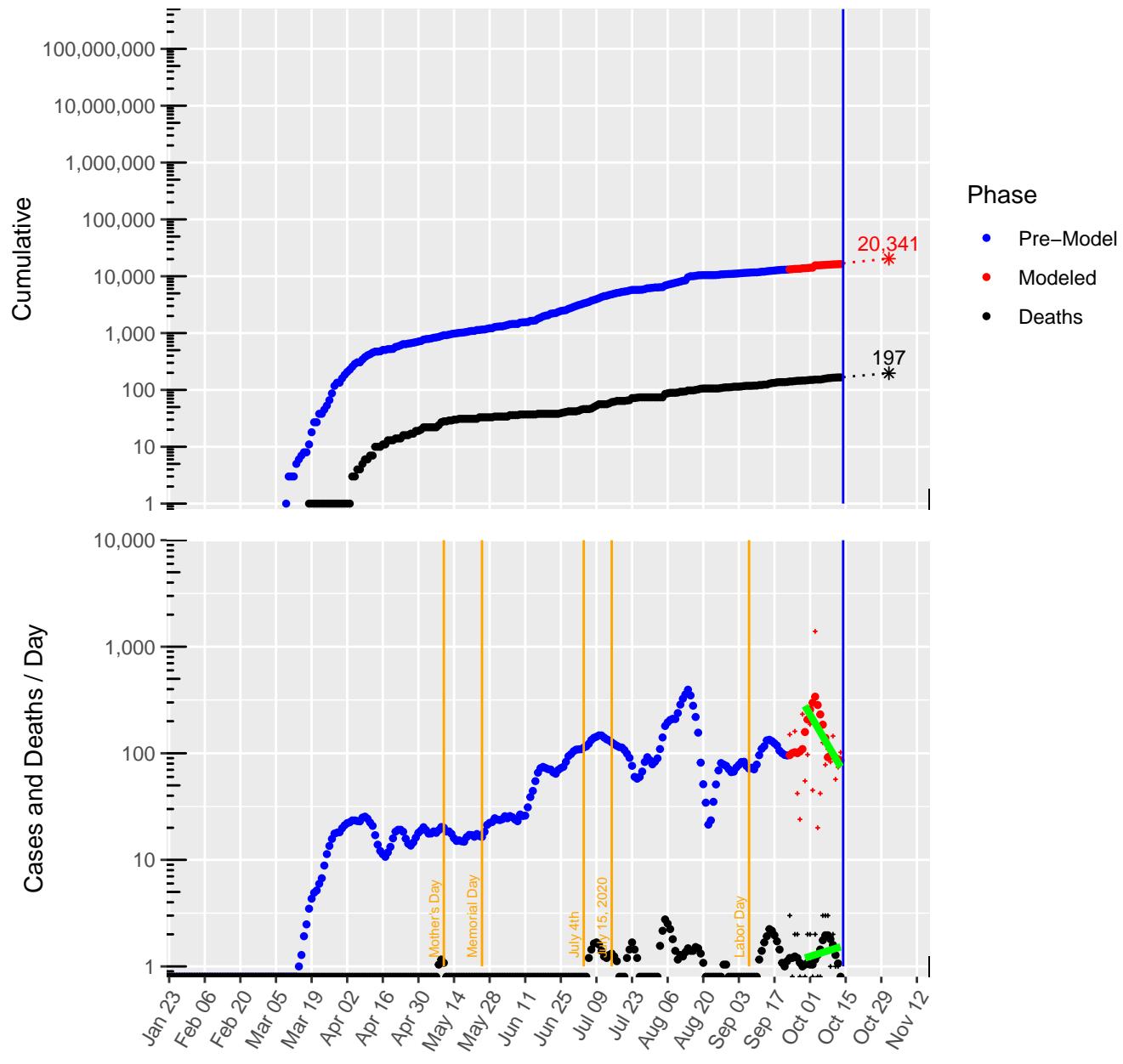
Dallas, Texas projection as of 2020-10-14



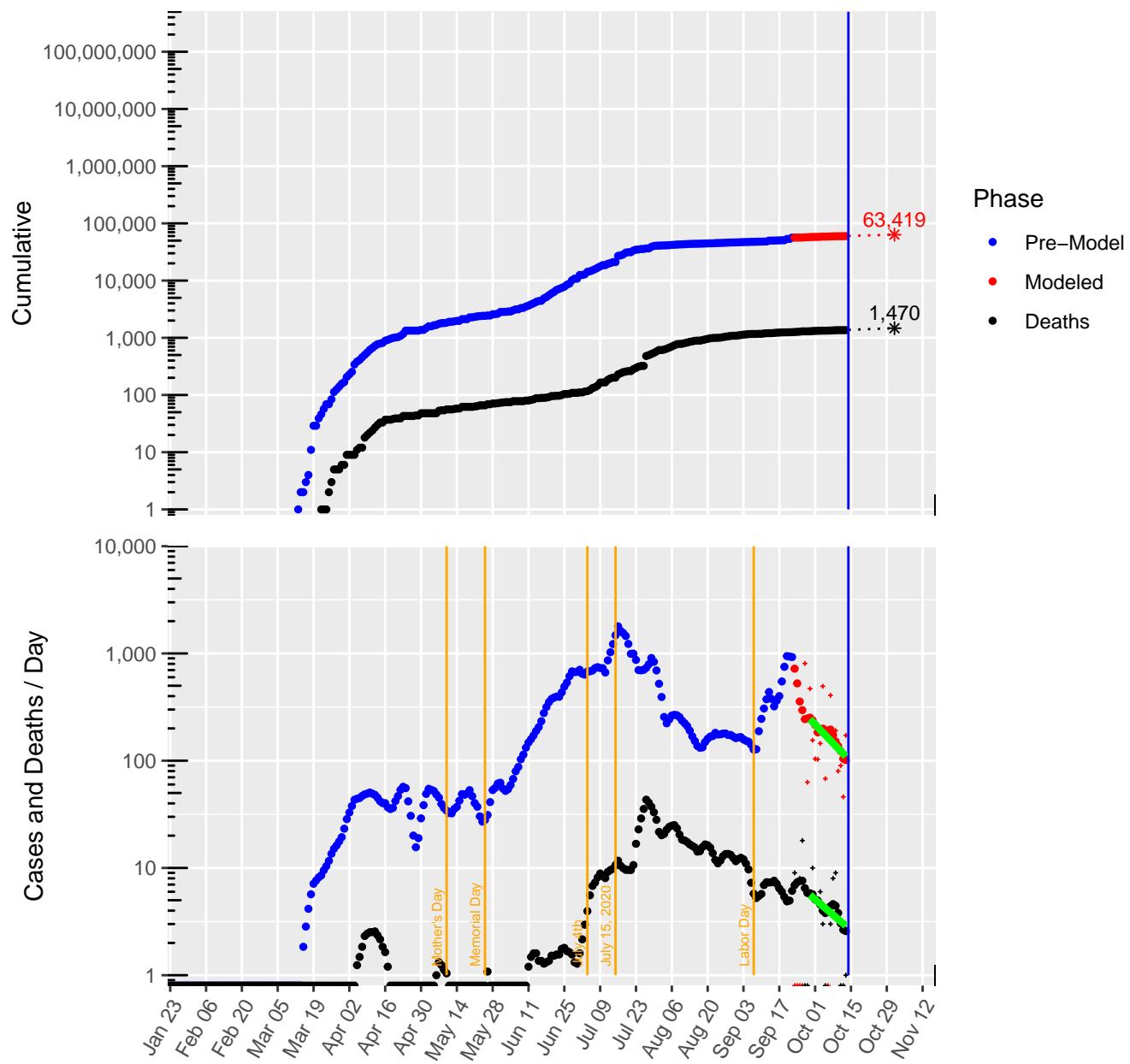
Tarrant County (Fort Worth) projection as of 2020-10-14



Collin County, Texas projection as of 2020-10-14

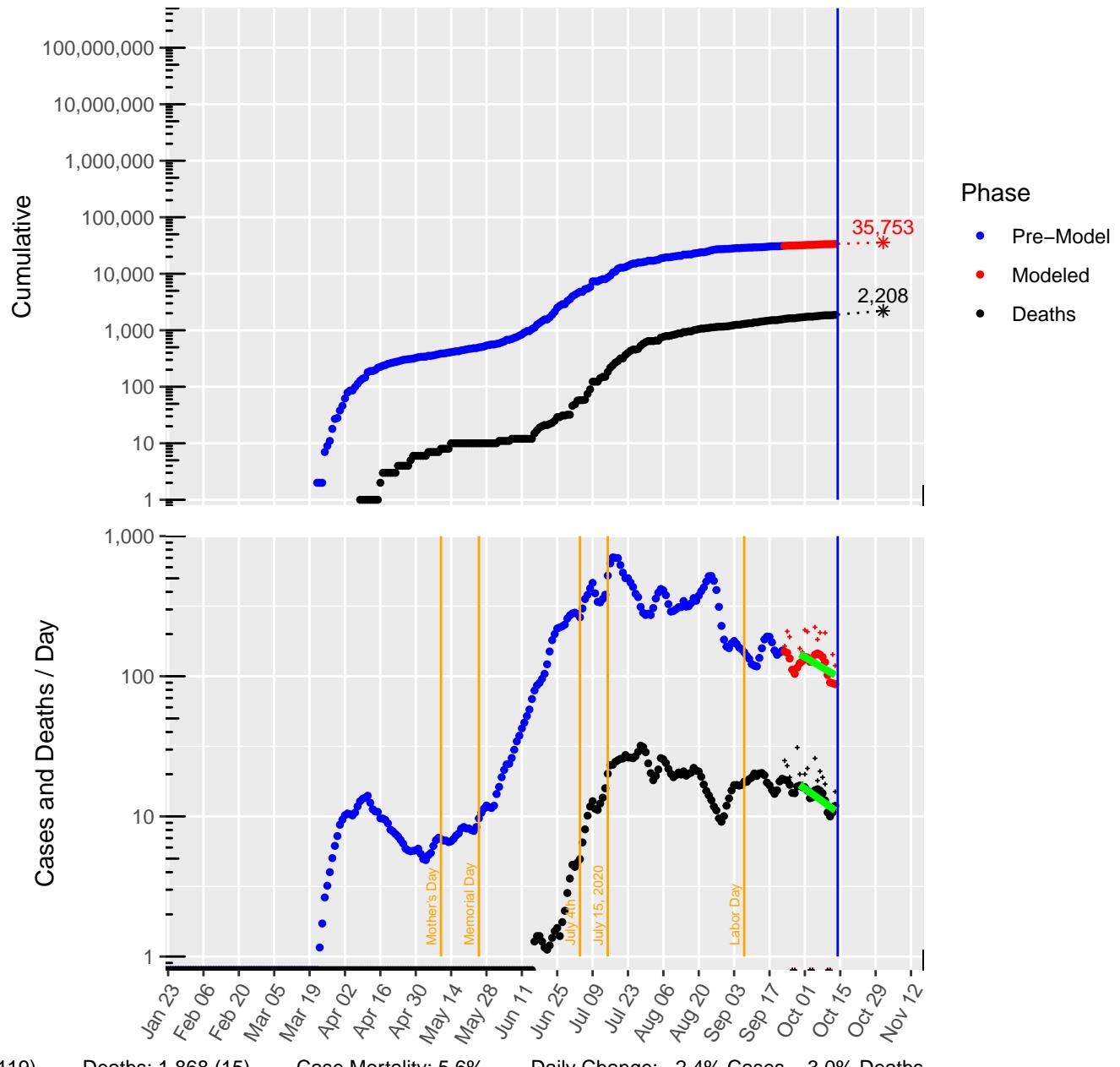


Bexar County (San Antonio) projection as of 2020-10-14

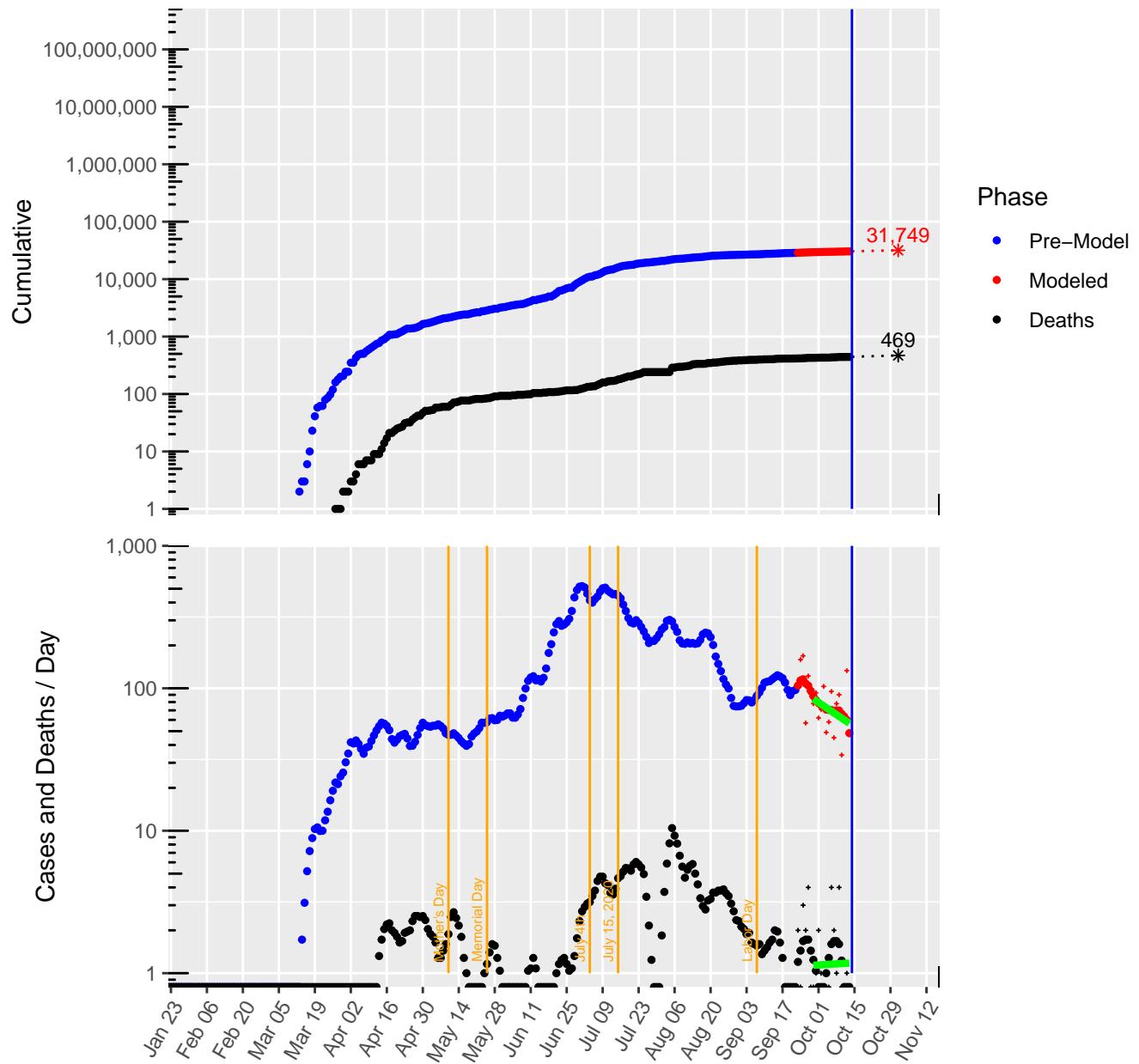


(172) -- Deaths: 1,361 (1) -- Case Mortality: 2.3% -- Daily Change: -5.4% Cases, -4.6% Deaths

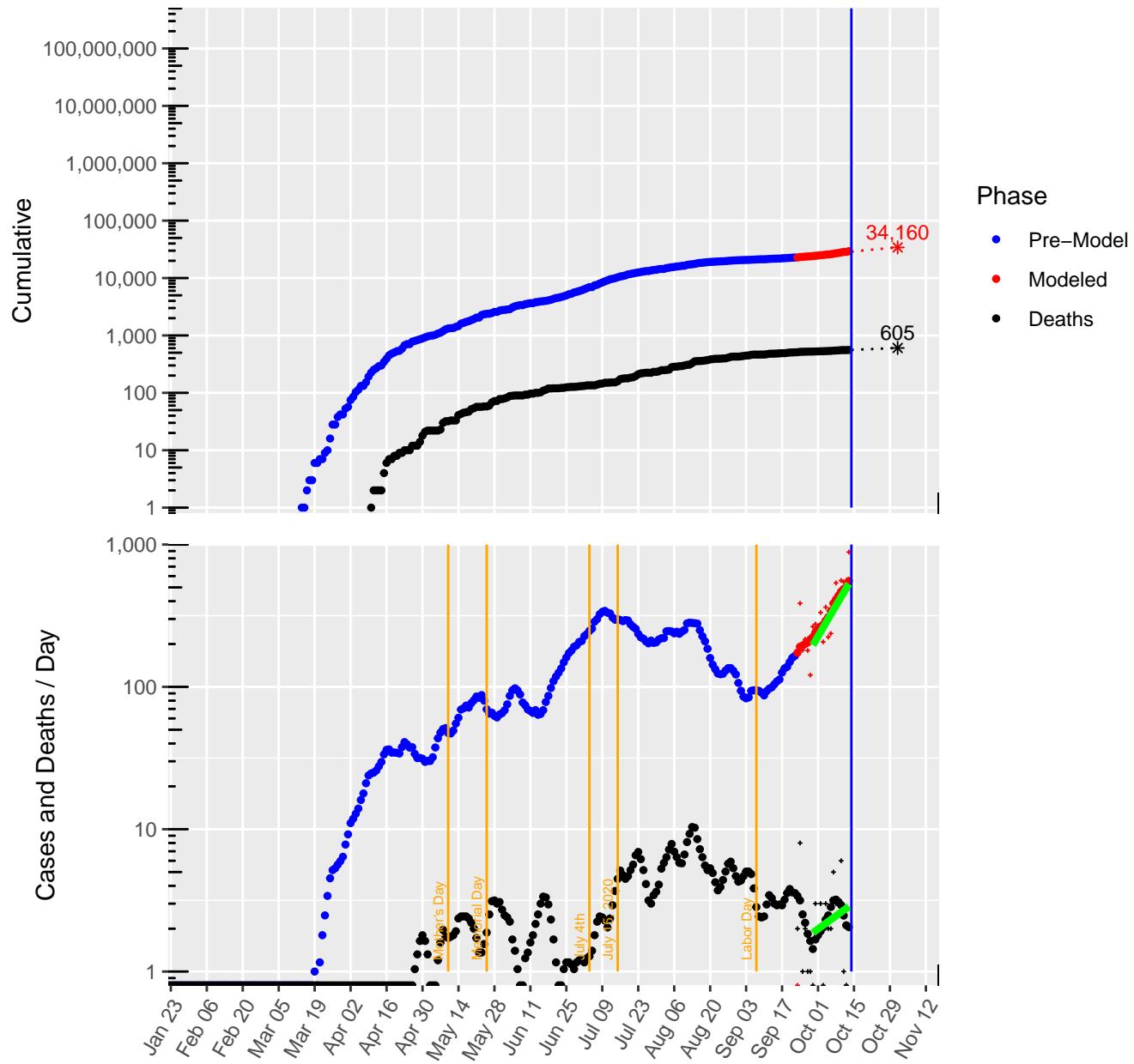
Hidalgo County, Texas projection as of 2020-10-14



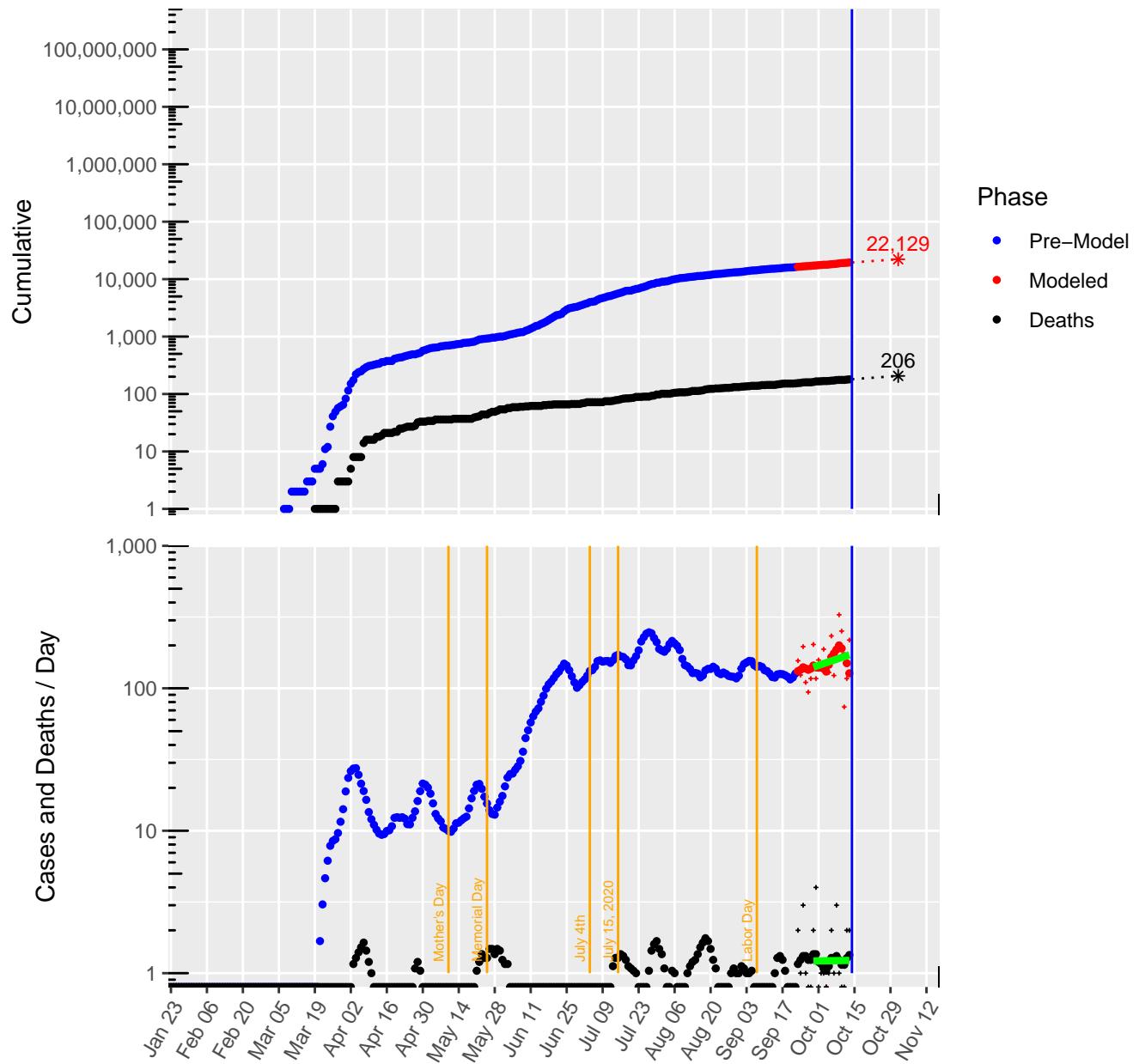
Travis County (Austin) projection as of 2020-10-14



El Paso County, Texas projection as of 2020-10-14

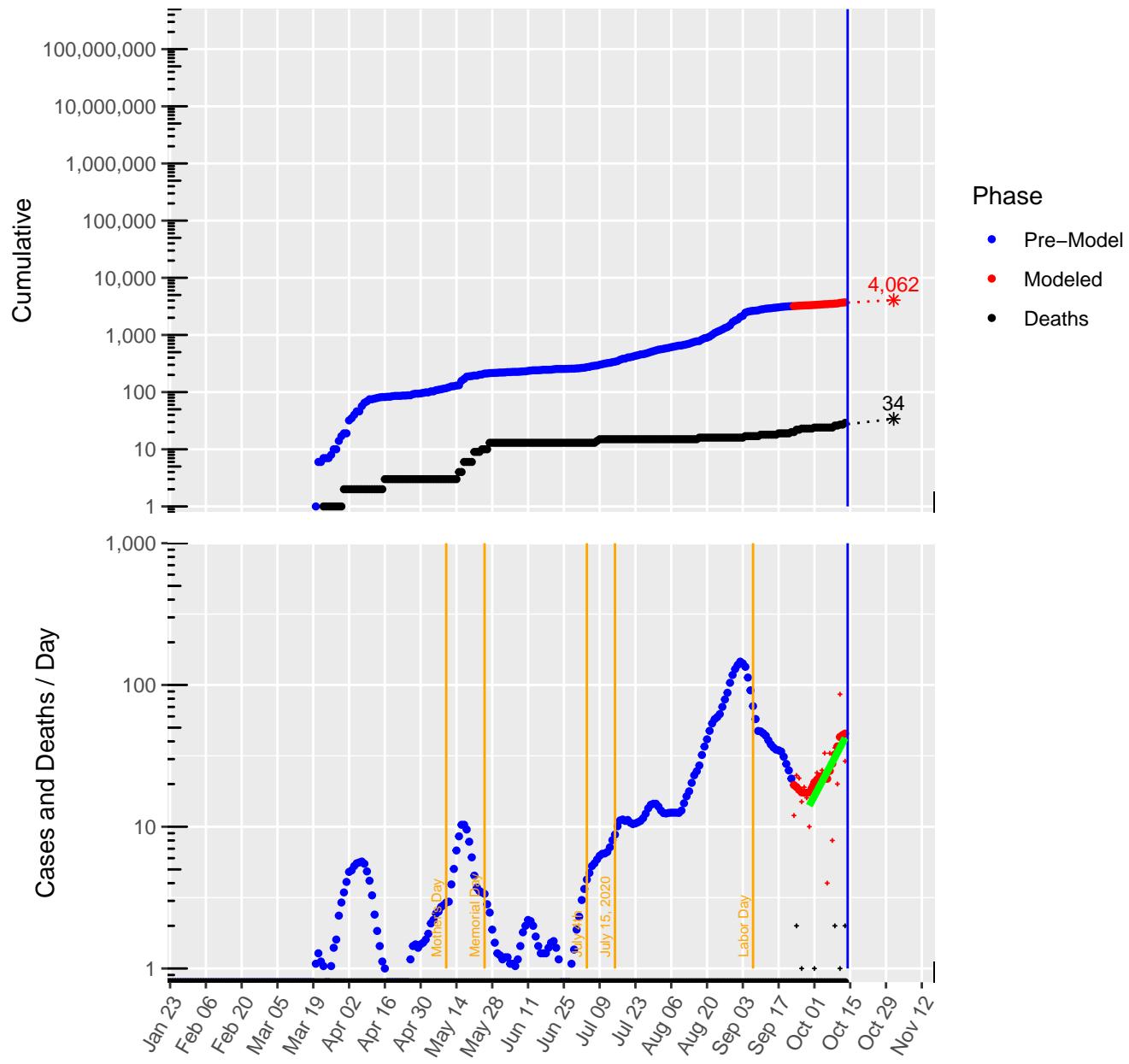


Tulsa County, Oklahoma projection as of 2020-10-14

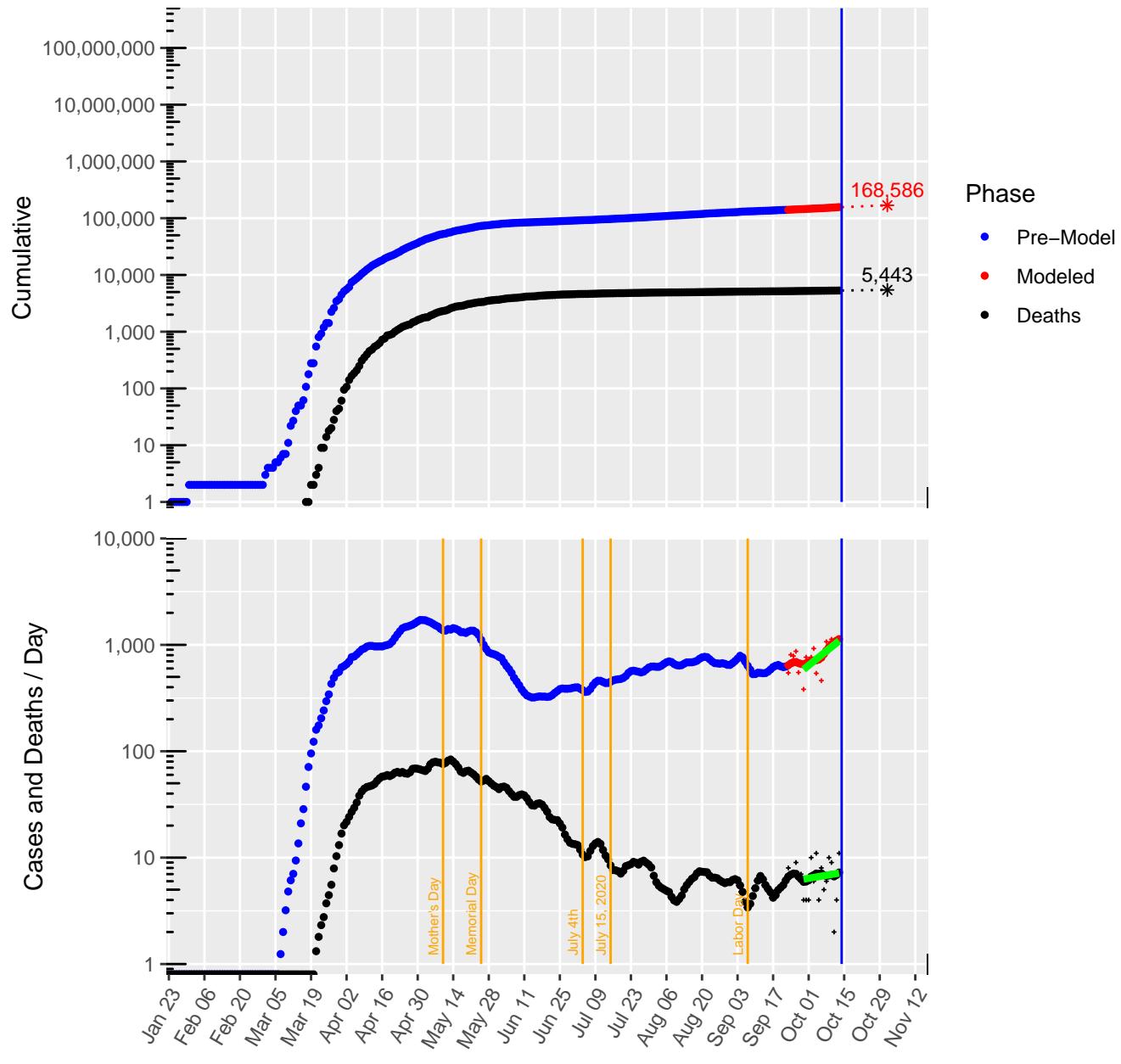


3 (218) --- Deaths: 180 (2) --- Case Mortality: 0.9% --- Daily Change: +1.4% Cases, +0.1% Deaths

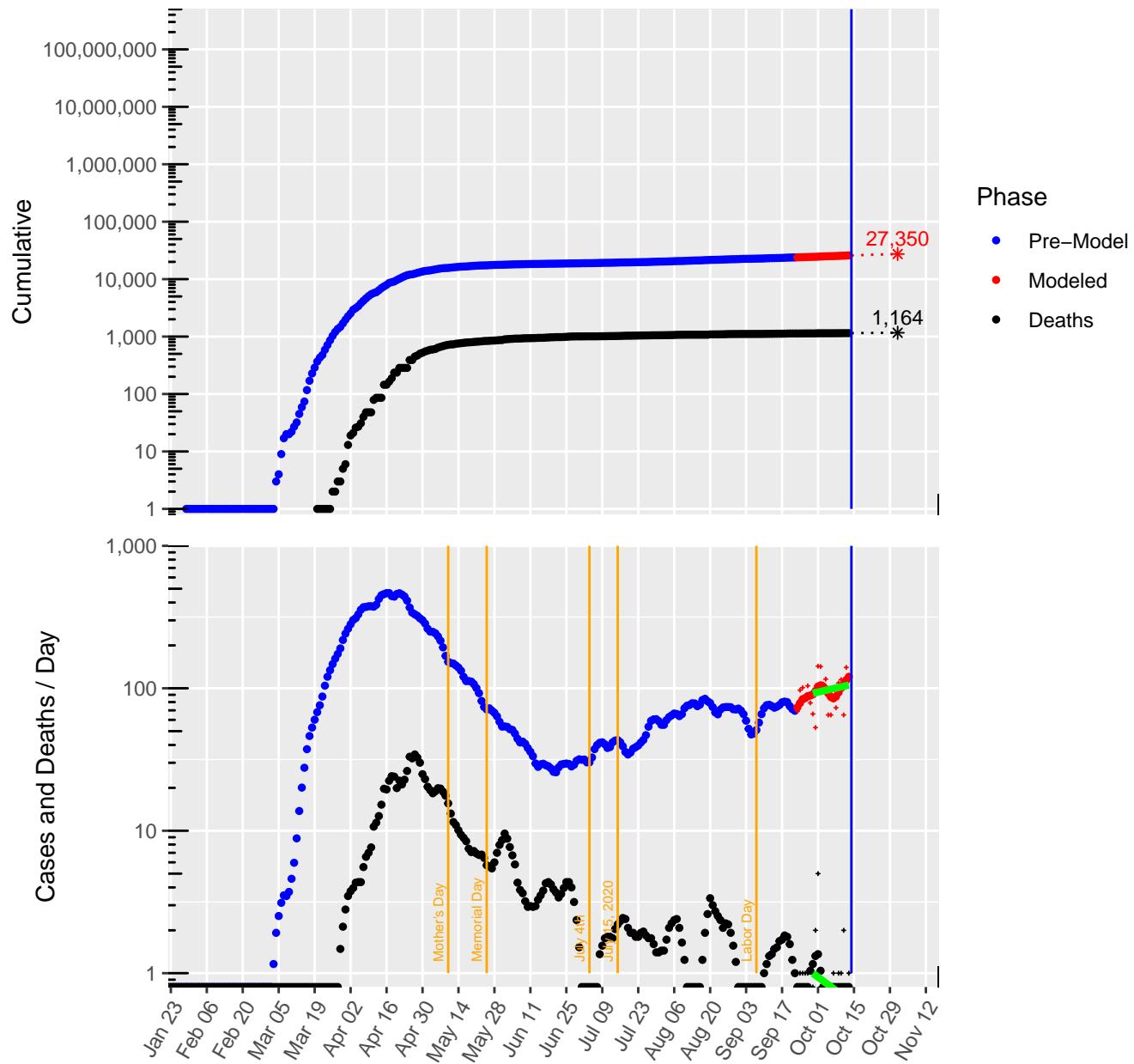
McLean County, Illinois projection as of 2020-10-14



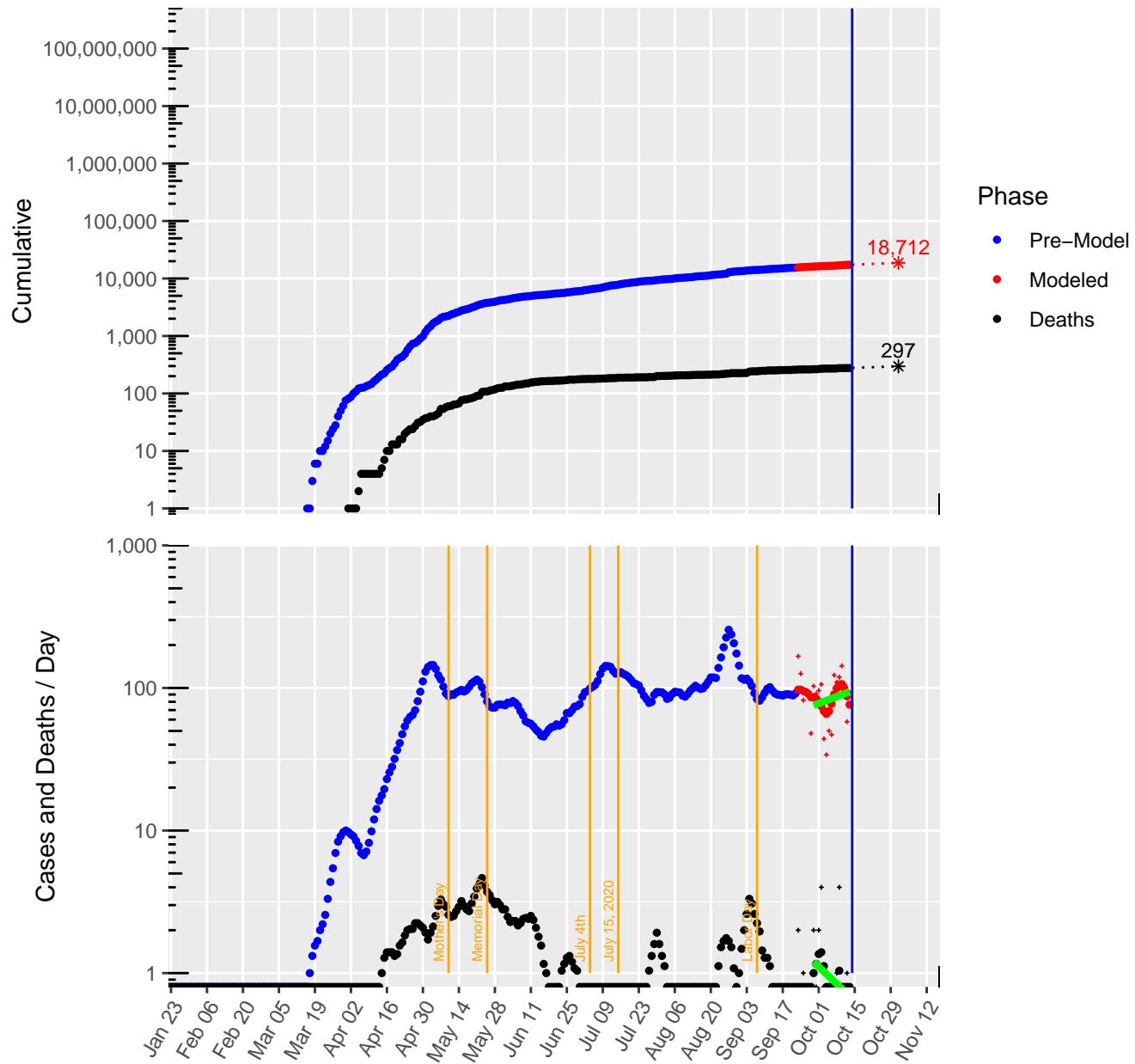
Cook County, Illinois projection as of 2020-10-14



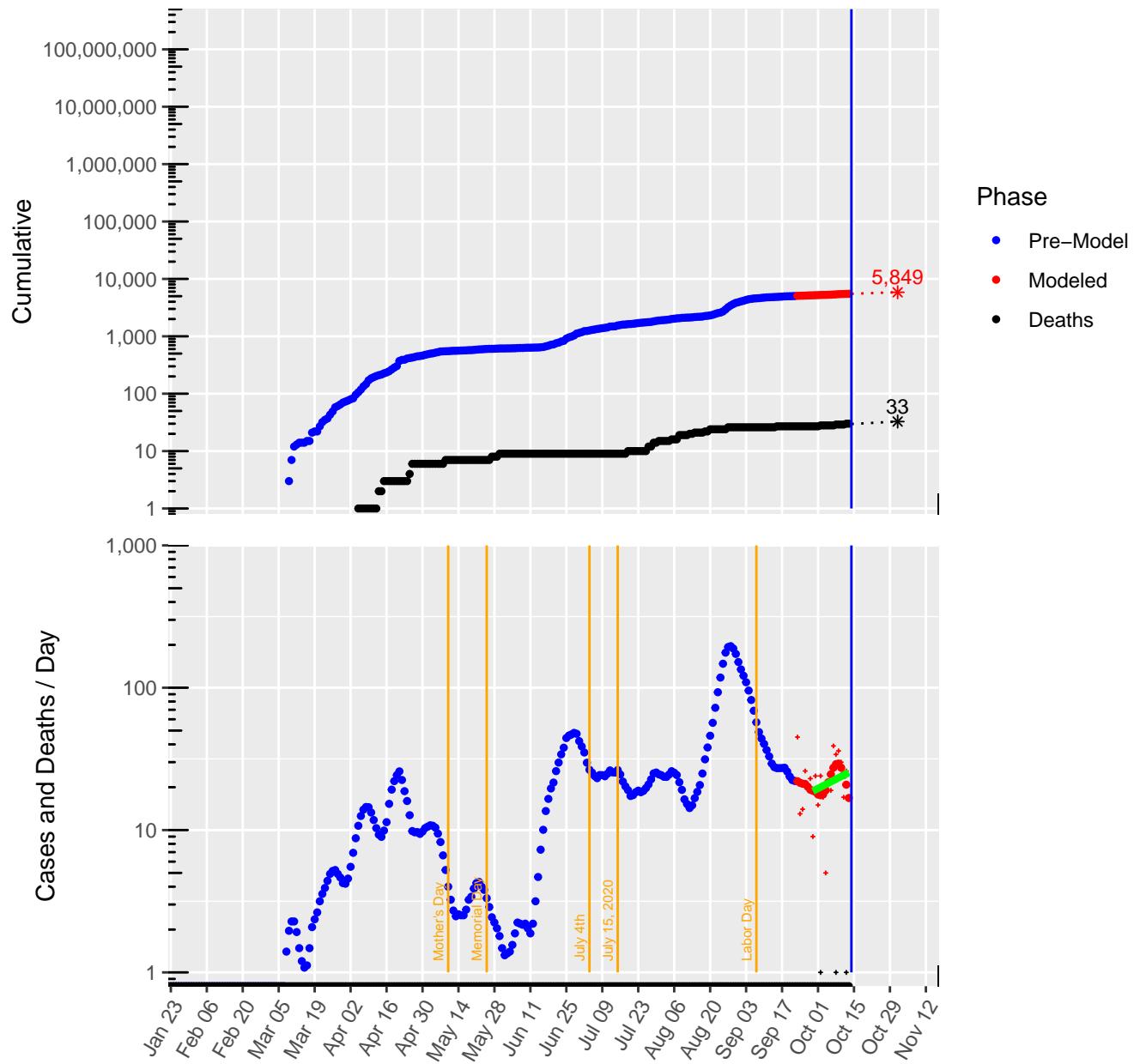
Suffolk County (Boston) projection as of 2020-10-14



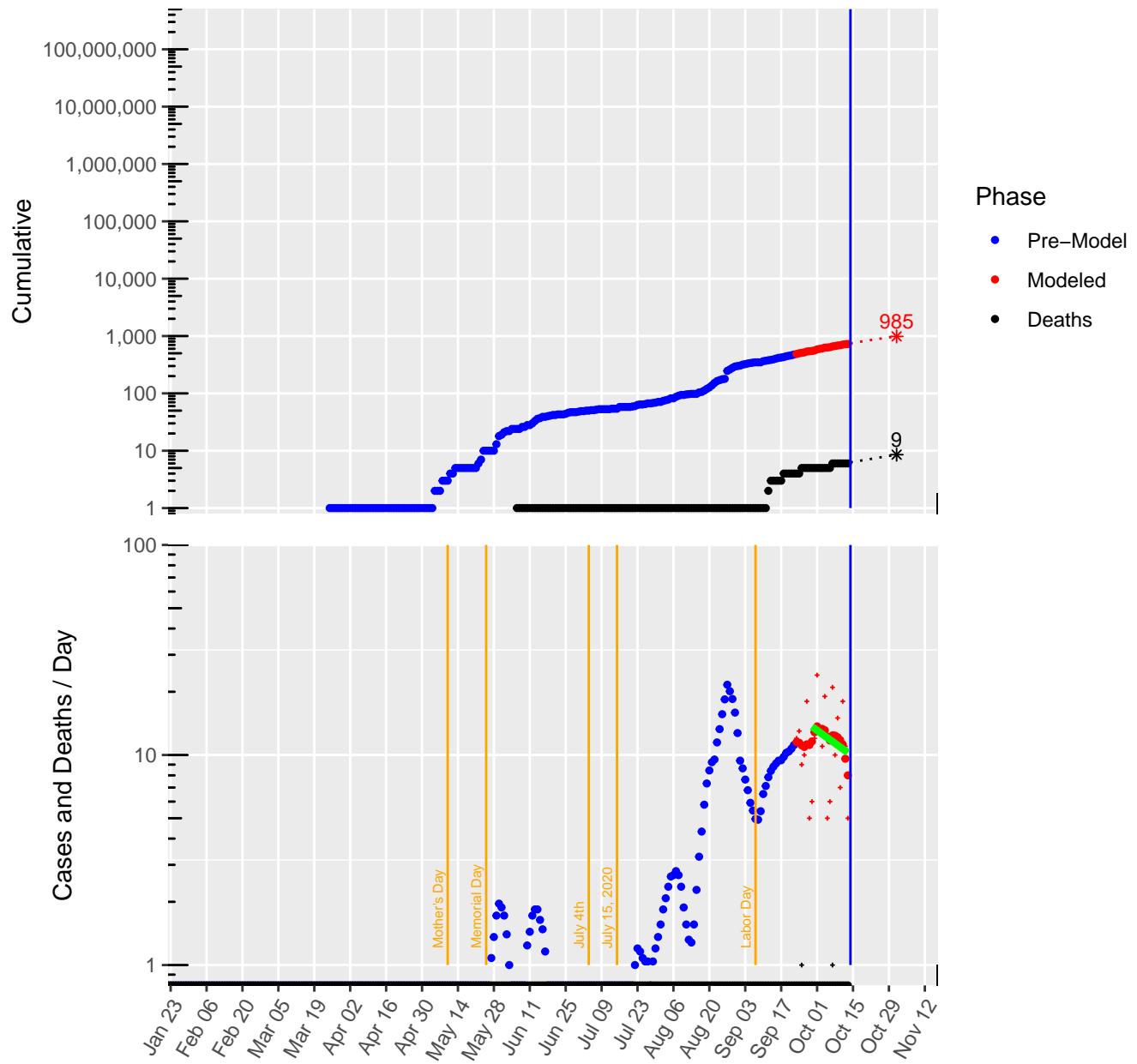
Polk County, Iowa projection as of 2020-10-14



Johnson County, Iowa projection as of 2020-10-14

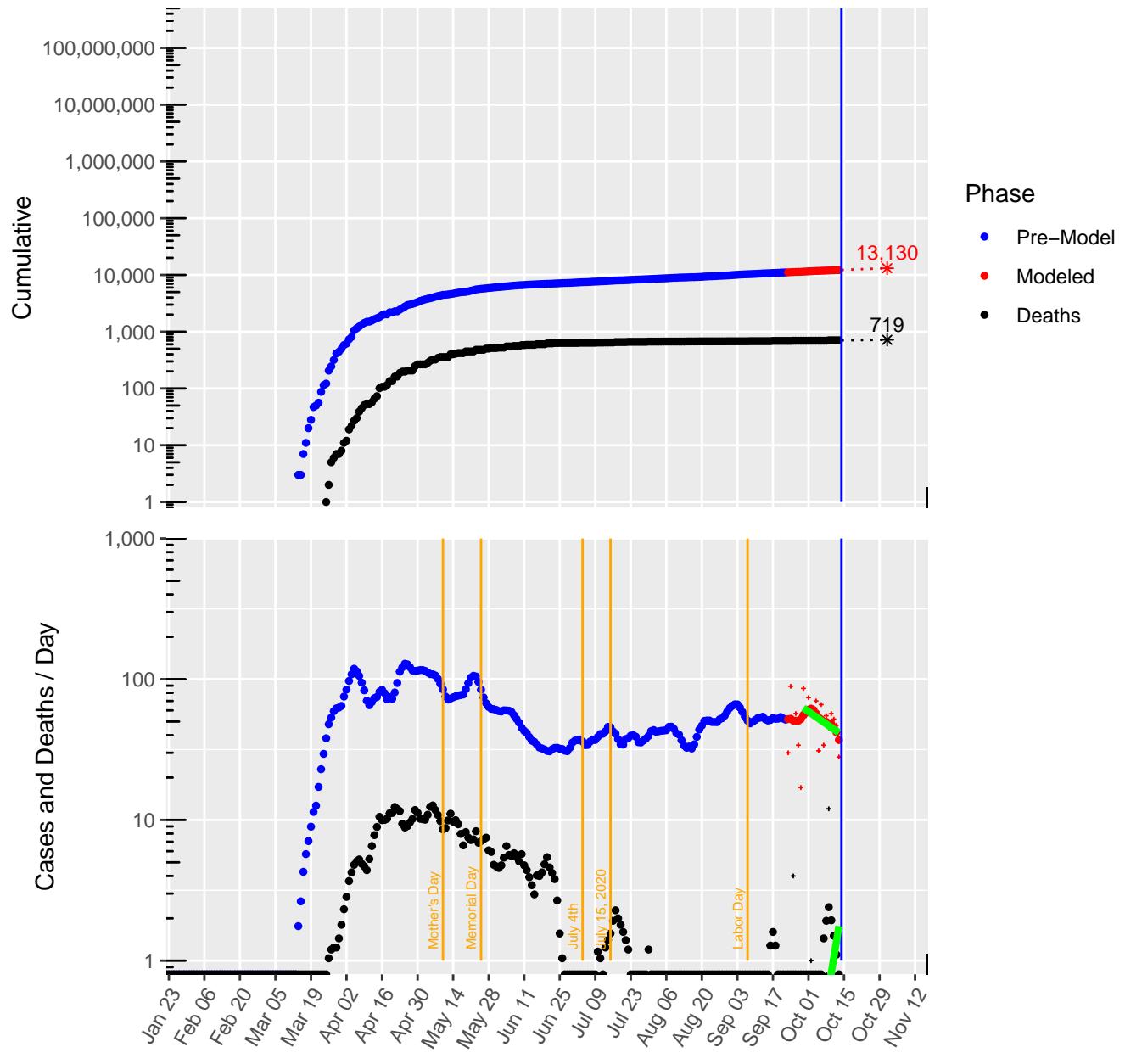


Meade County, South Dakota (Sturgis) projection as of 2020-10-14

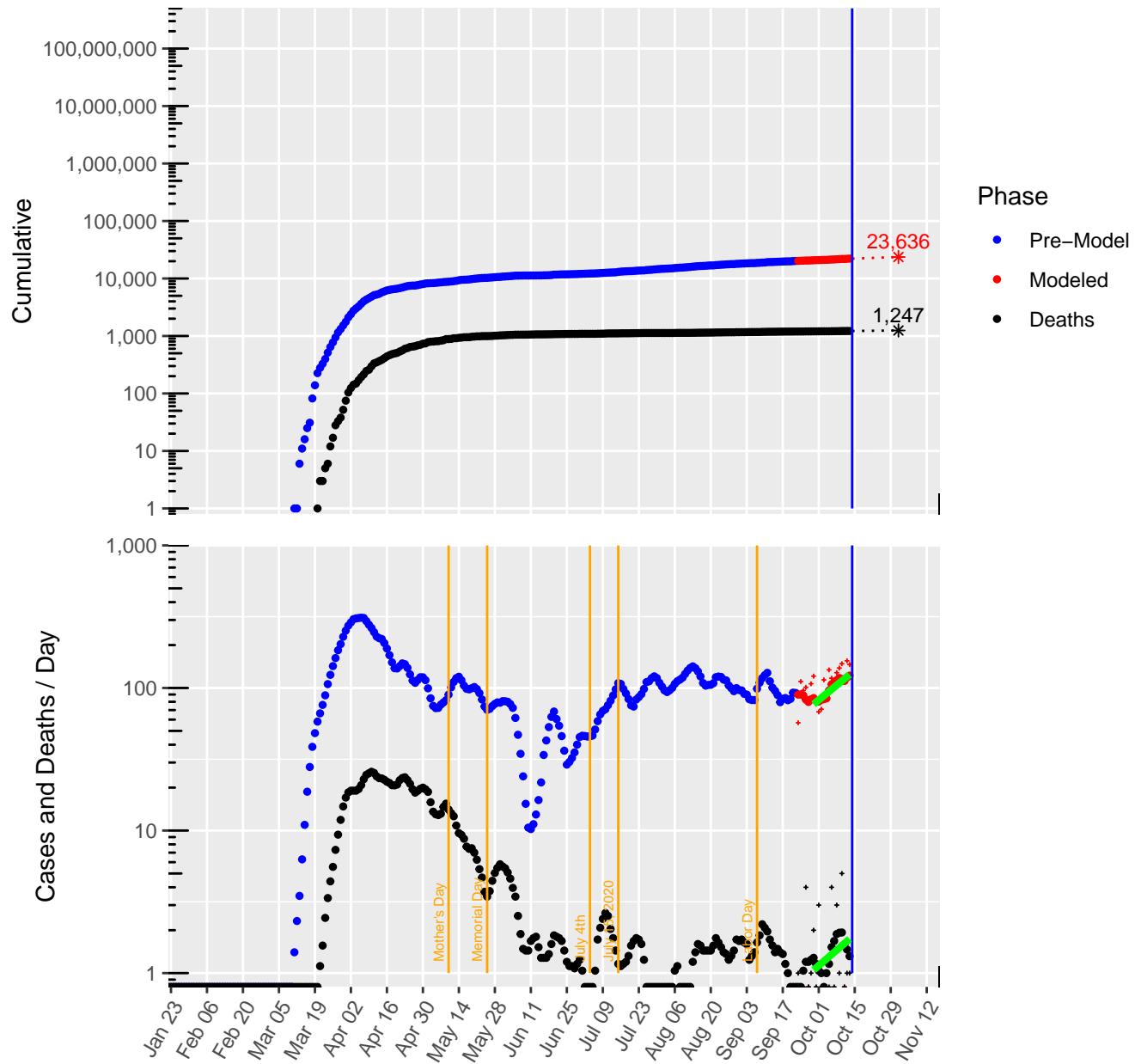


Cases: 725 (5) — Deaths: 6 (0) — Case Mortality: 0.8% — Daily Change: -2.0% Cases, +5.5% Deaths

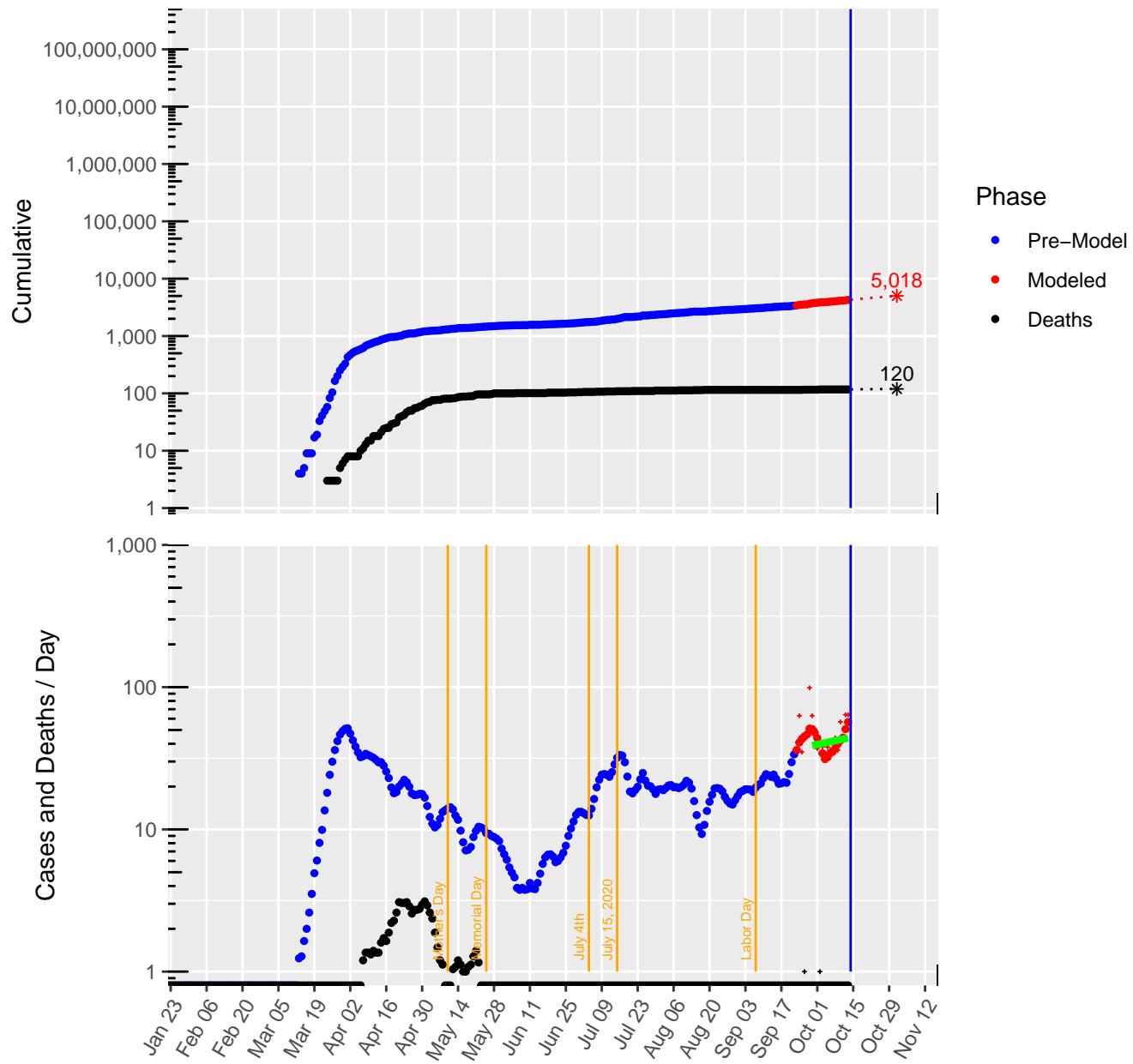
Erie County, New York projection as of 2020-10-14



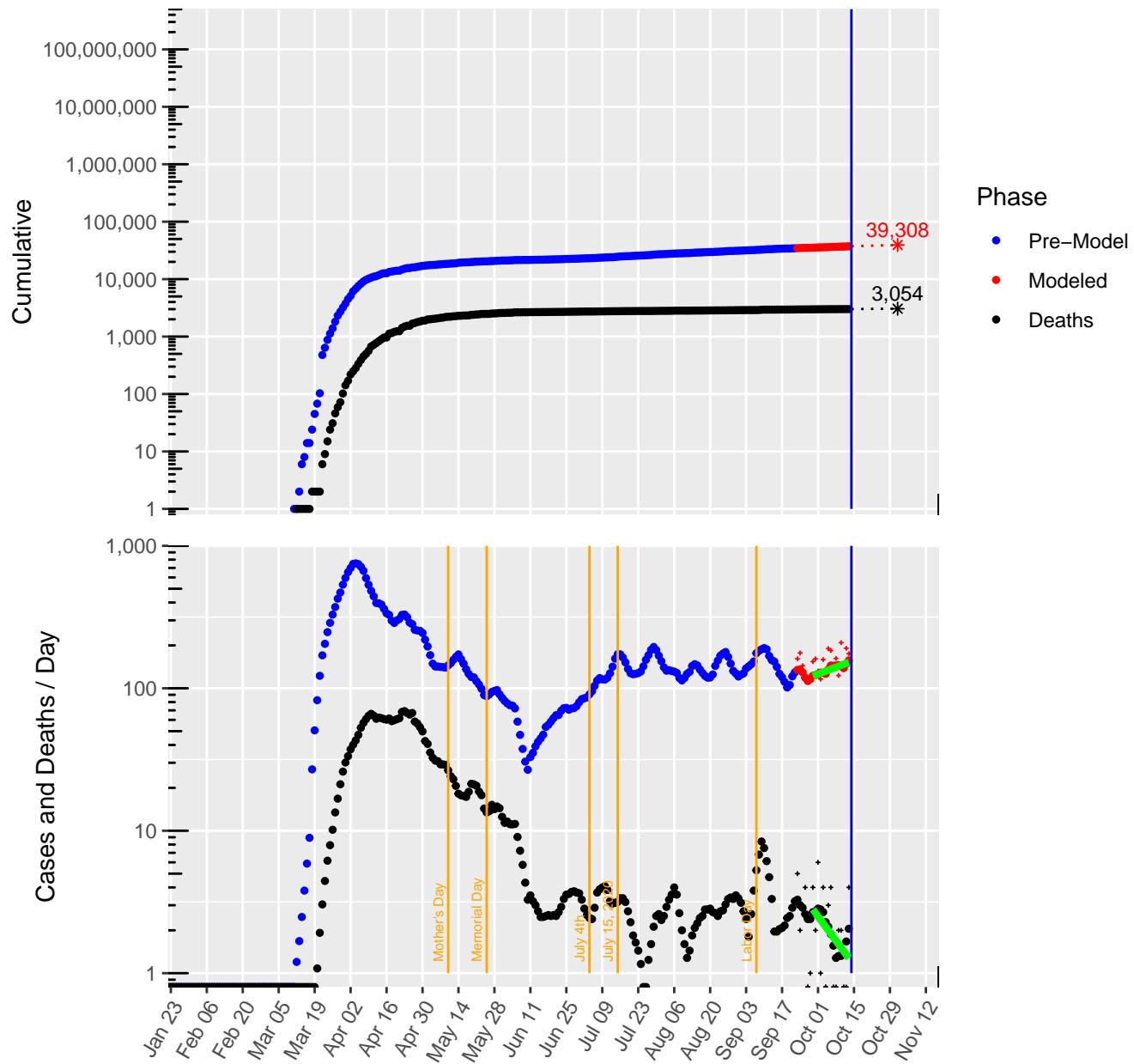
Oakland County, Michigan projection as of 2020-10-14



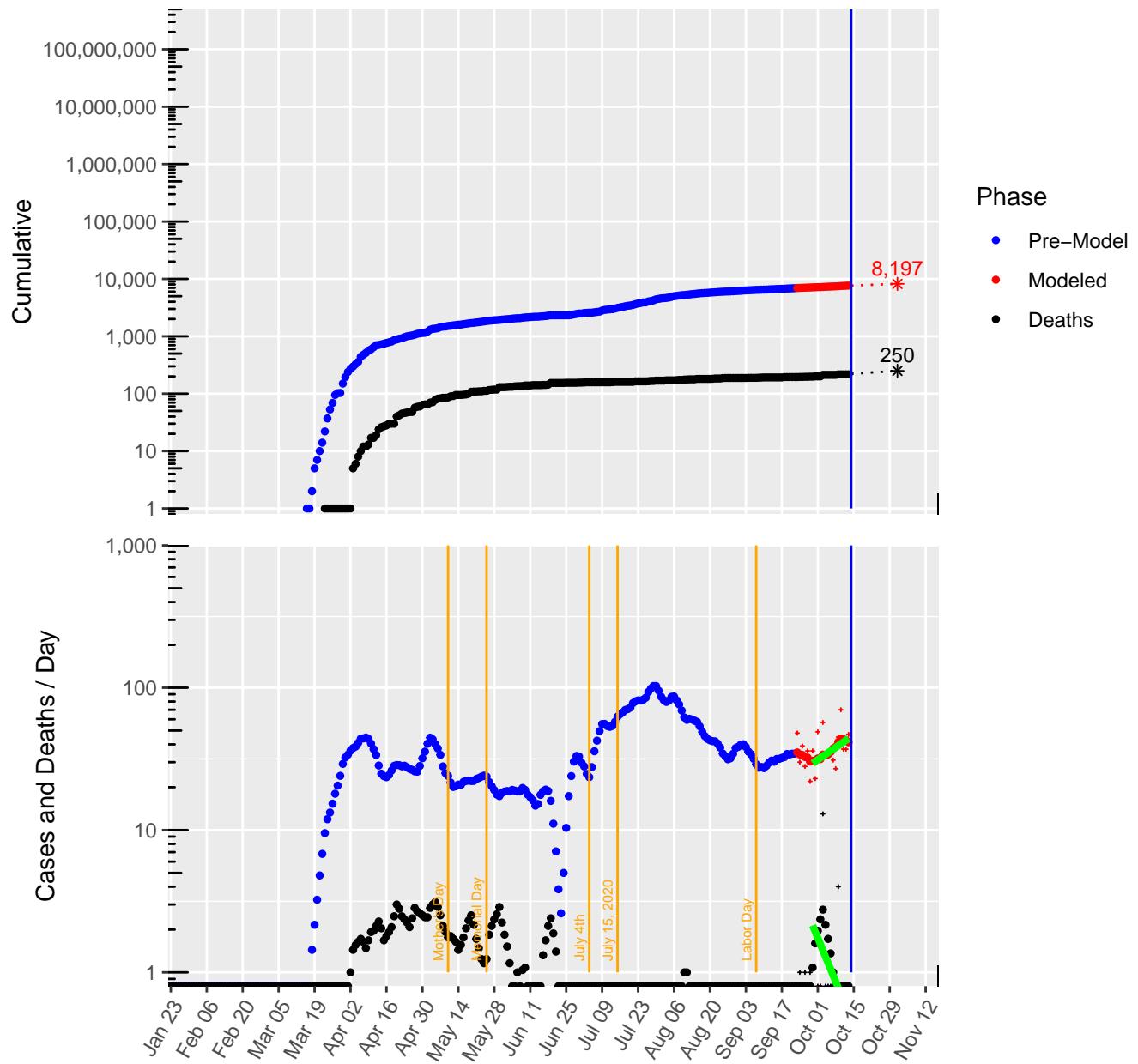
Washtenaw County, Michigan (Ann Arbor) projection as of 2020-10-14



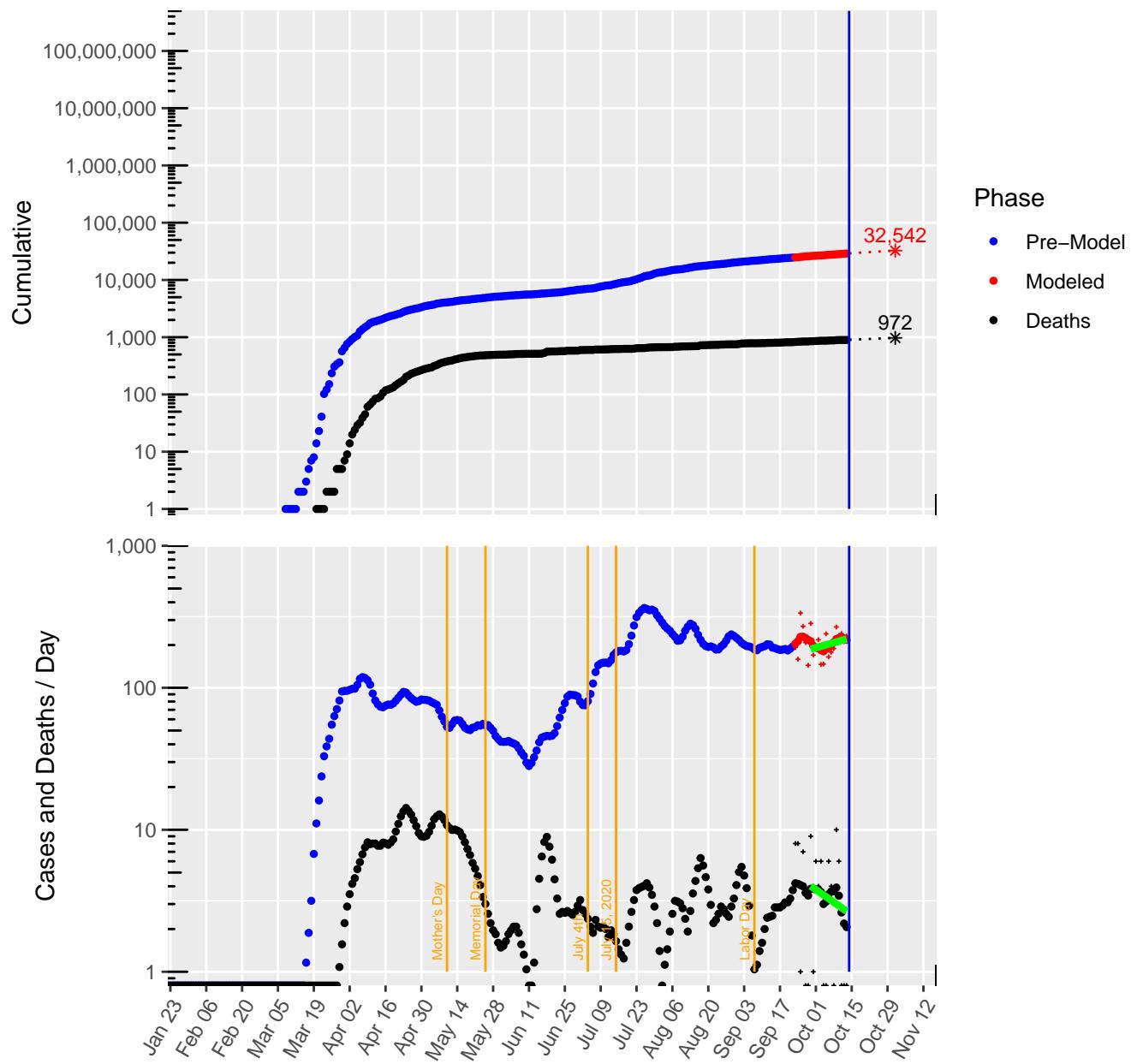
Wayne County (Detroit) projection as of 2020-10-14



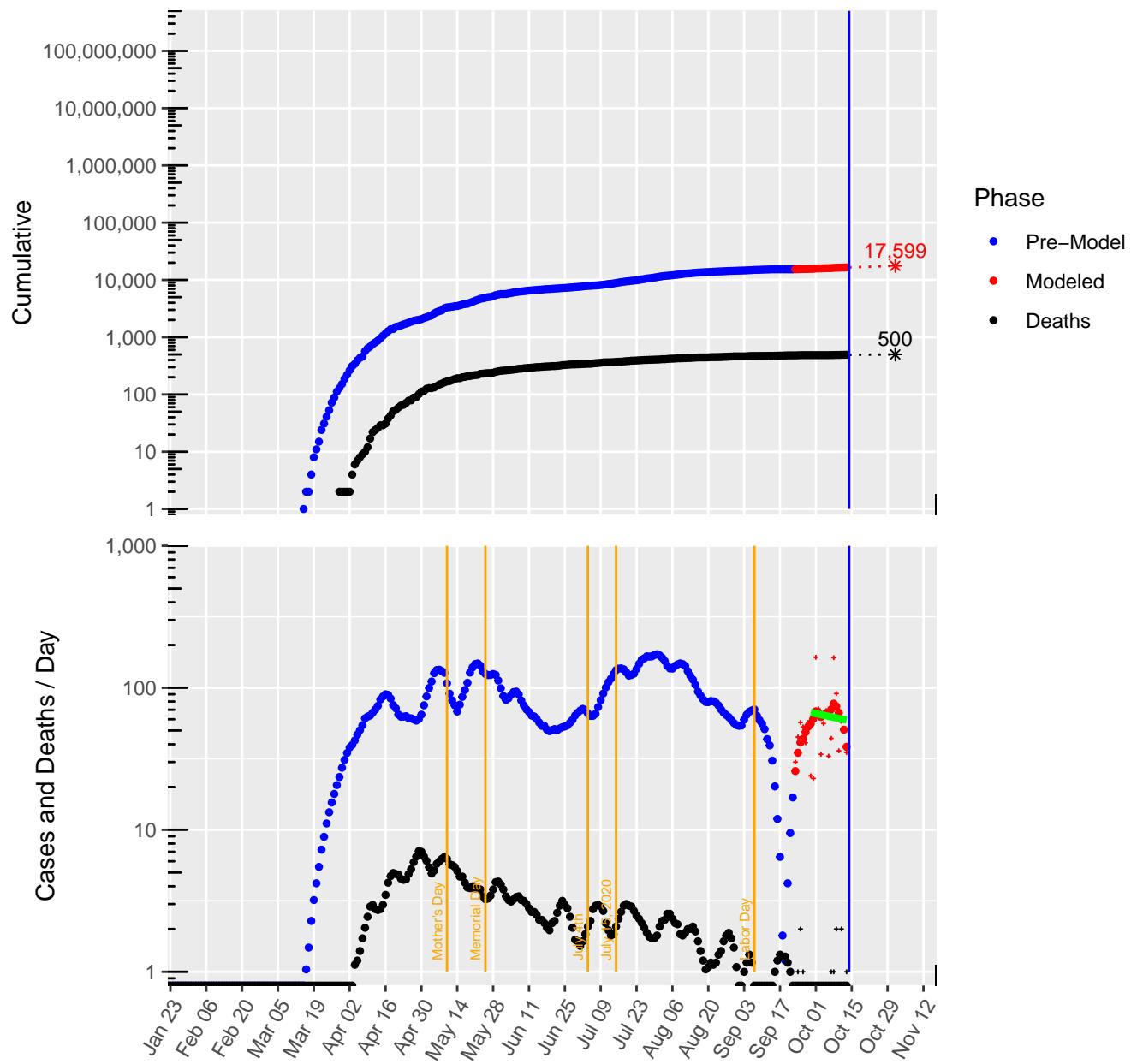
St. Louis (City) projection as of 2020-10-14



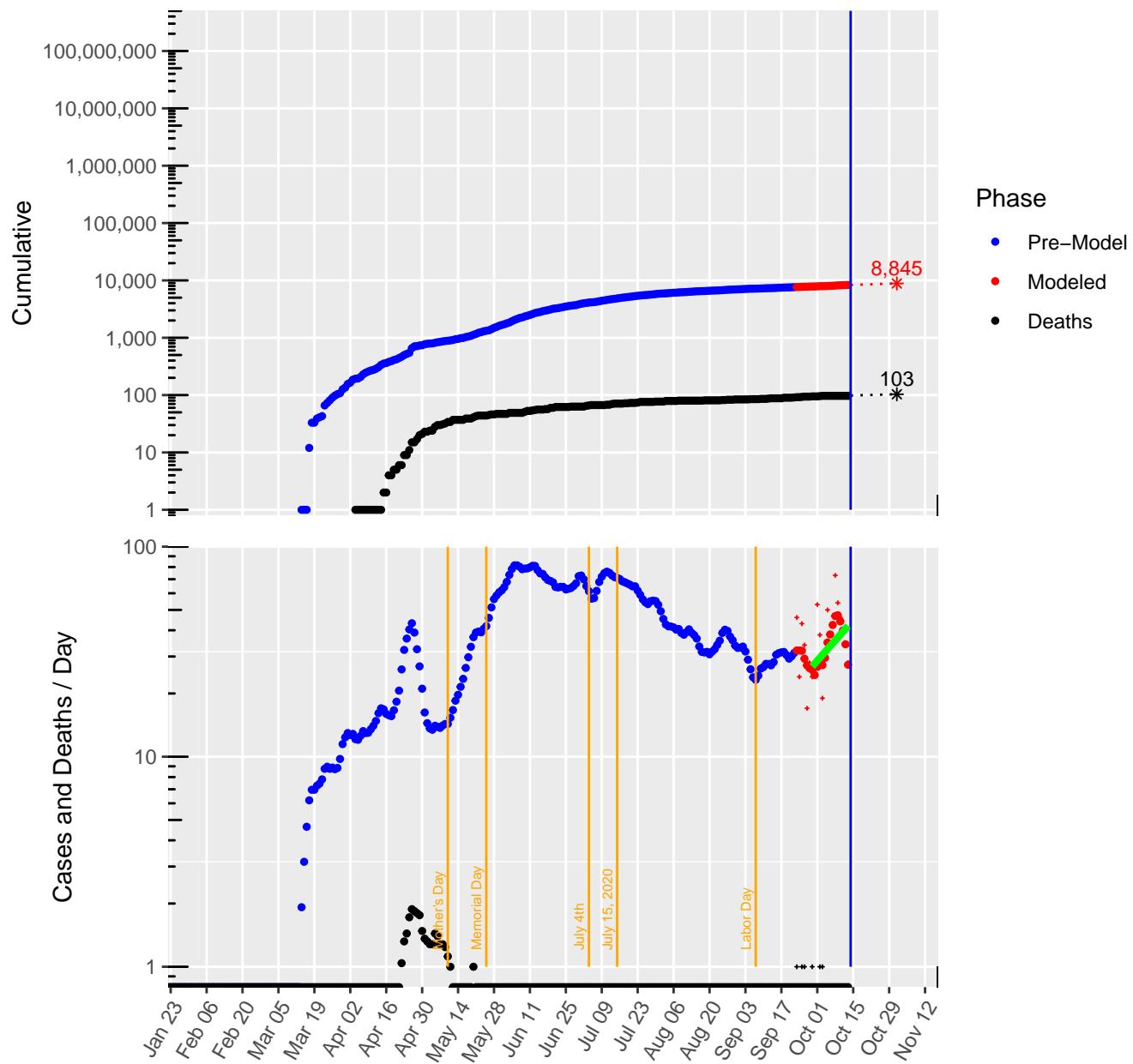
St. Louis (County) projection as of 2020-10-14



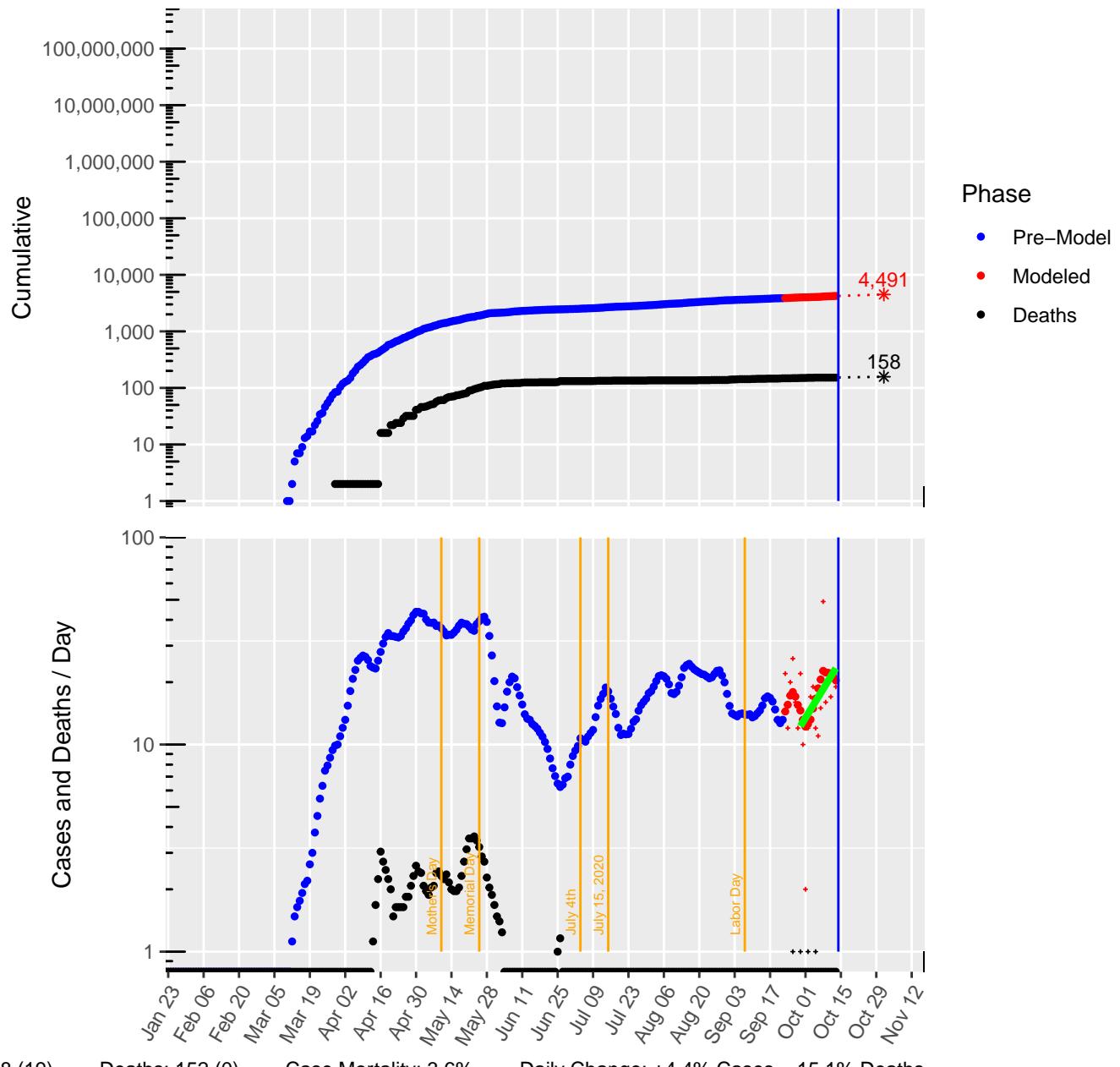
Baltimore (City) projection as of 2020-10-14



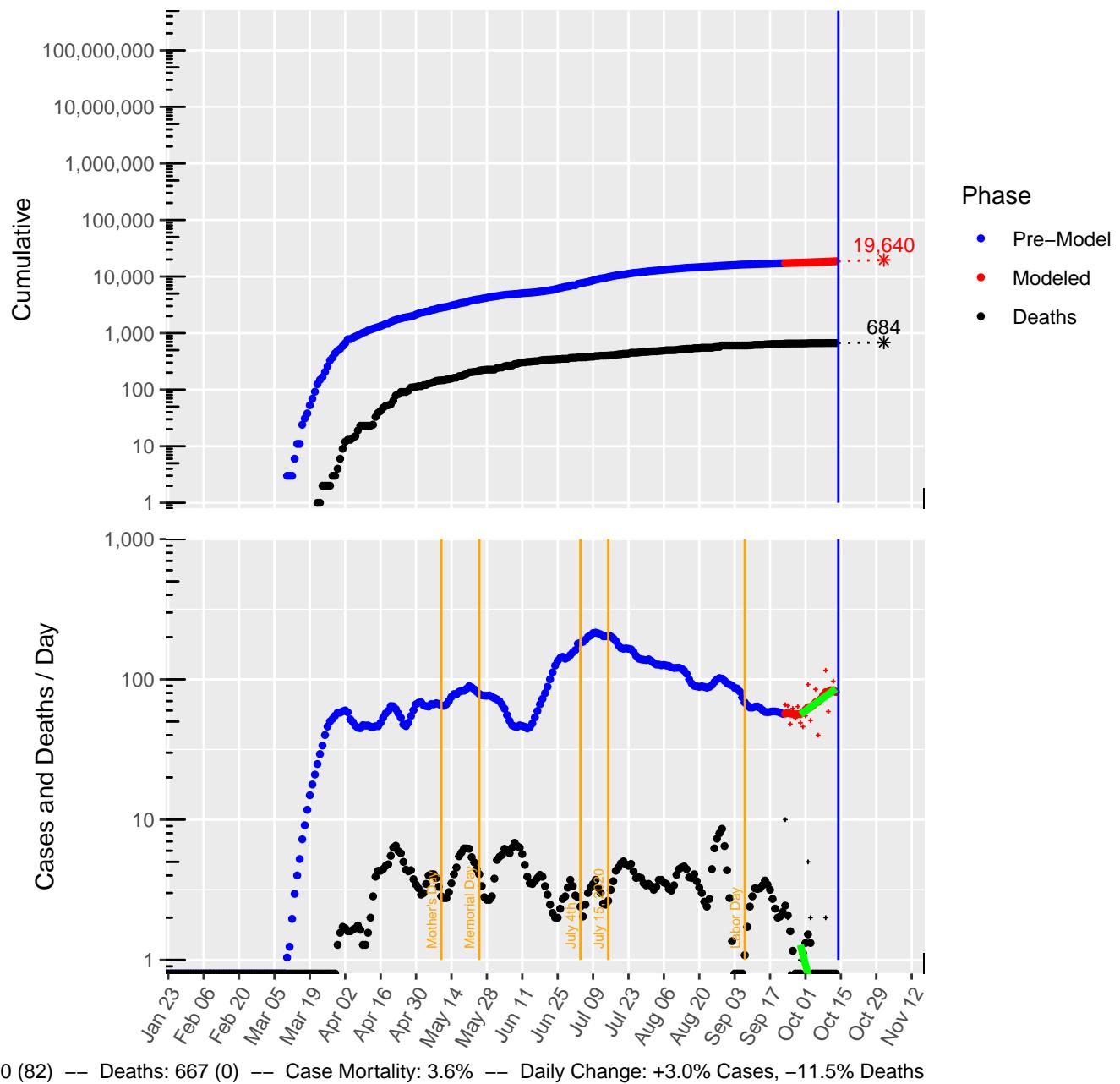
Durham County, North Carolina projection as of 2020-10-14



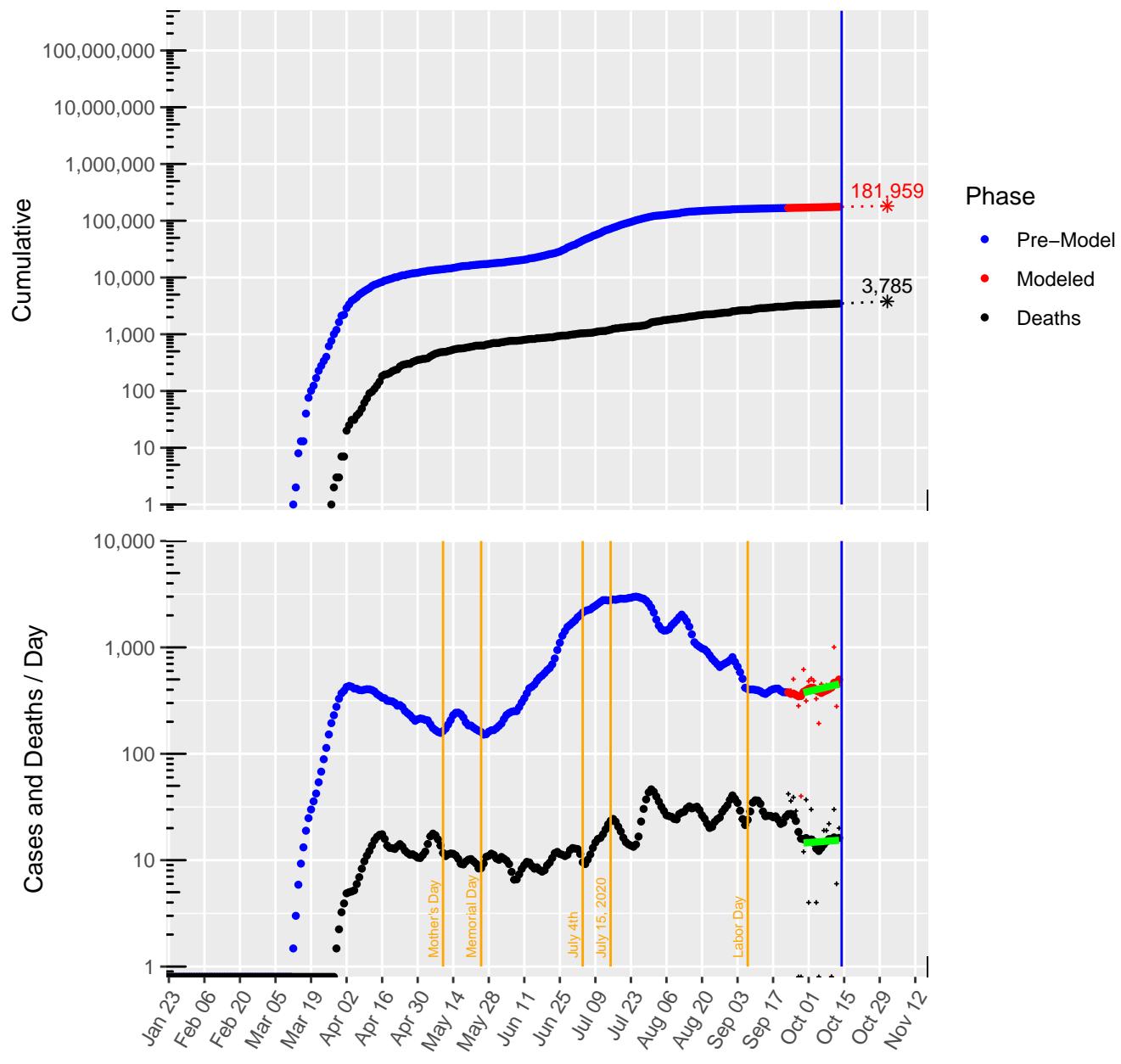
Arlington County, Virginia projection as of 2020-10-14



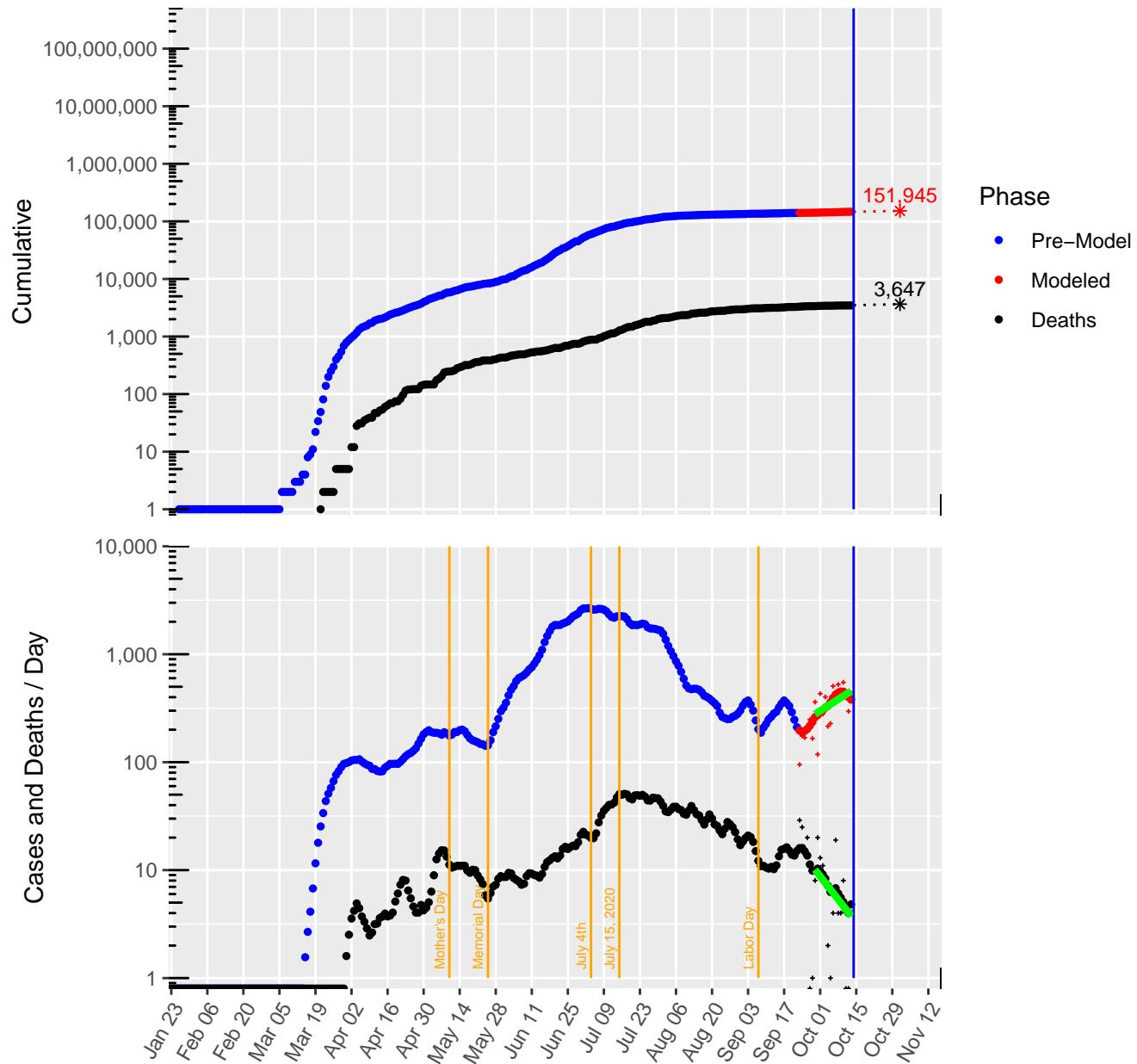
Cuyahoga County (Cleveland) projection as of 2020-10-14



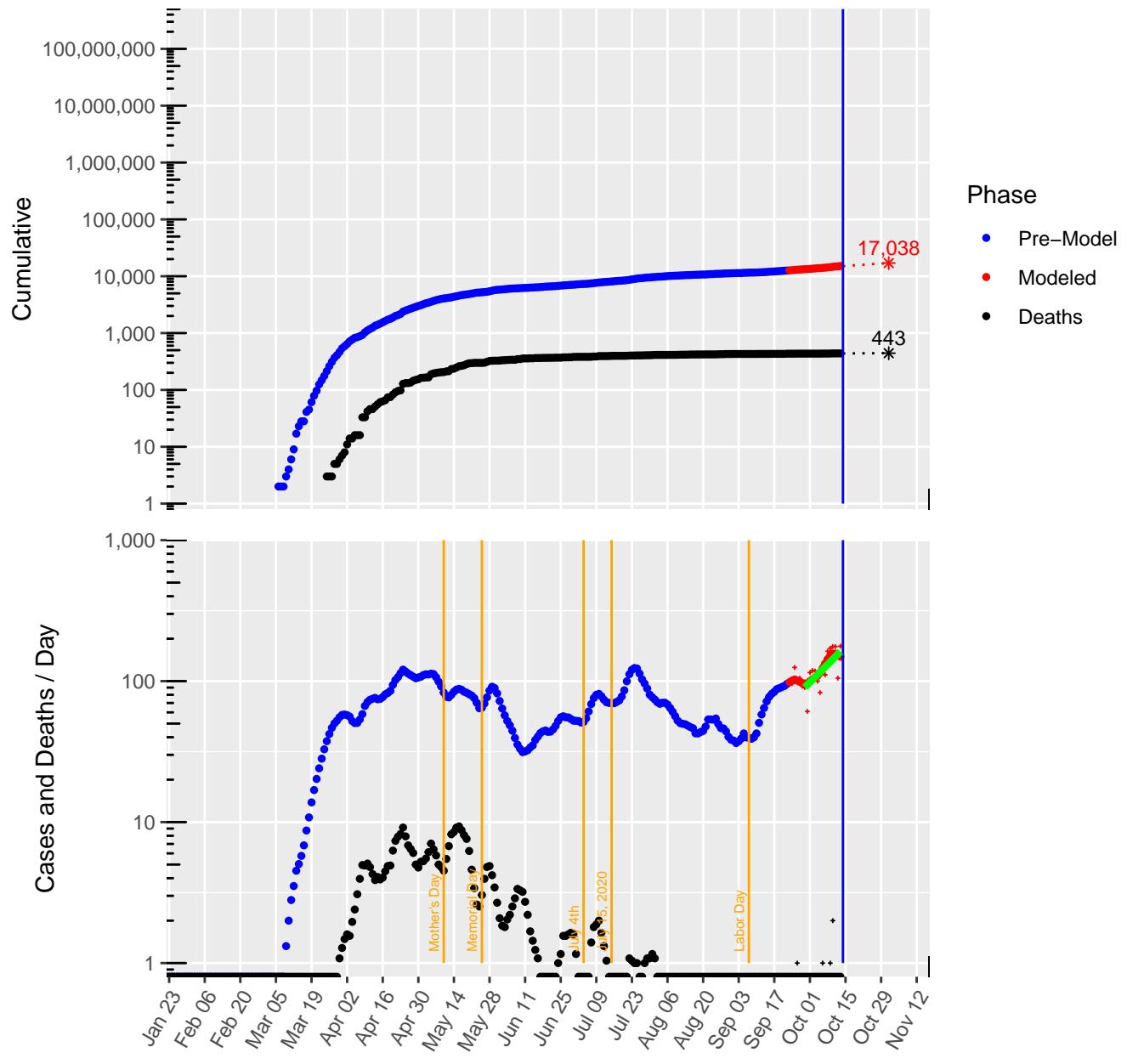
Miami-Dade projection as of 2020-10-14



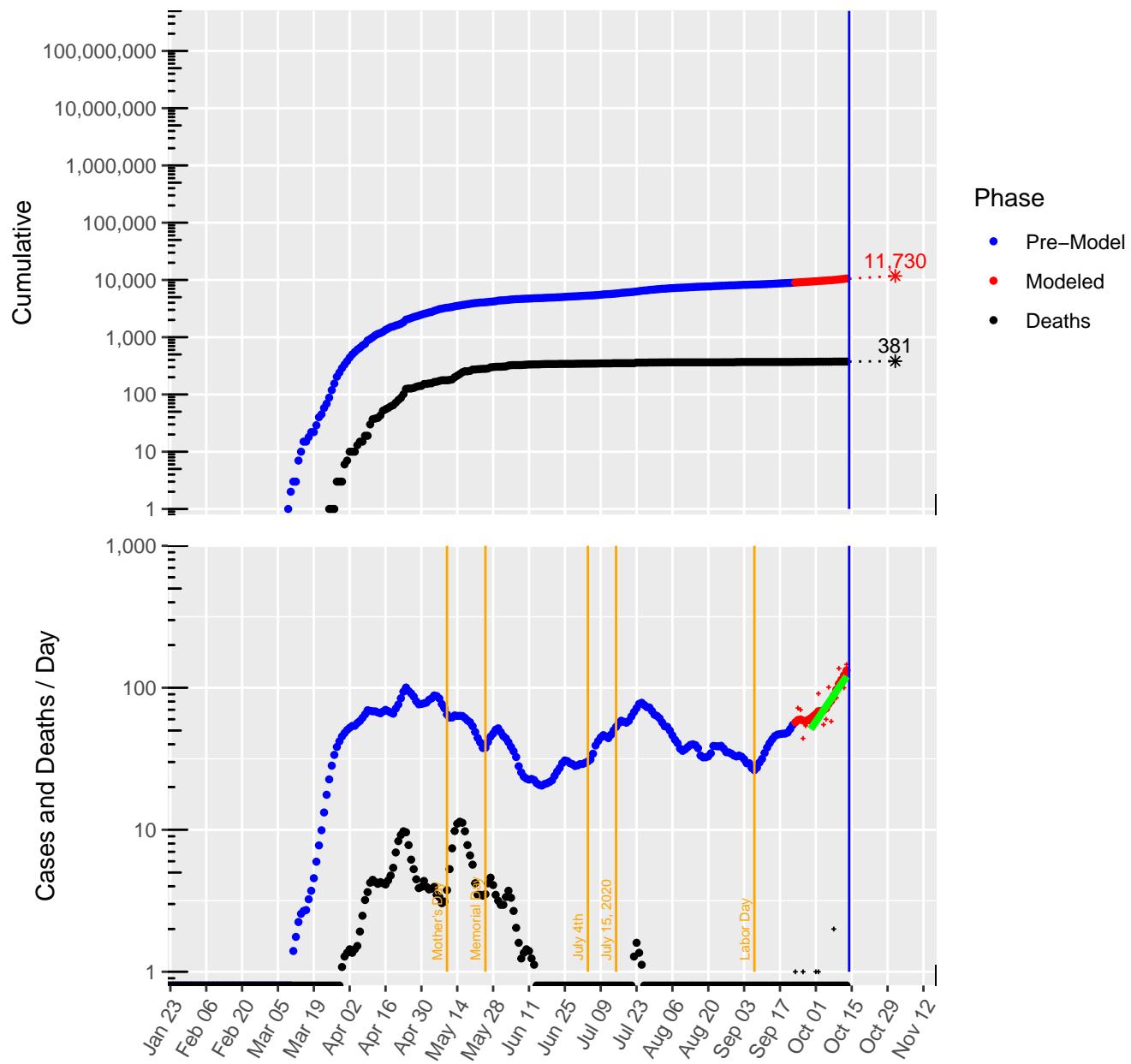
Maricopa County, Arizona projection as of 2020-10-14



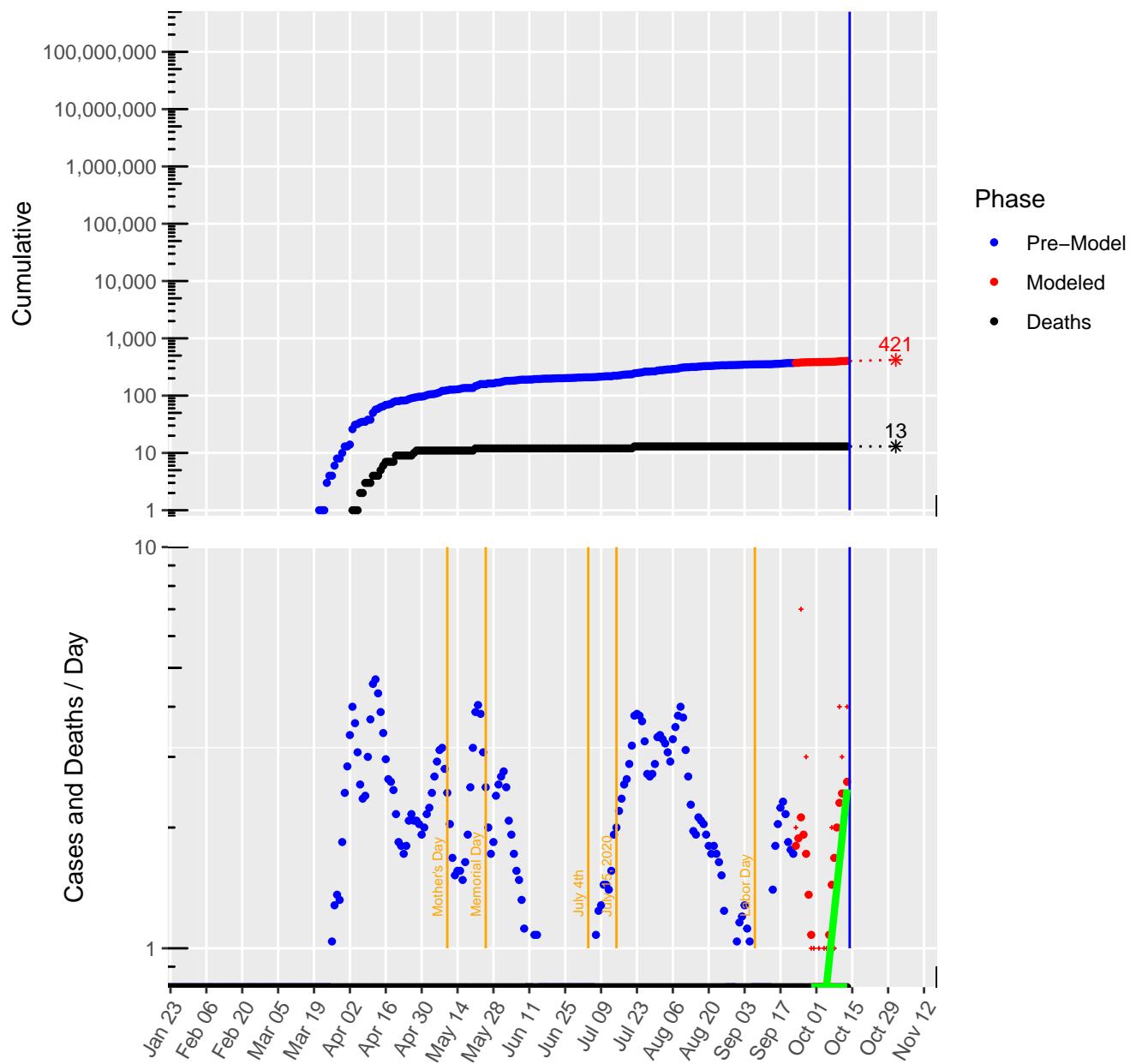
Denver County projection as of 2020-10-14



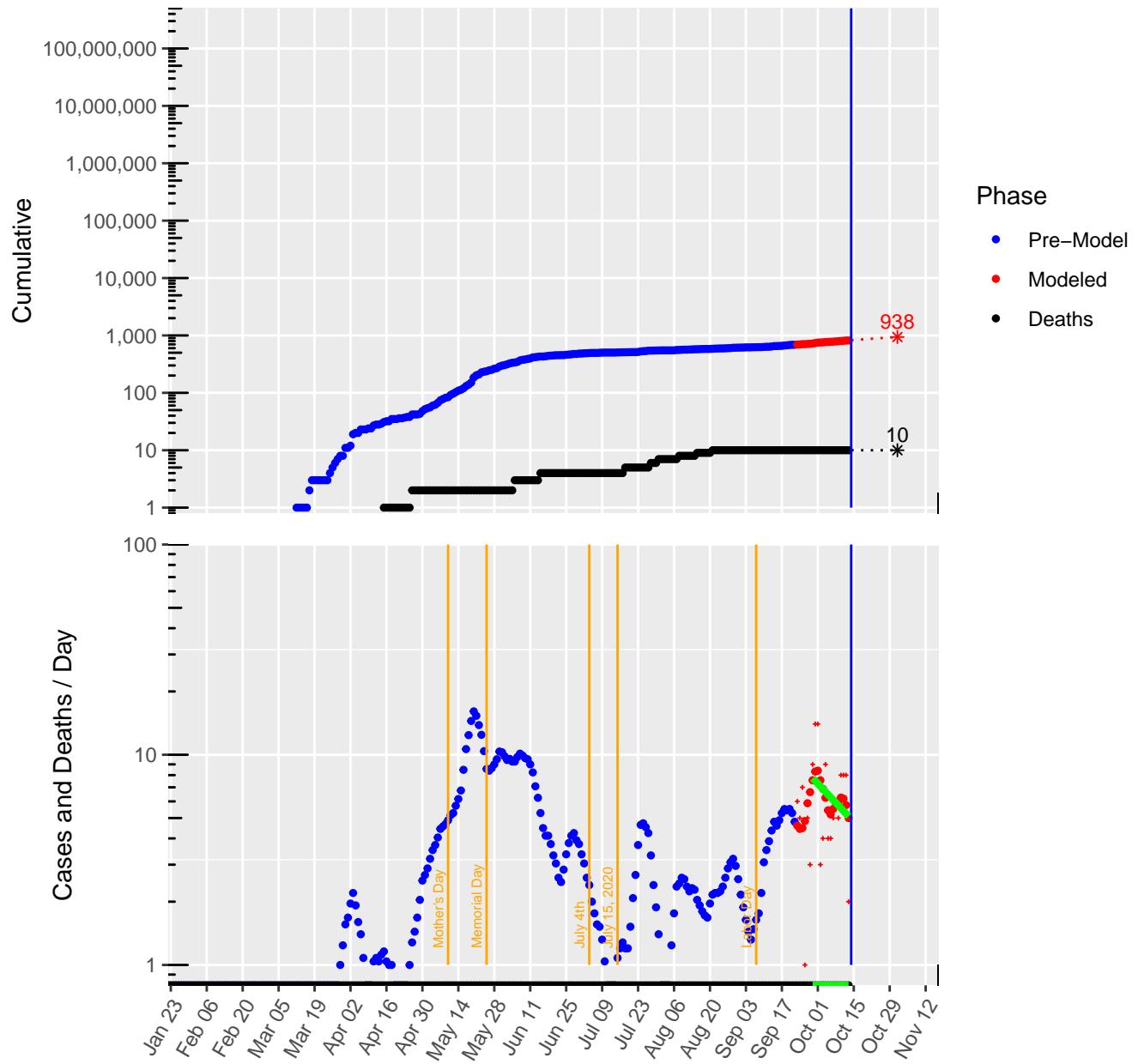
Arapahoe County, Colorado projection as of 2020-10-14



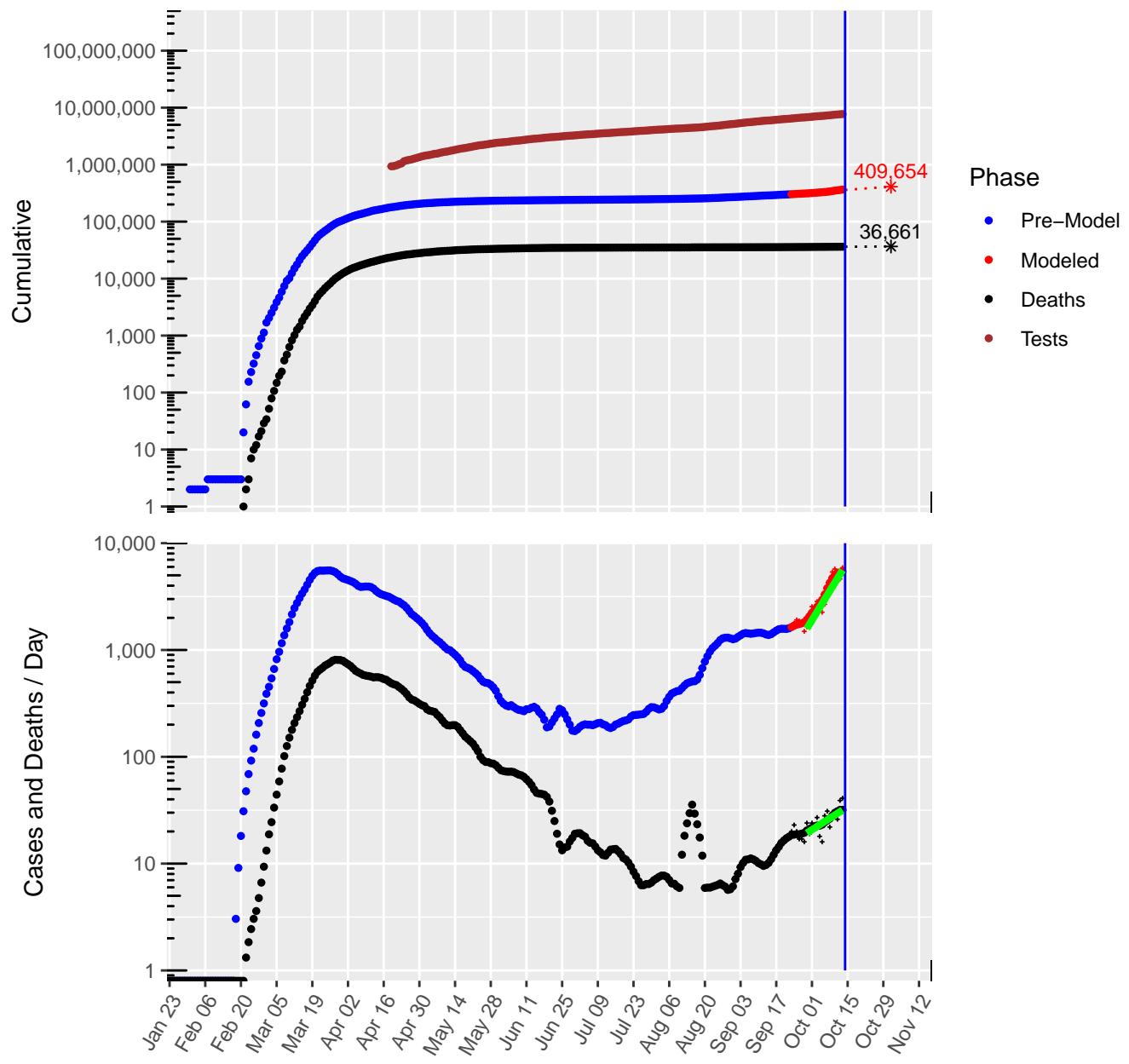
Montrose County, Colorado projection as of 2020-10-14



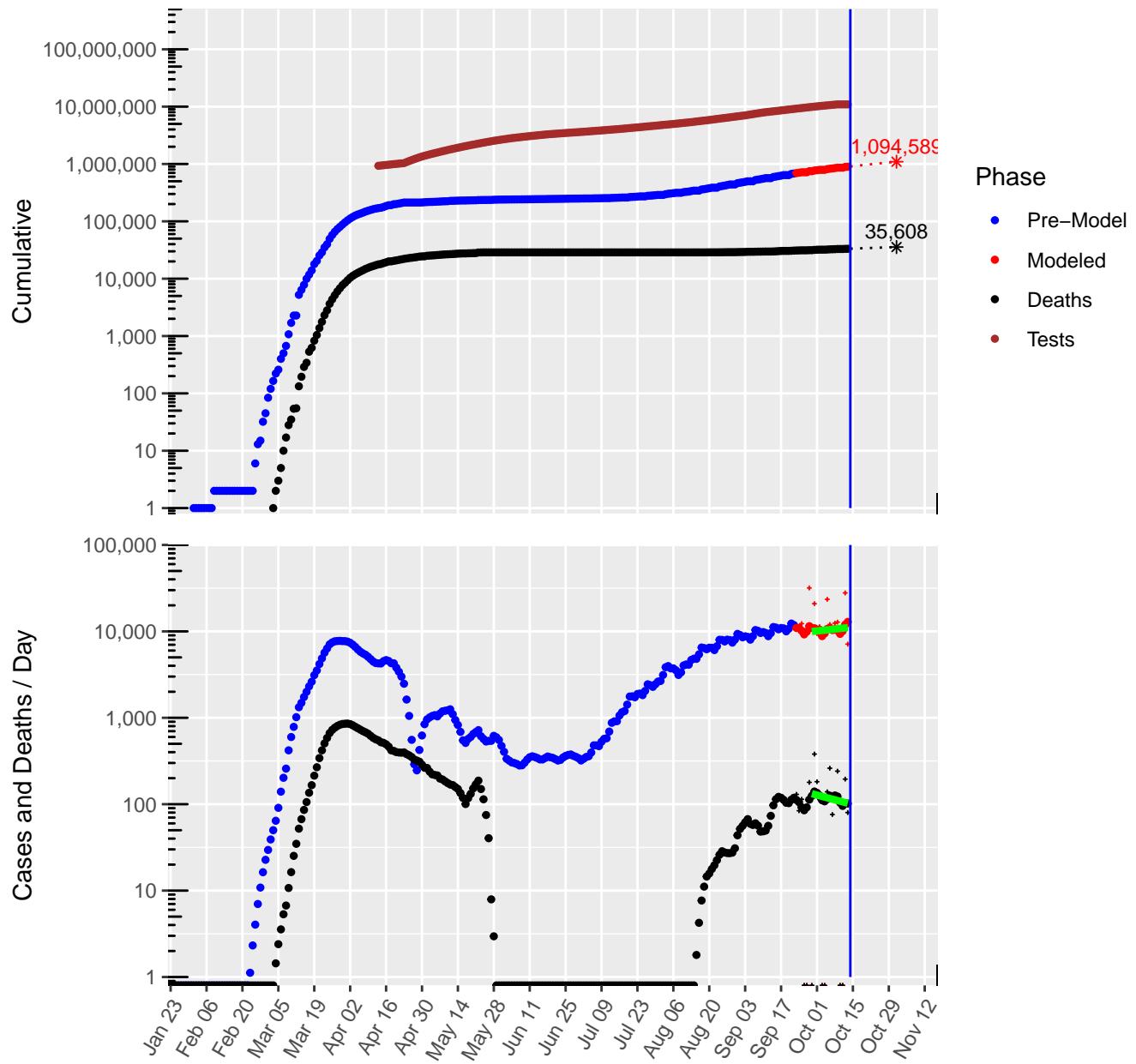
Androscoggin County, Maine projection as of 2020-10-14



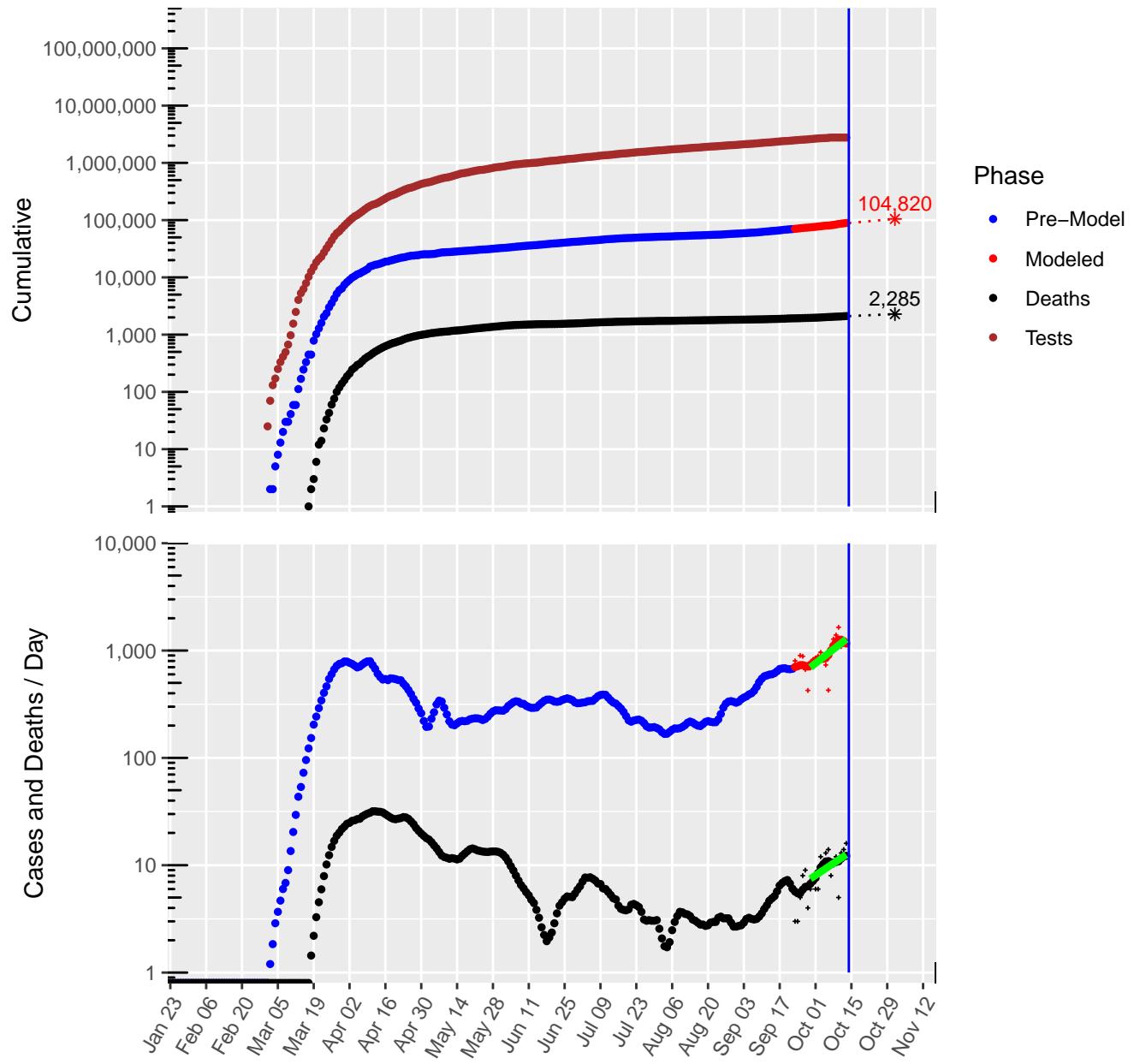
Italy projection as of 2020-10-14



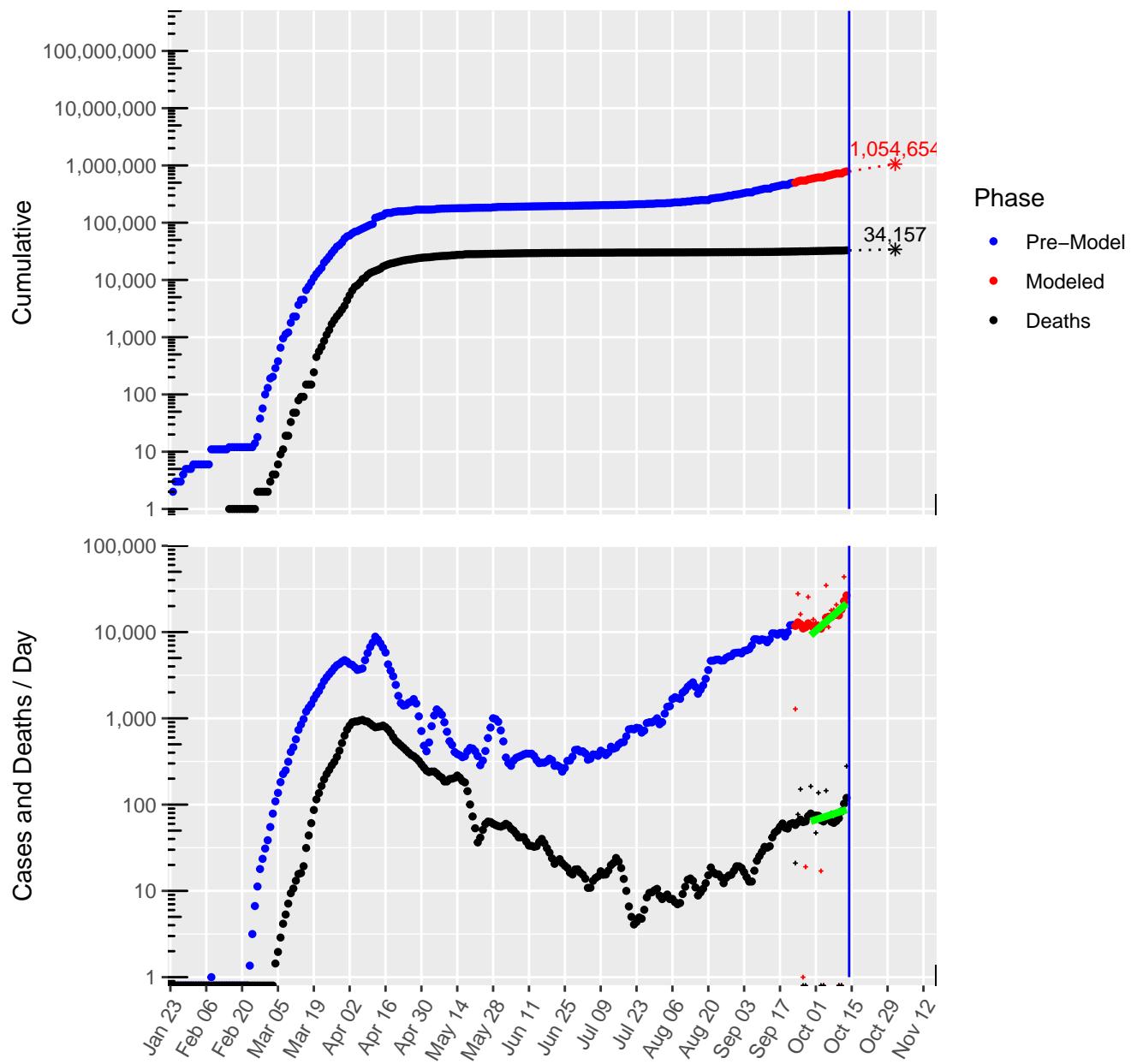
Spain projection as of 2020-10-14



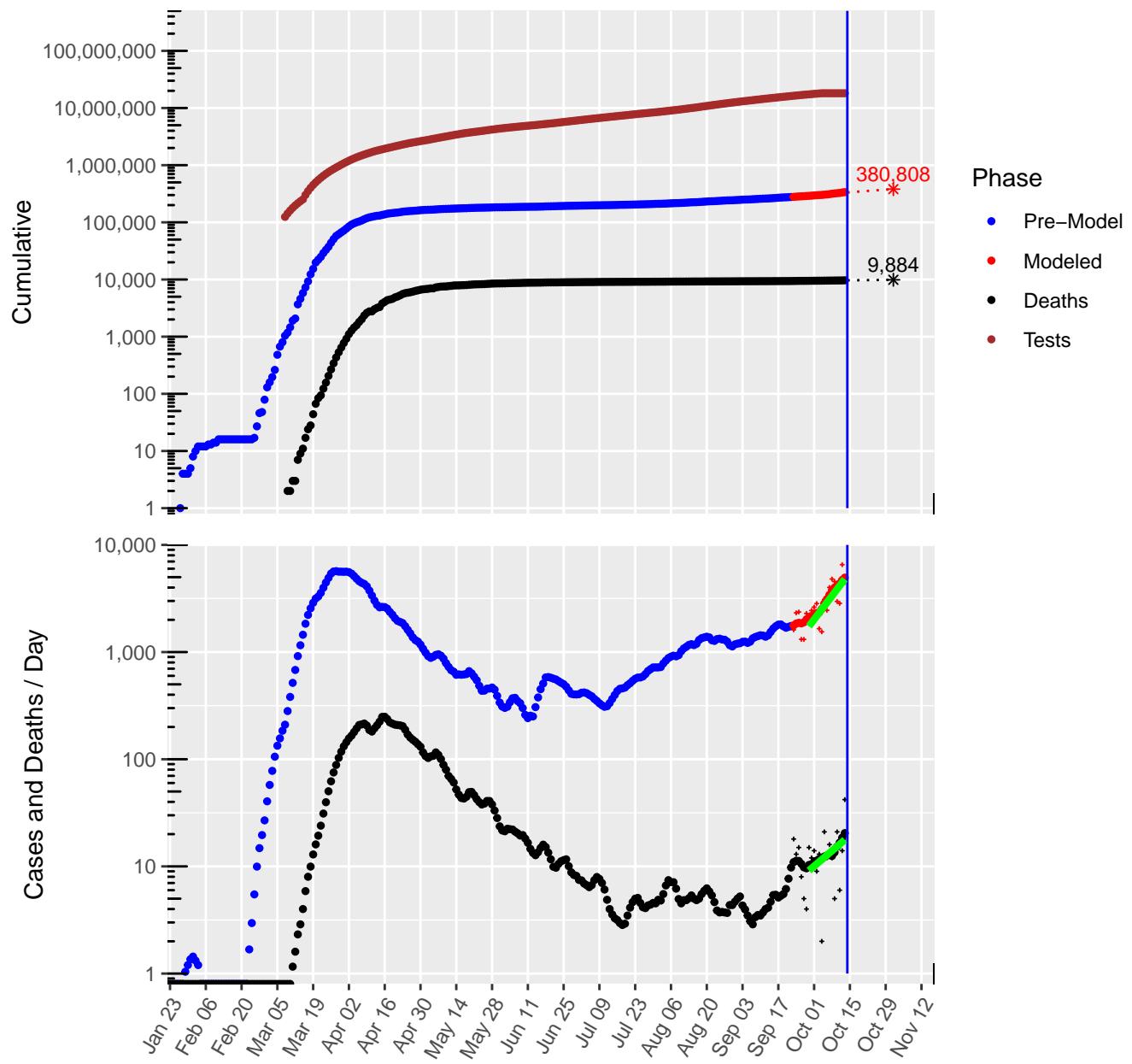
Portugal projection as of 2020-10-14



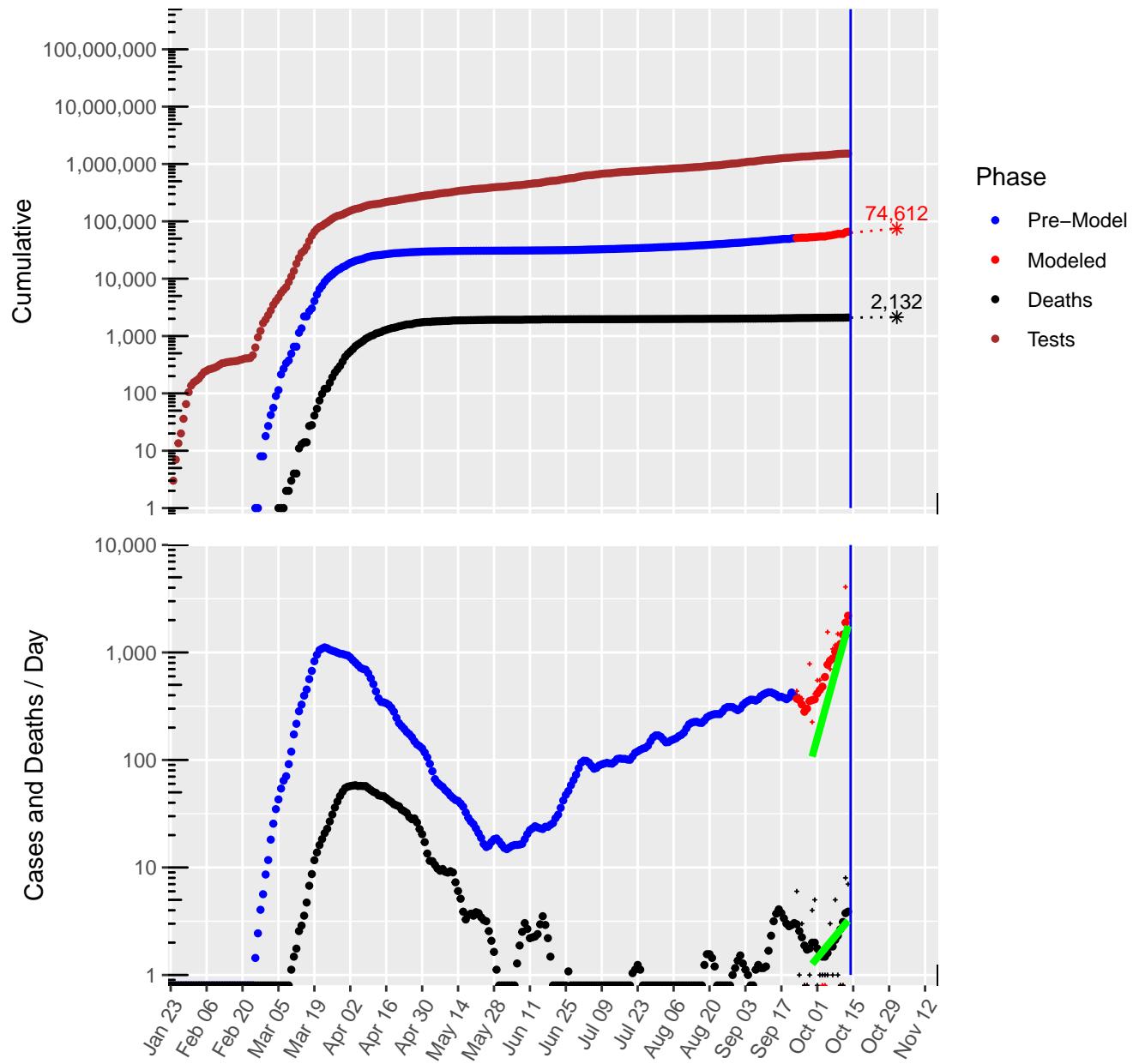
France projection as of 2020-10-14



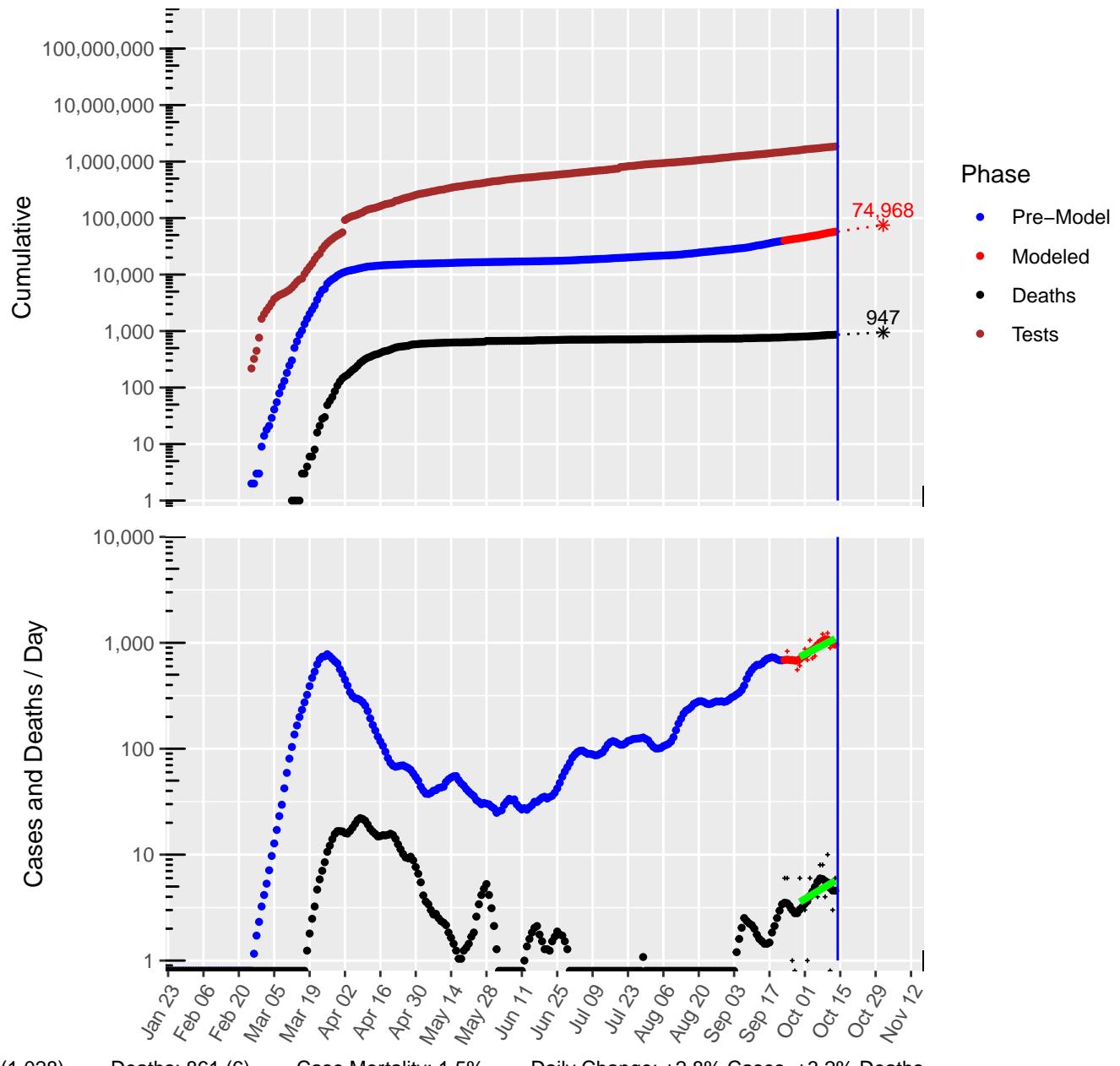
Germany projection as of 2020-10-14



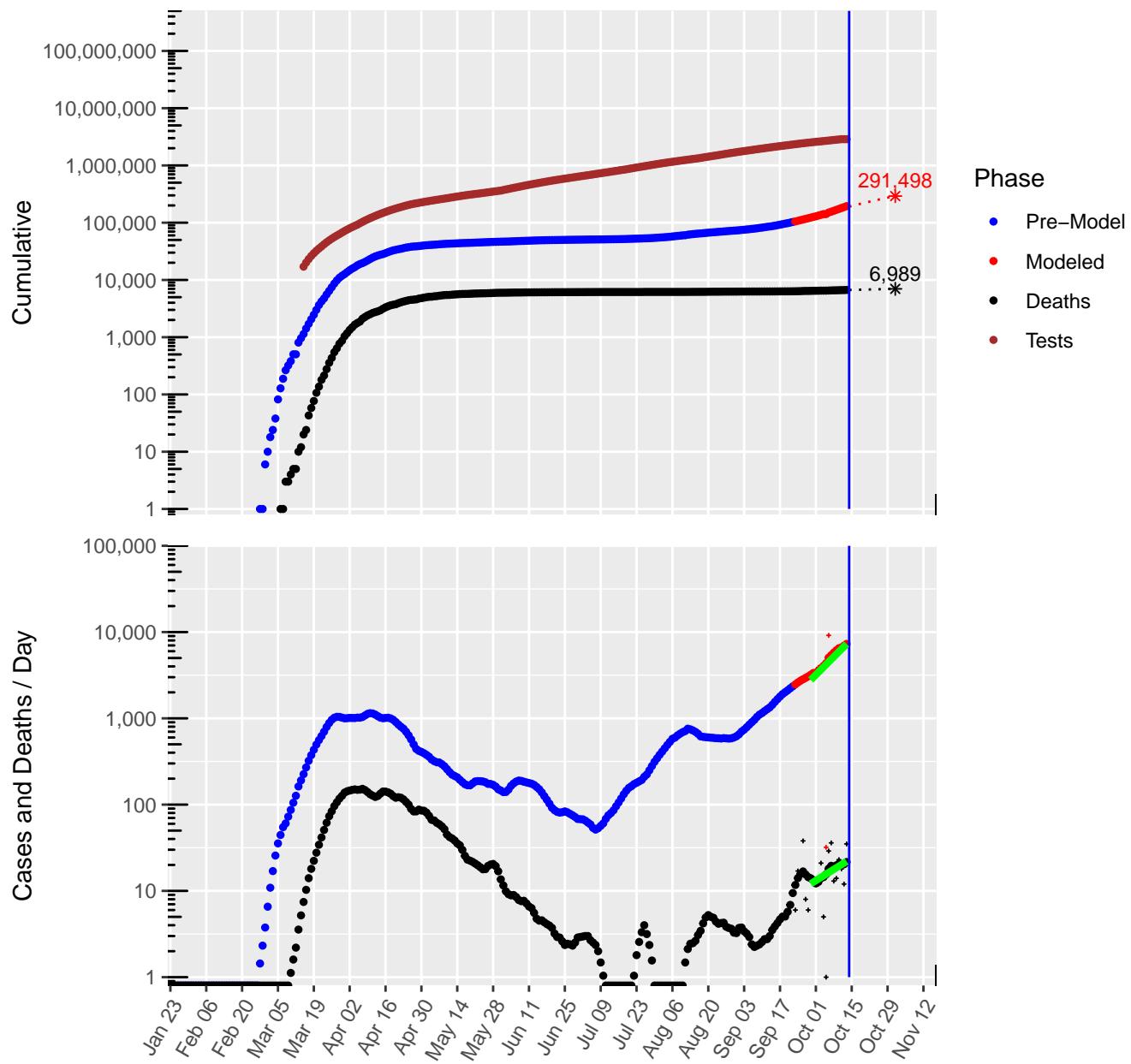
Switzerland projection as of 2020-10-14



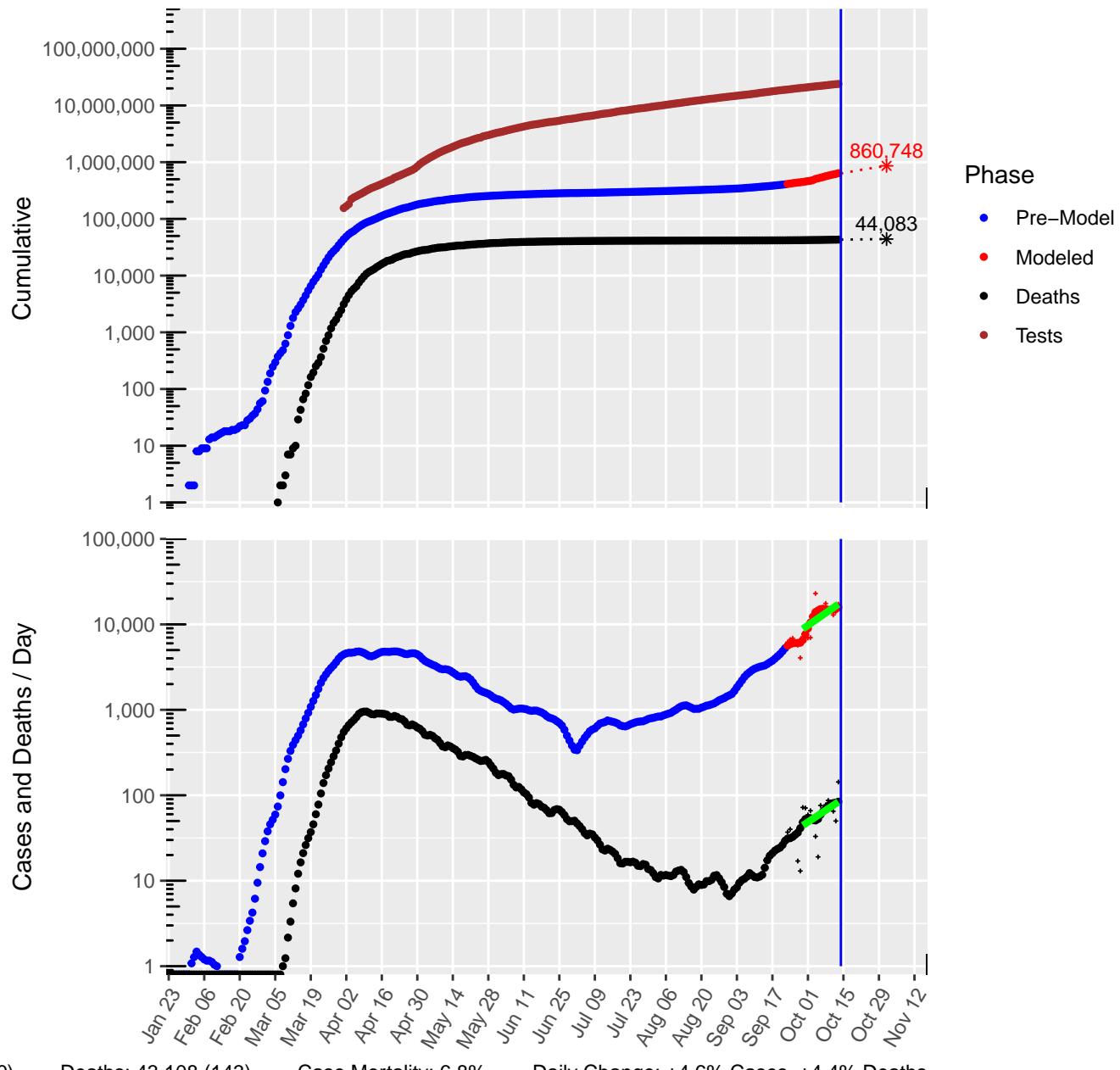
Austria projection as of 2020-10-14



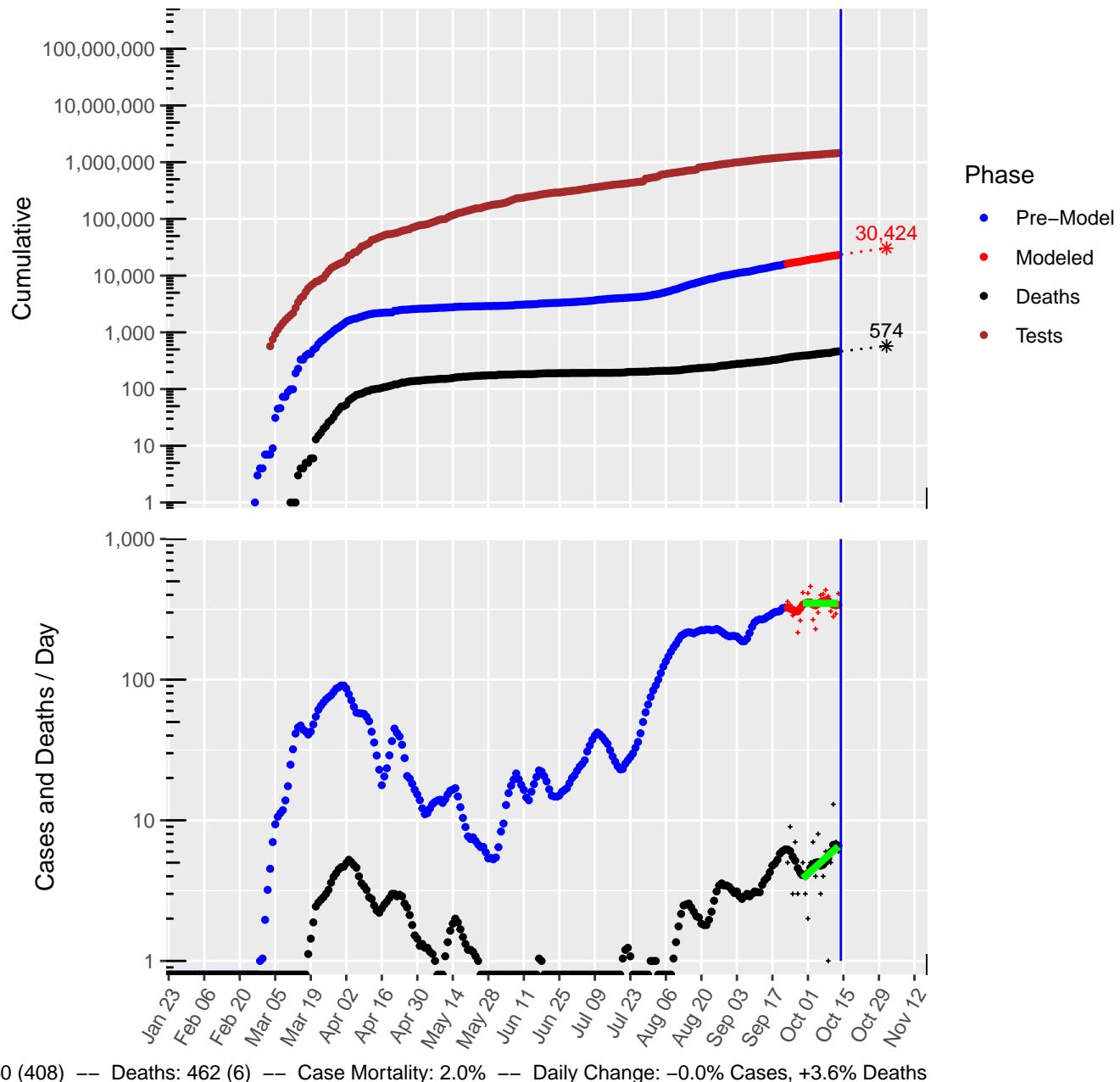
Netherlands projection as of 2020-10-14



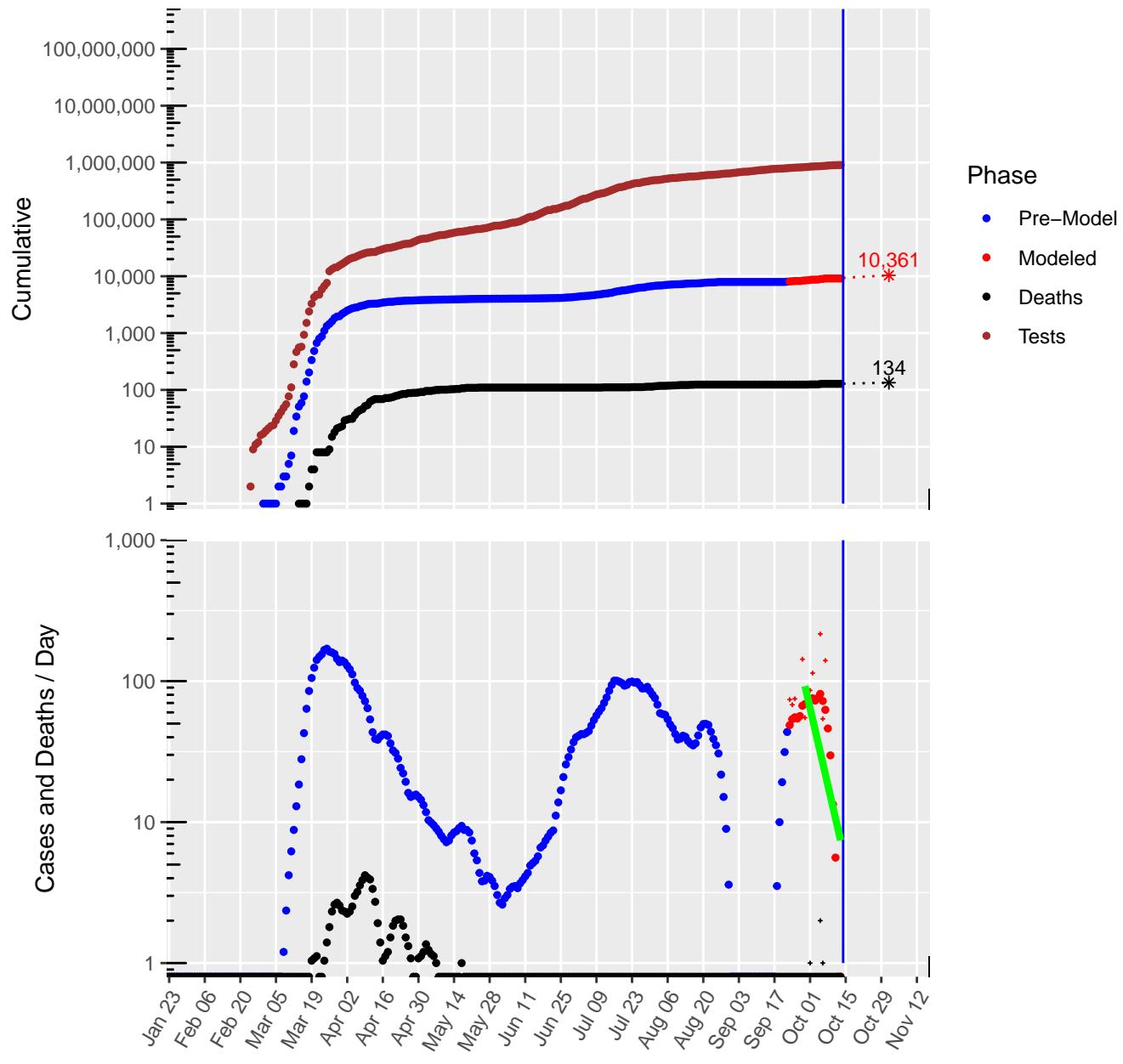
United Kingdom projection as of 2020-10-14



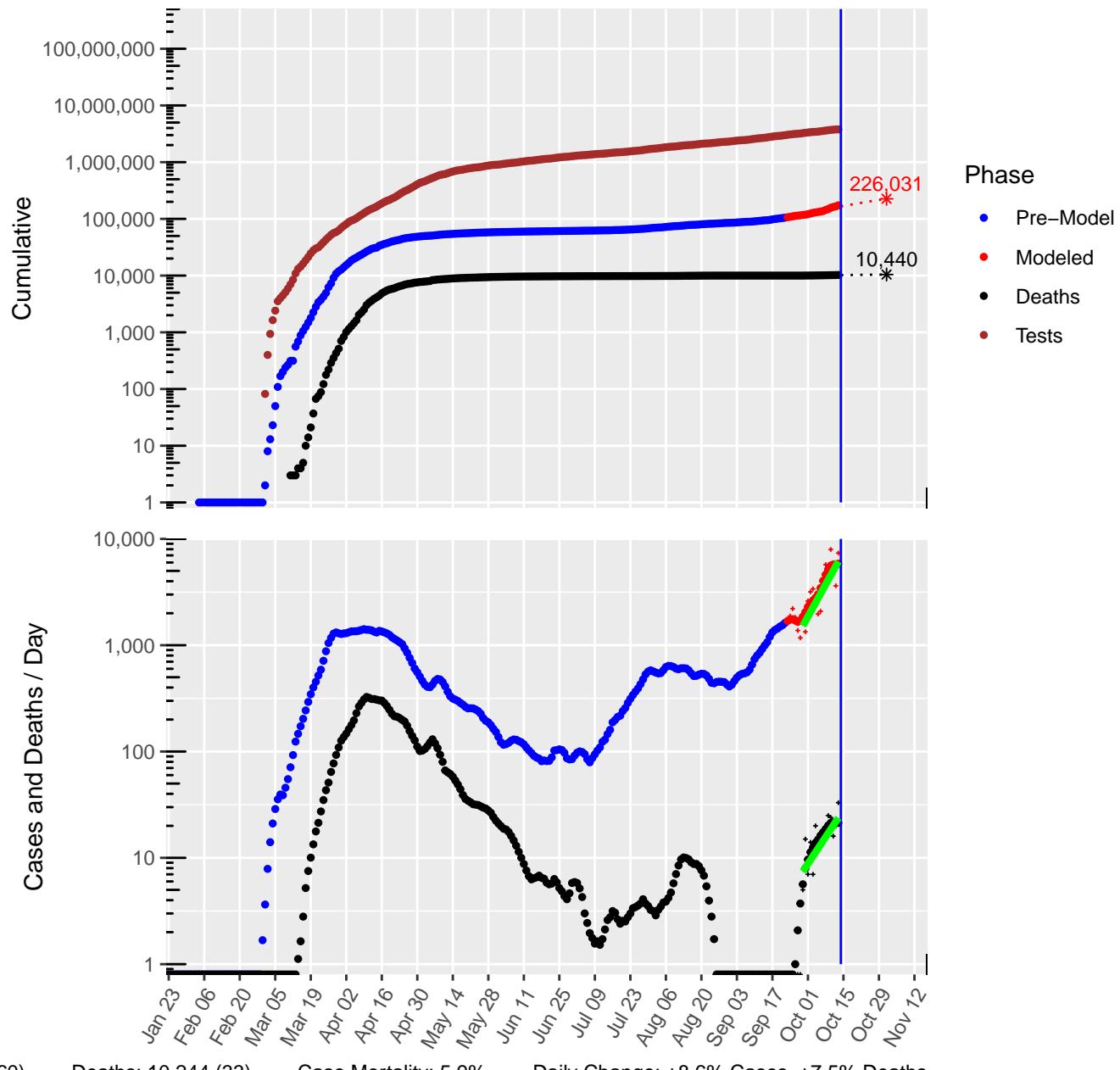
Greece projection as of 2020-10-14



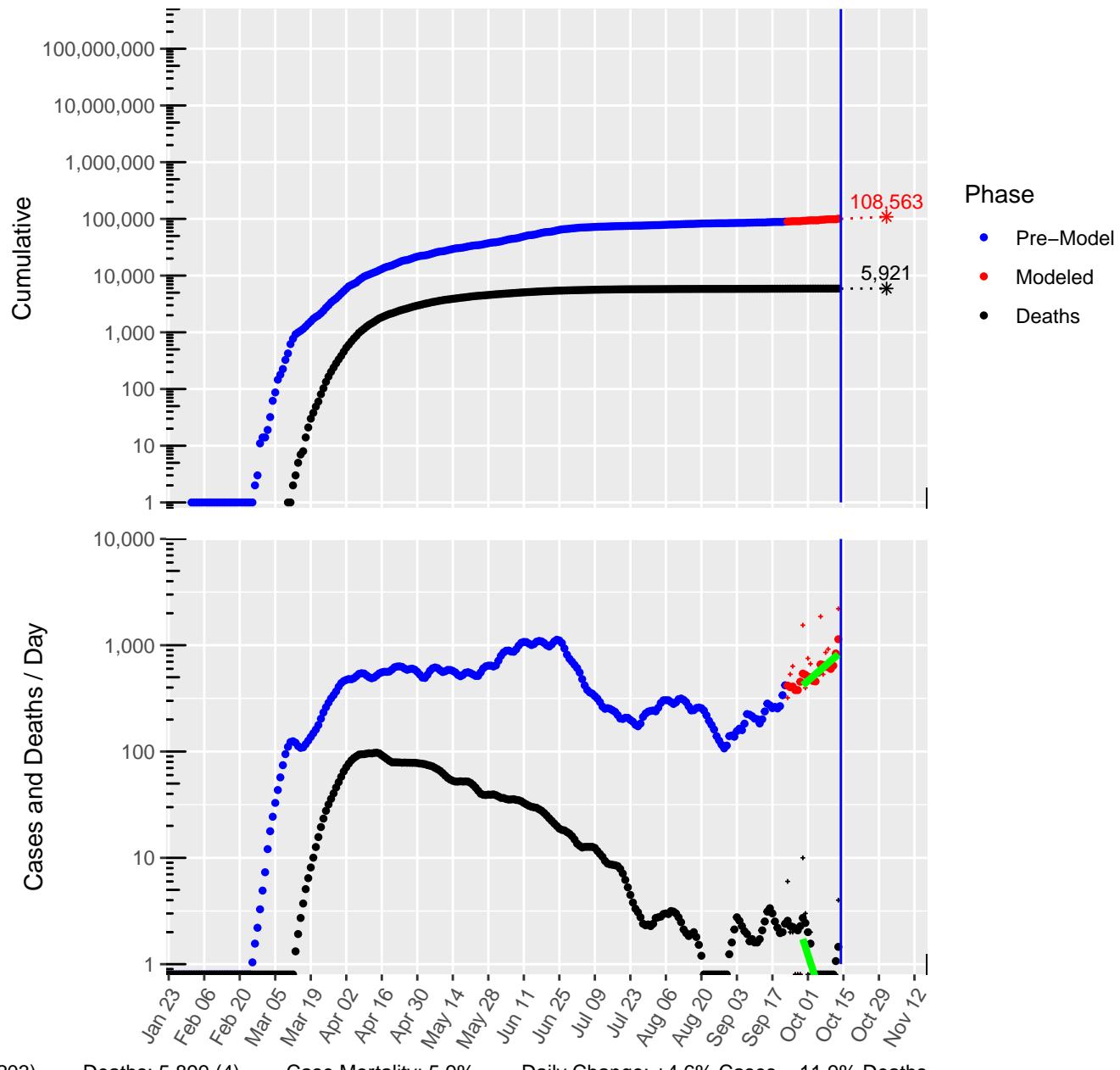
Luxembourg projection as of 2020-10-14



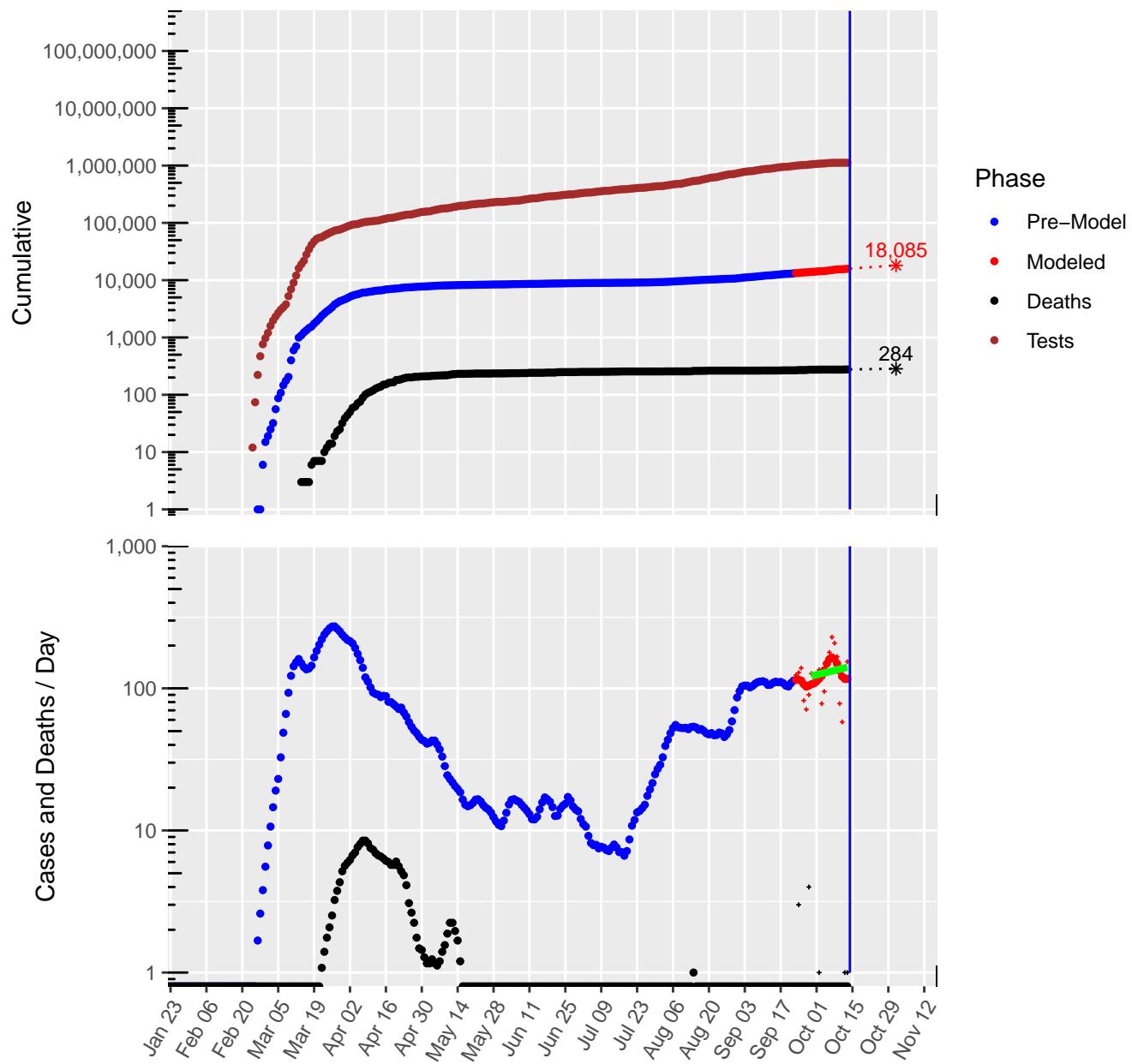
Belgium projection as of 2020-10-14



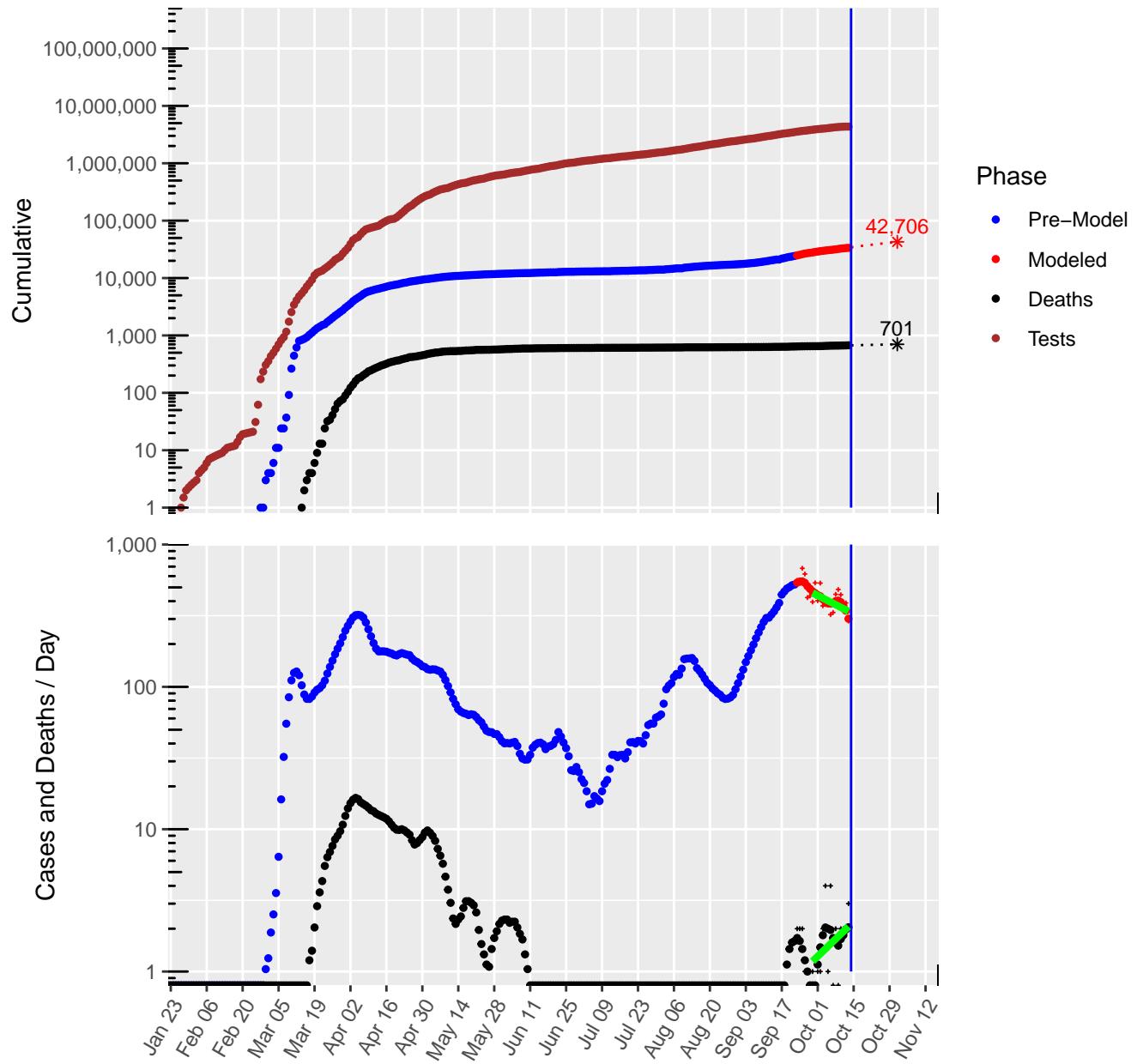
Sweden projection as of 2020-10-14



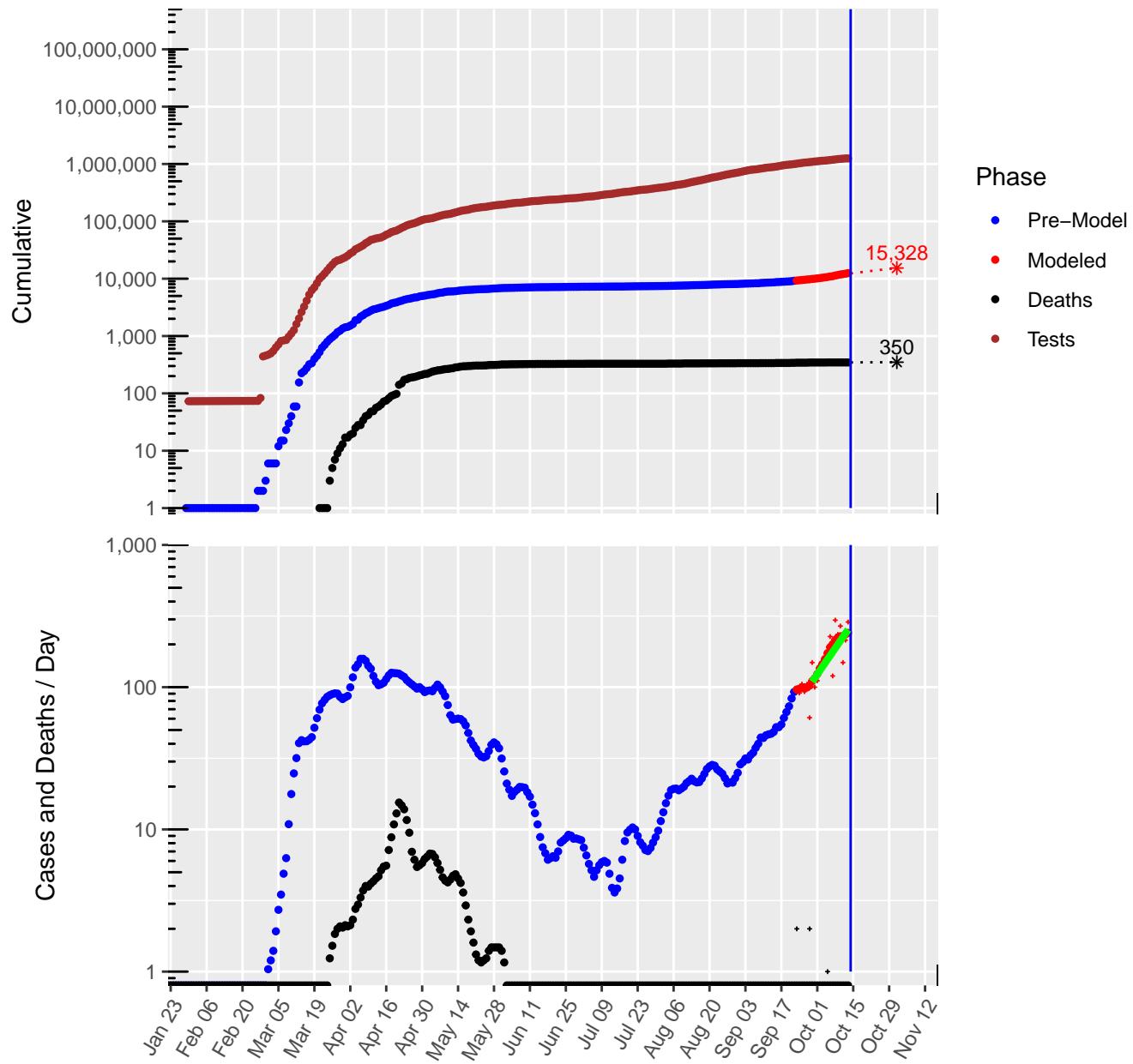
Norway projection as of 2020-10-14



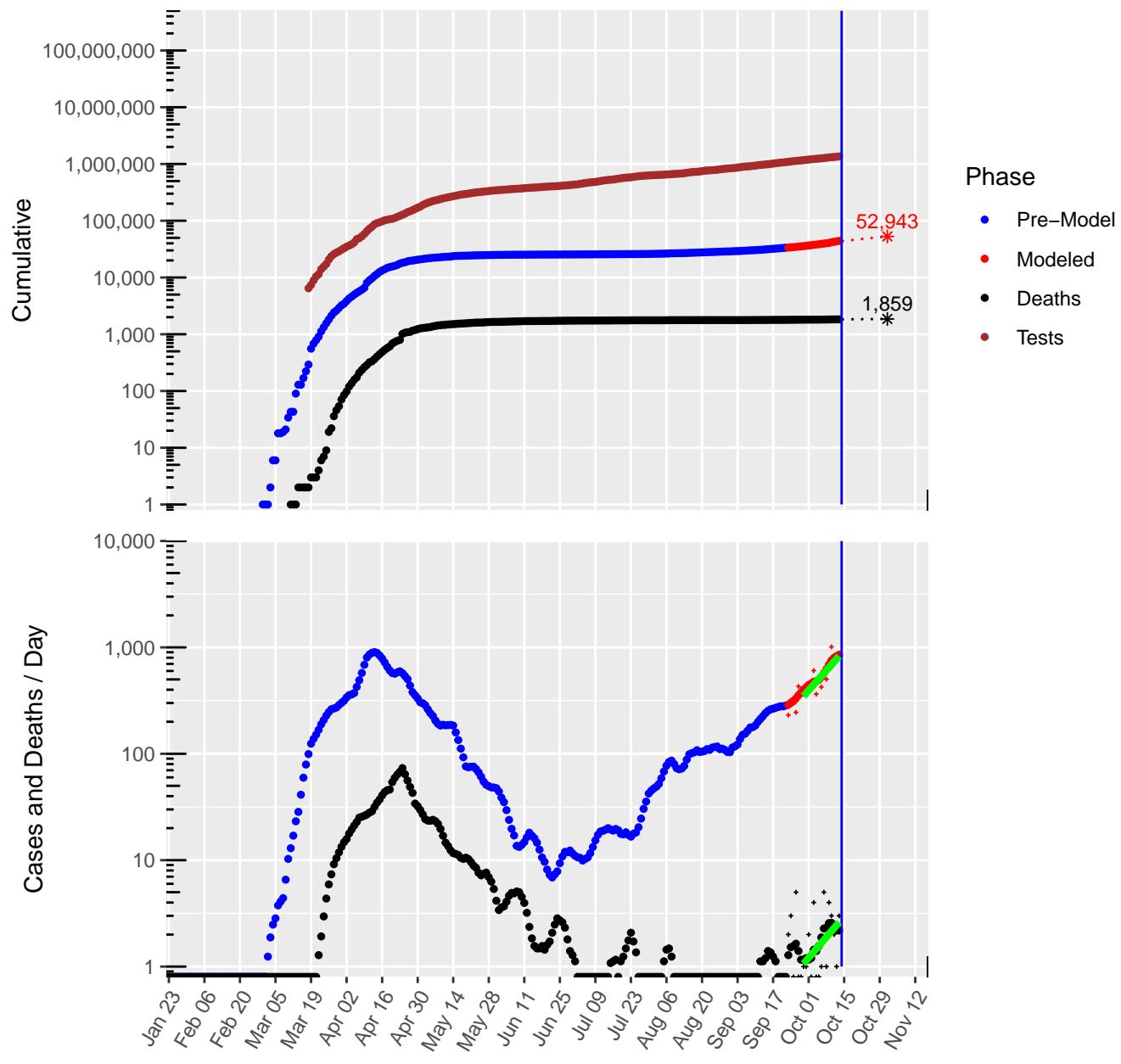
Denmark projection as of 2020-10-14



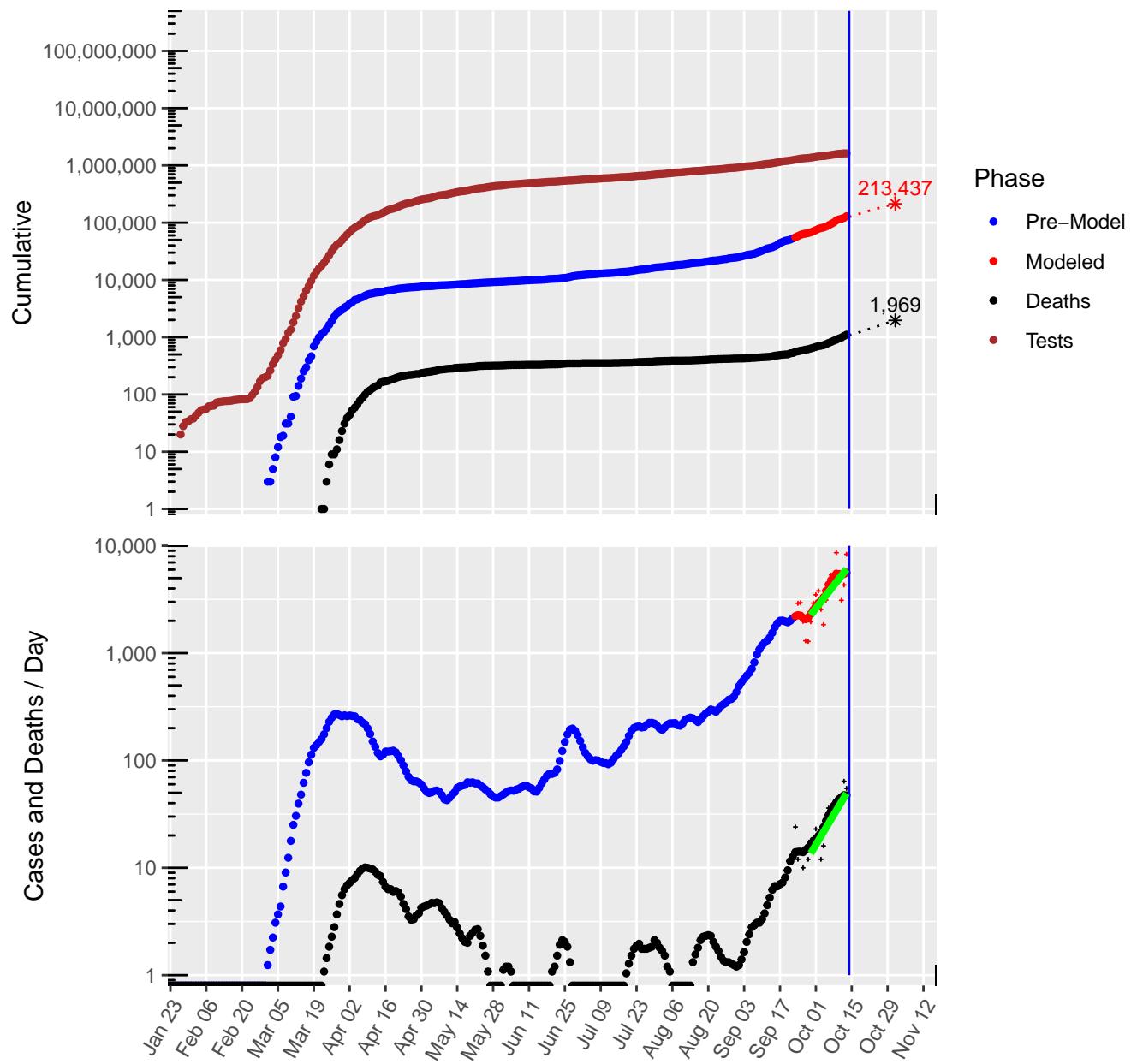
Finland projection as of 2020-10-14



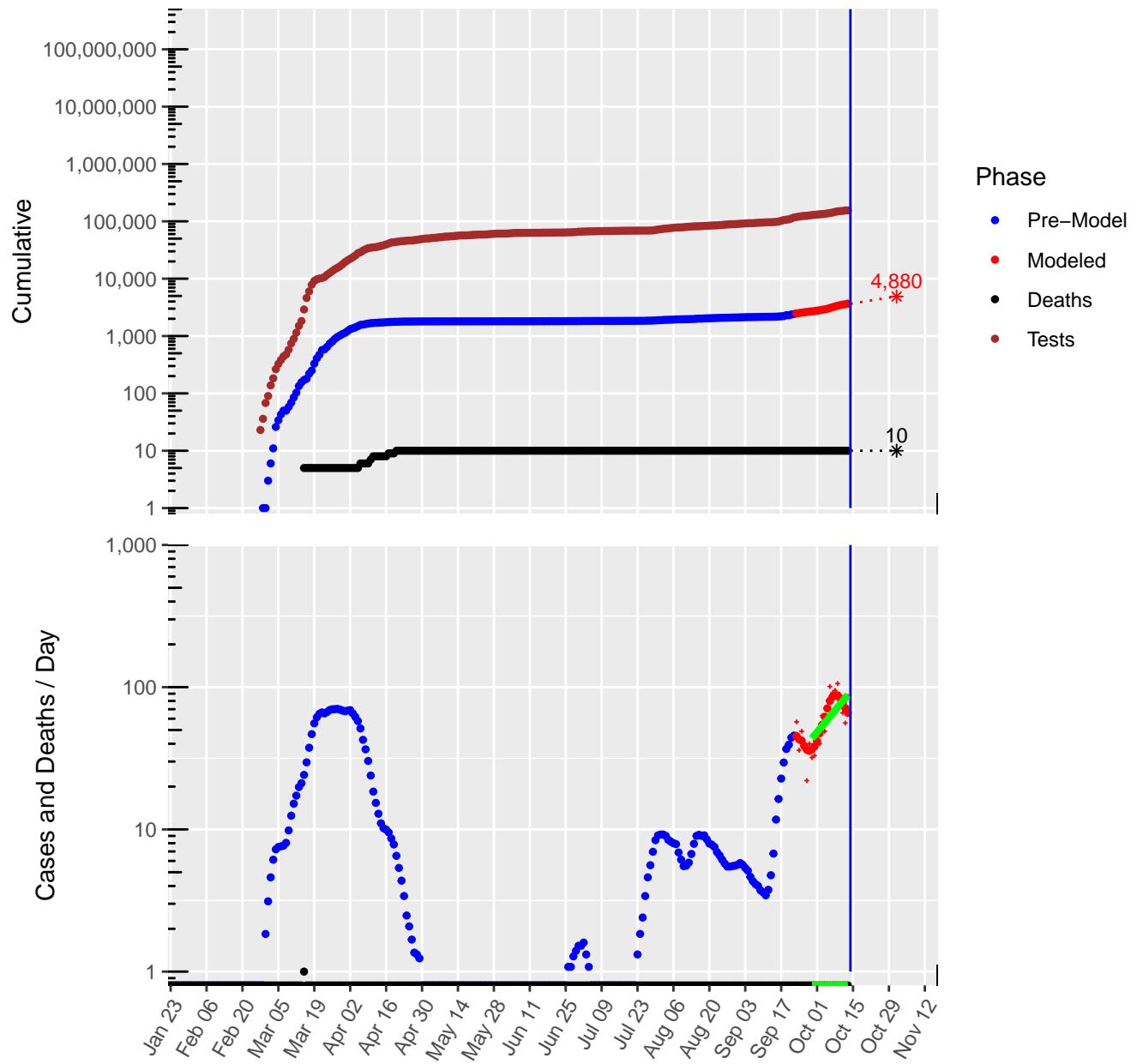
Ireland projection as of 2020-10-14



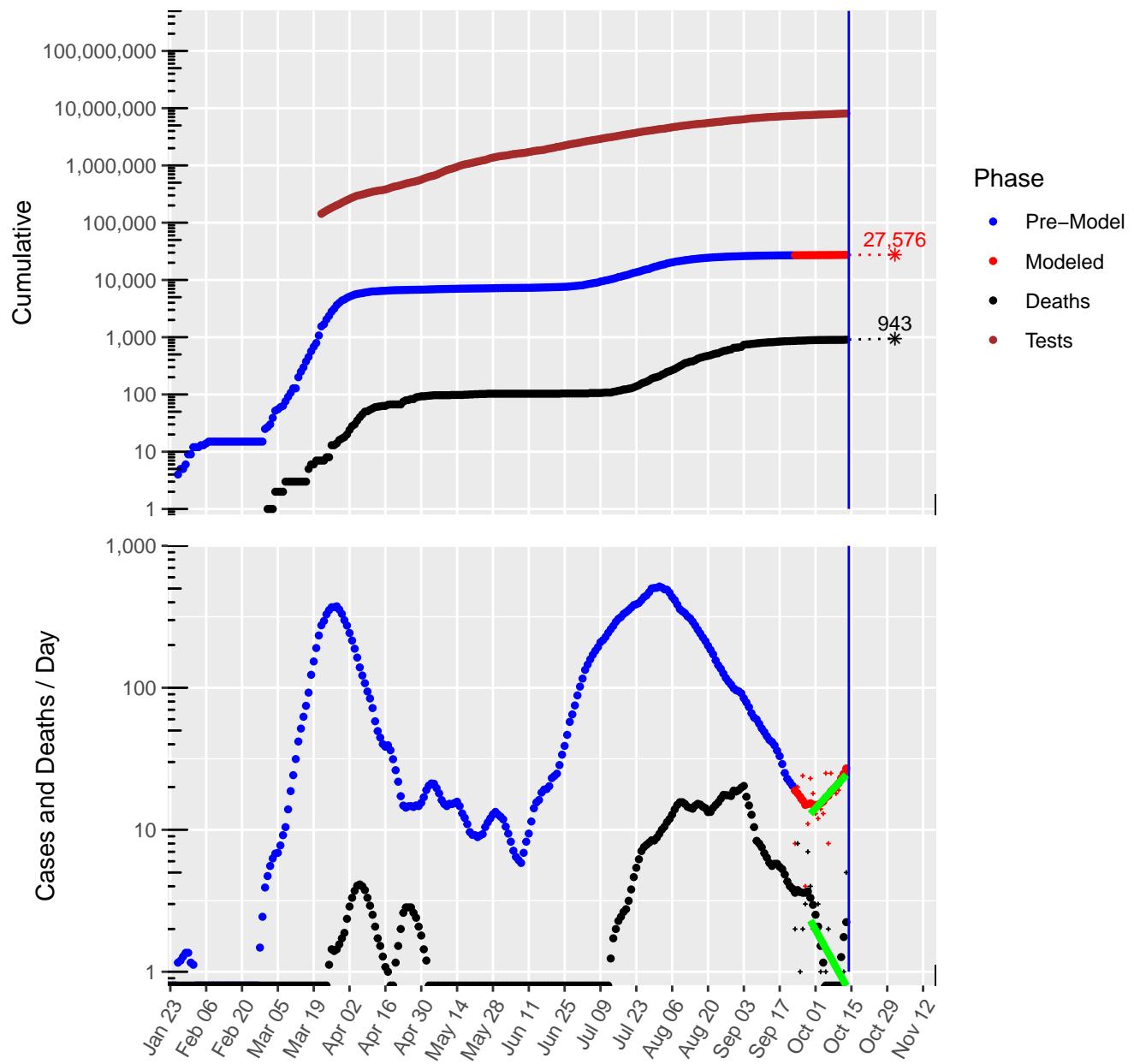
Czech Republic projection as of 2020-10-14



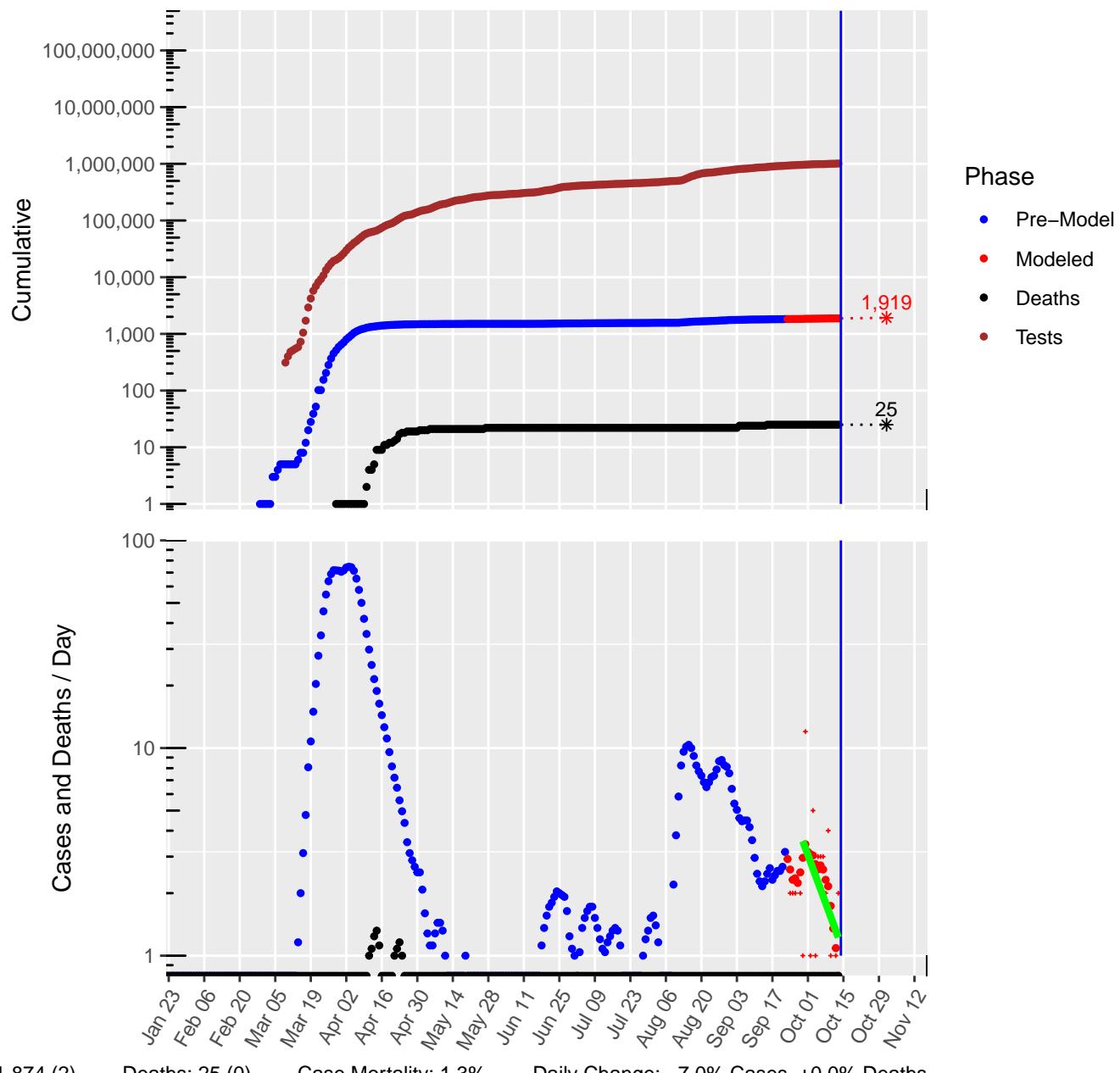
Iceland projection as of 2020-10-14



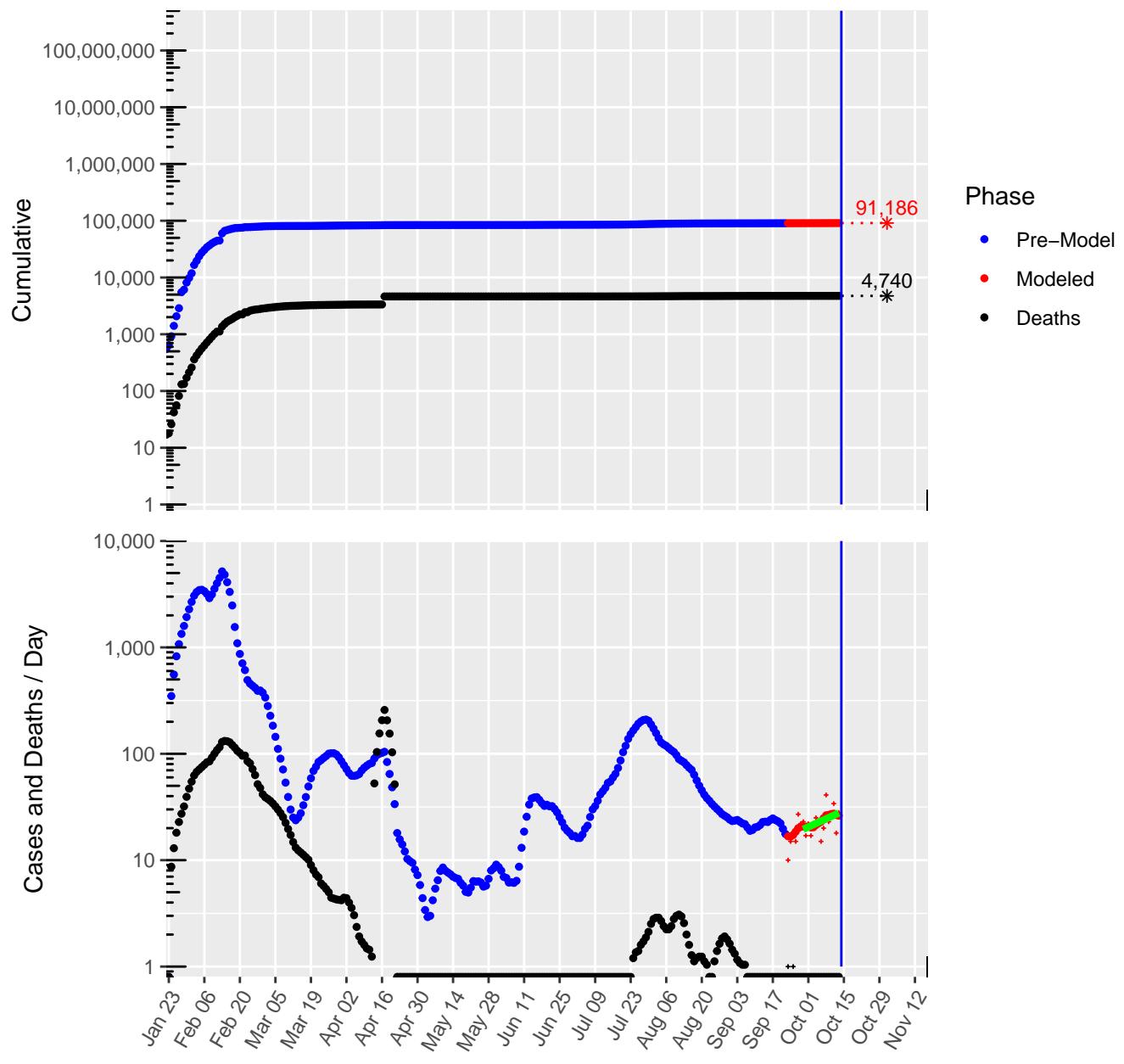
Australia projection as of 2020-10-14



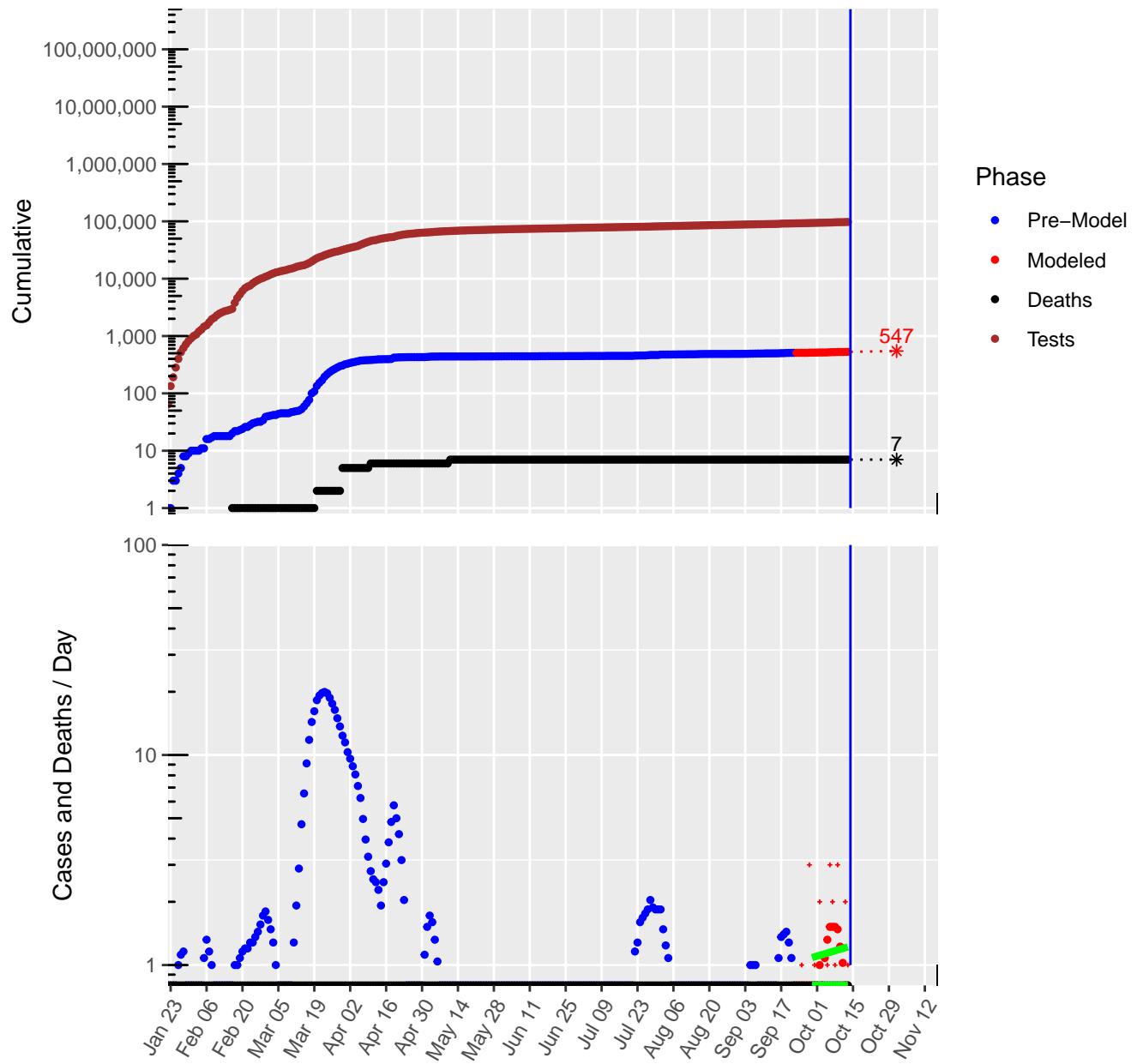
New Zealand projection as of 2020-10-14



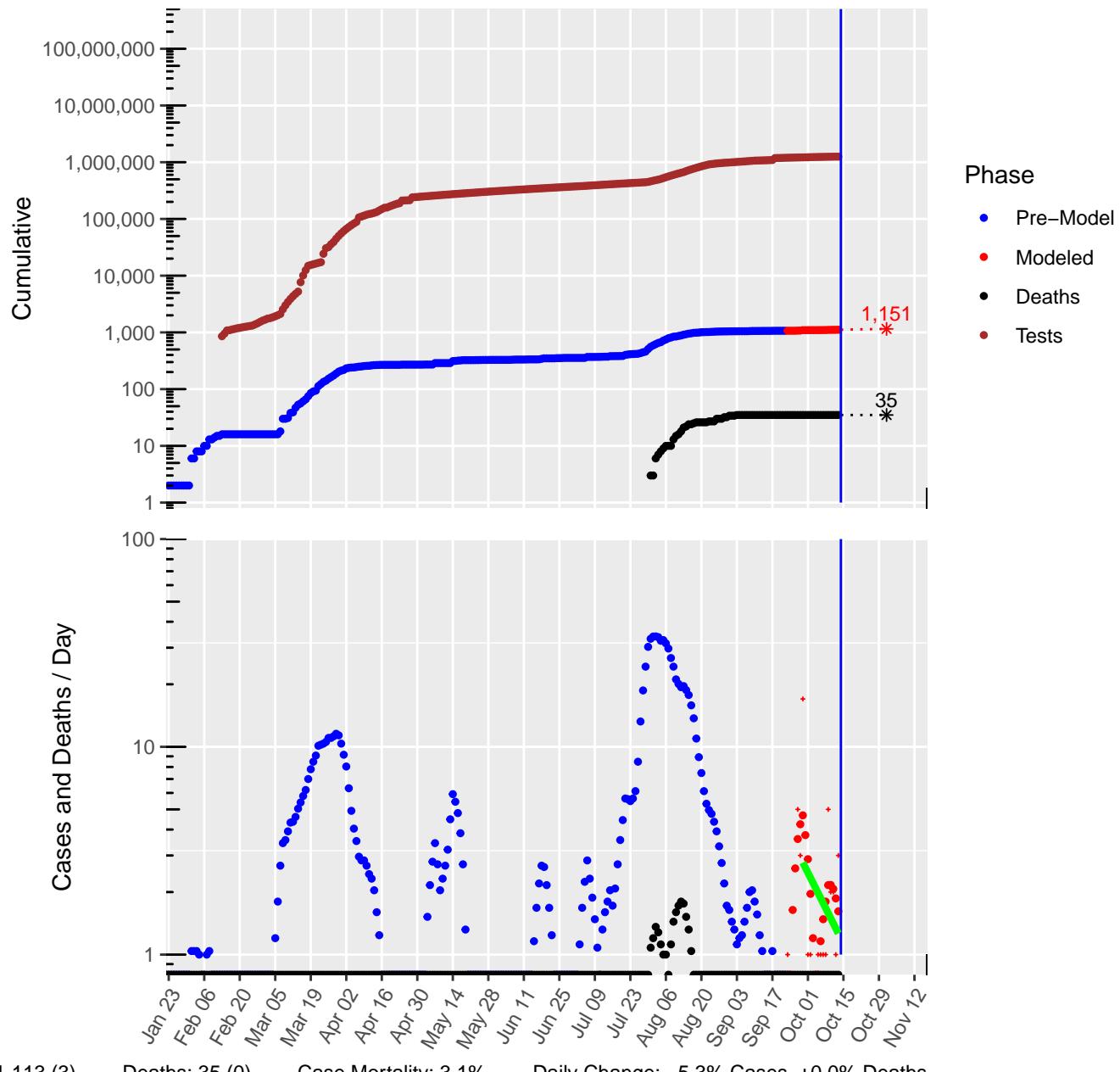
China projection as of 2020-10-14



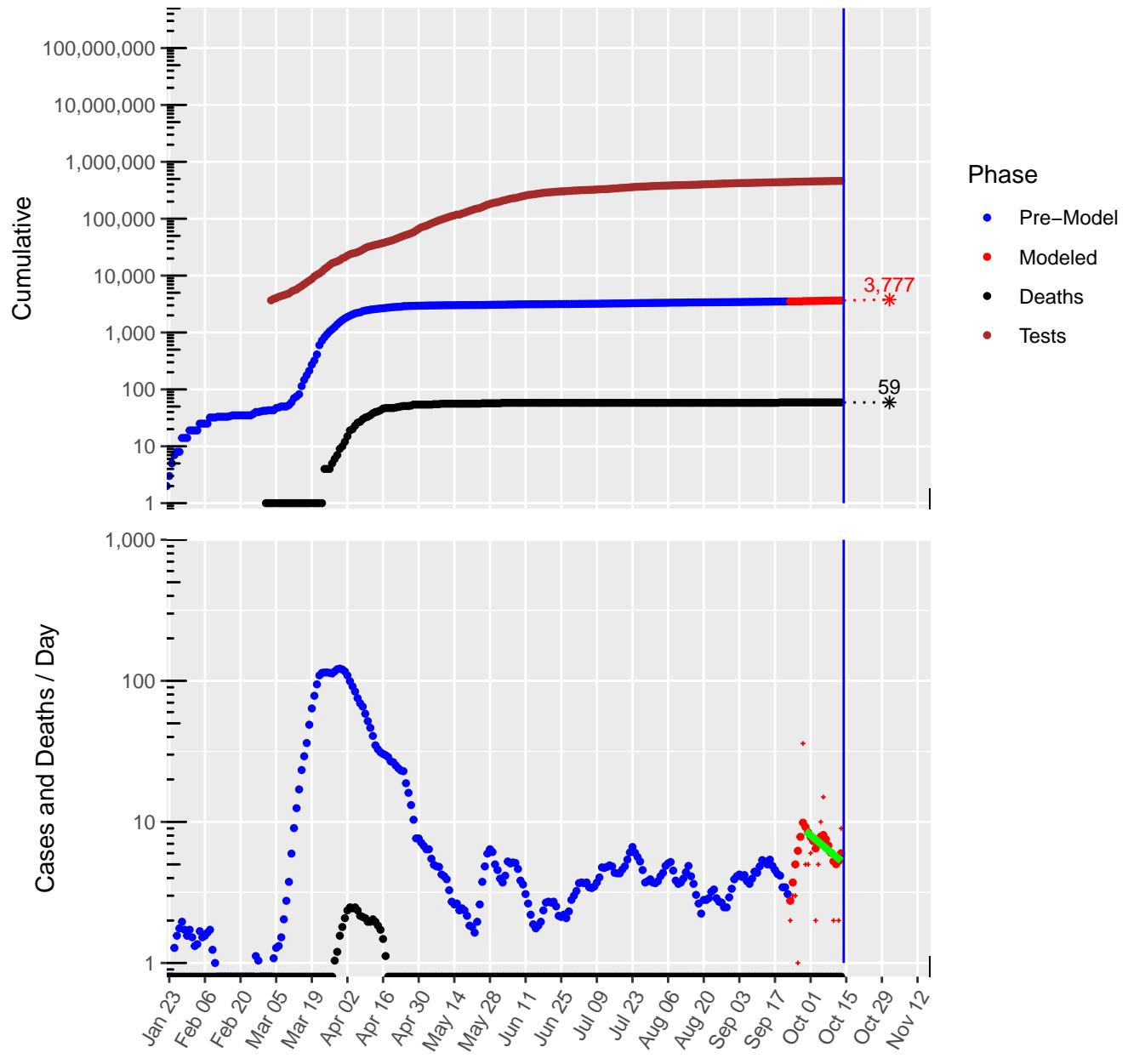
Taiwan projection as of 2020-10-14



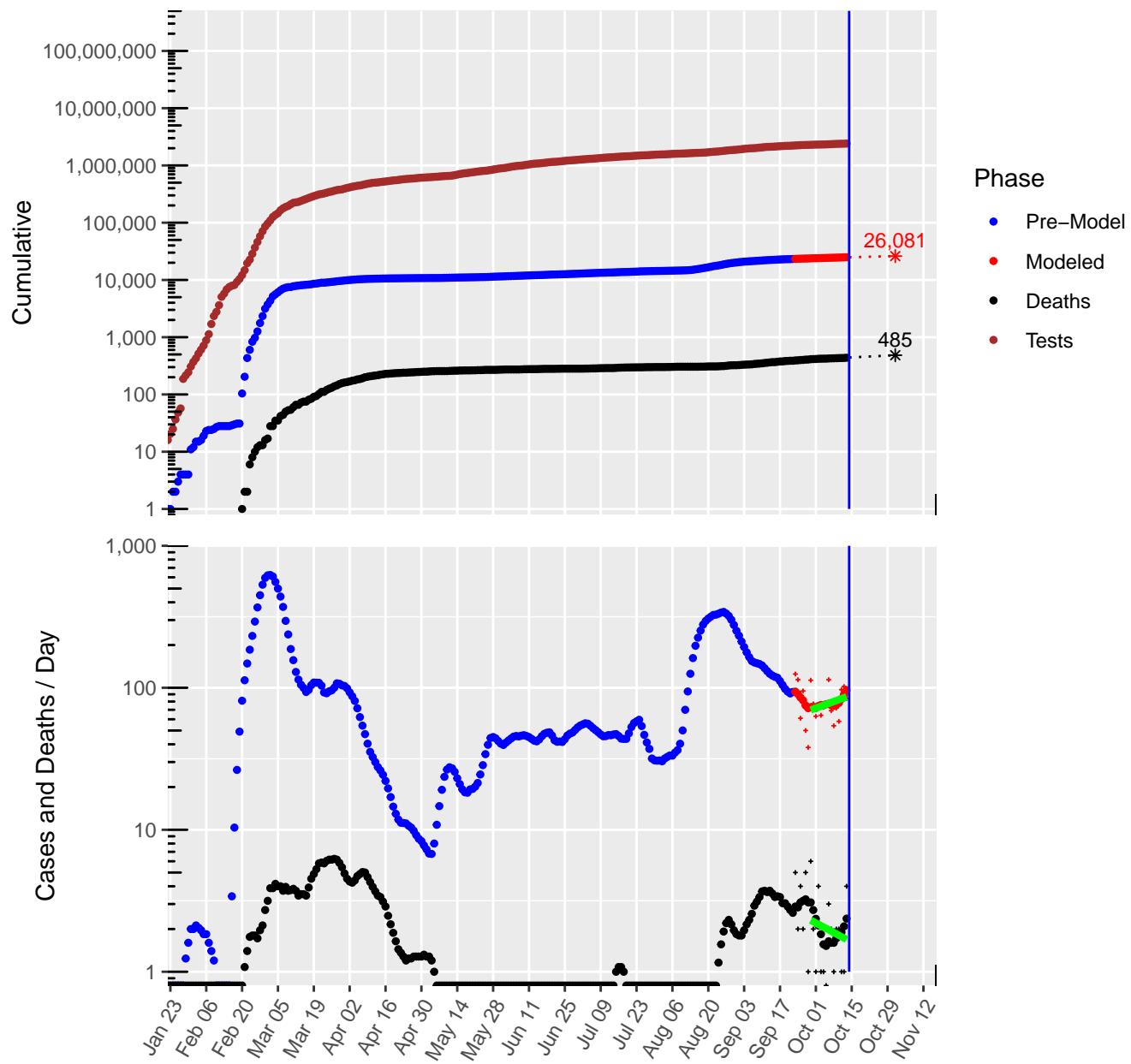
Vietnam projection as of 2020-10-14



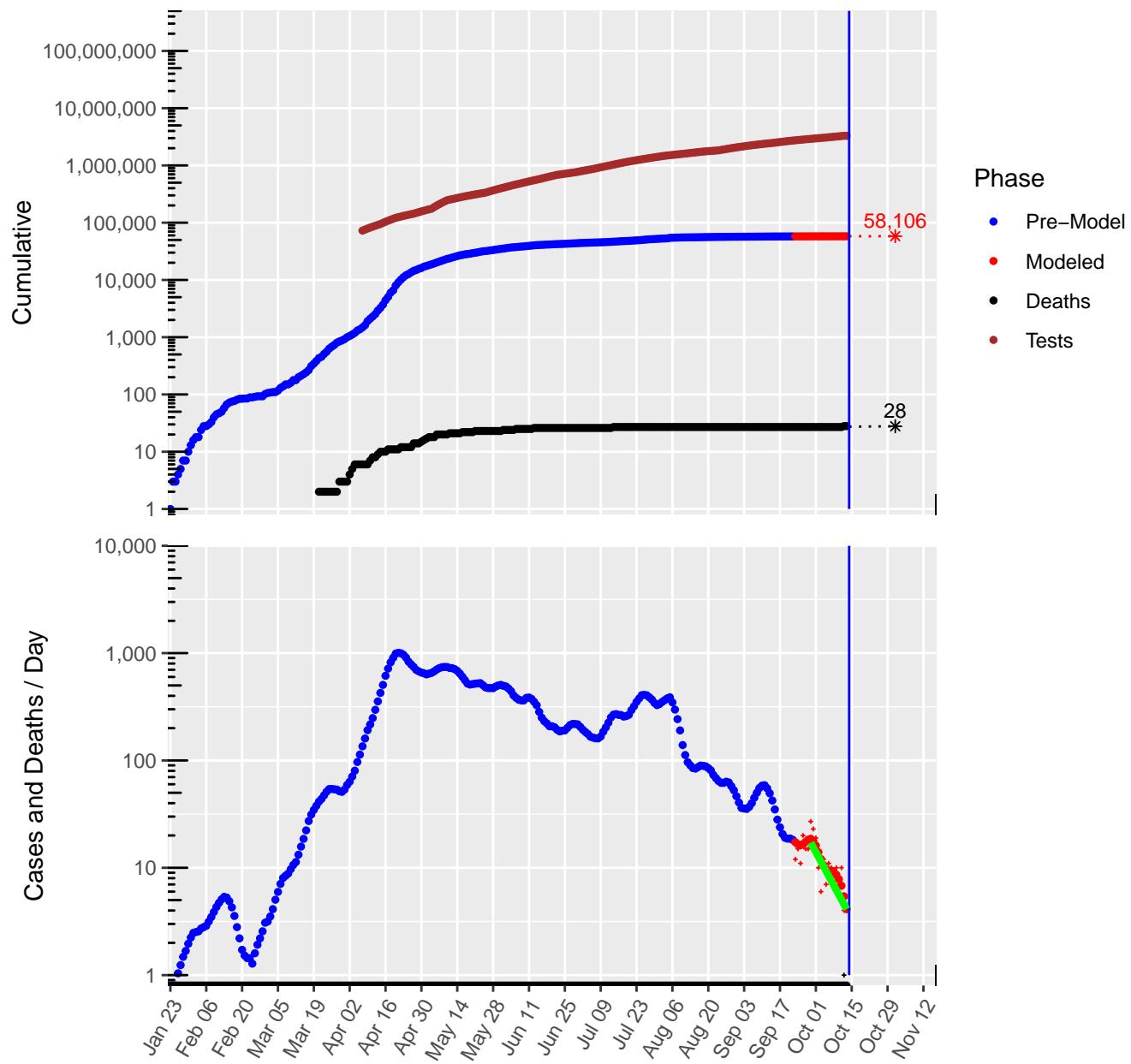
Thailand projection as of 2020-10-14



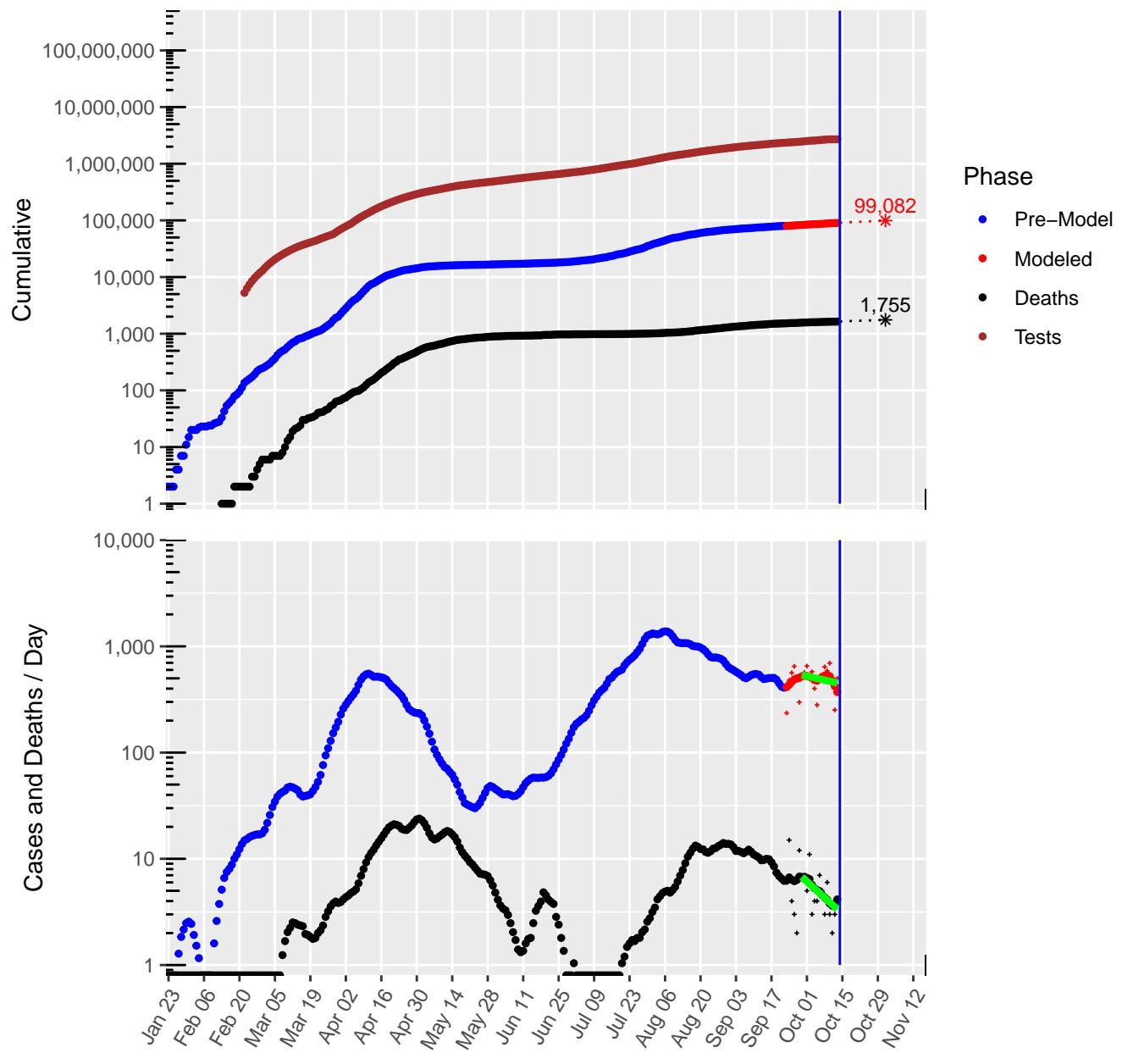
South Korea projection as of 2020-10-14



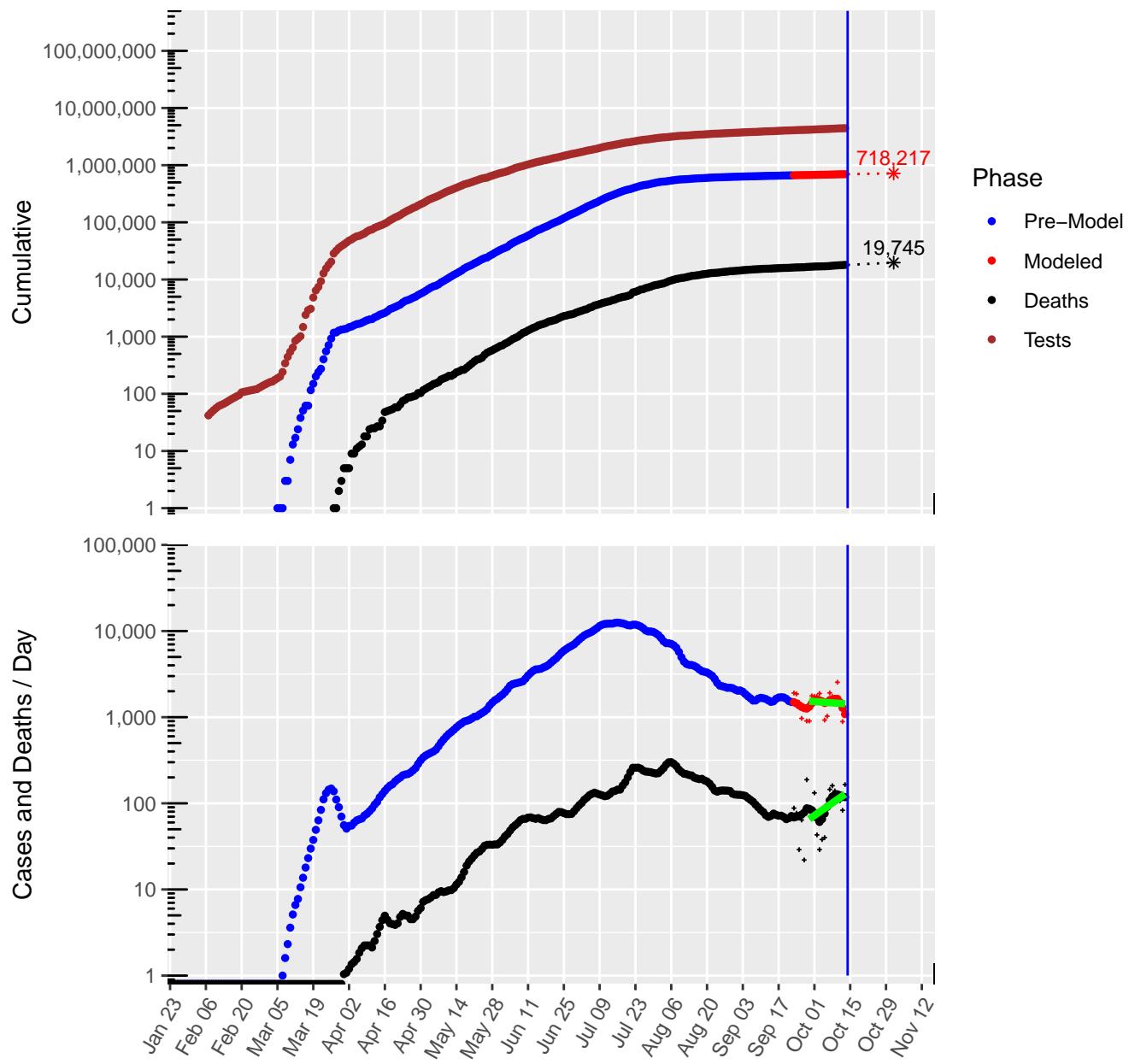
Singapore projection as of 2020-10-14



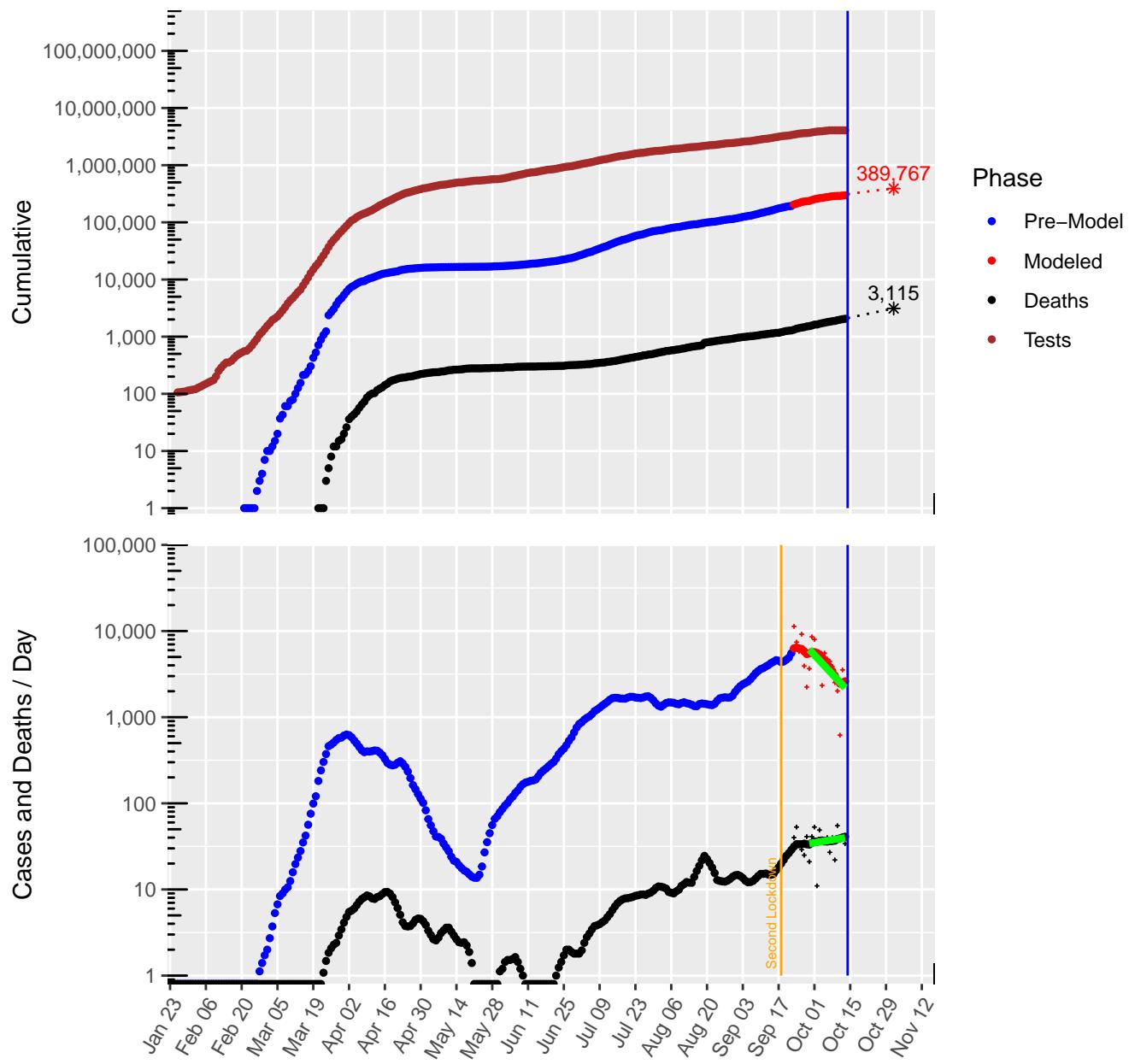
Japan projection as of 2020-10-14



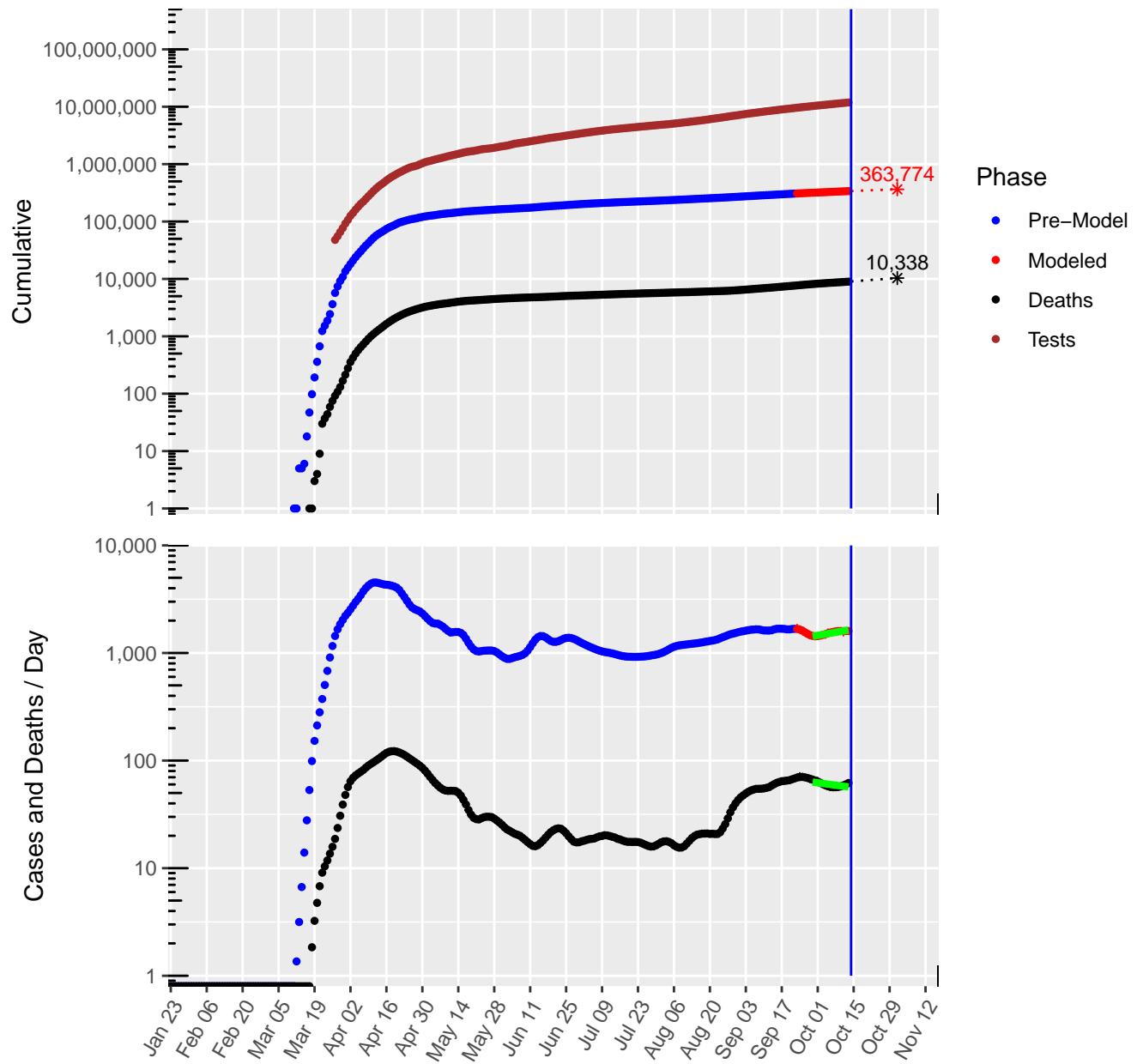
South Africa projection as of 2020-10-14



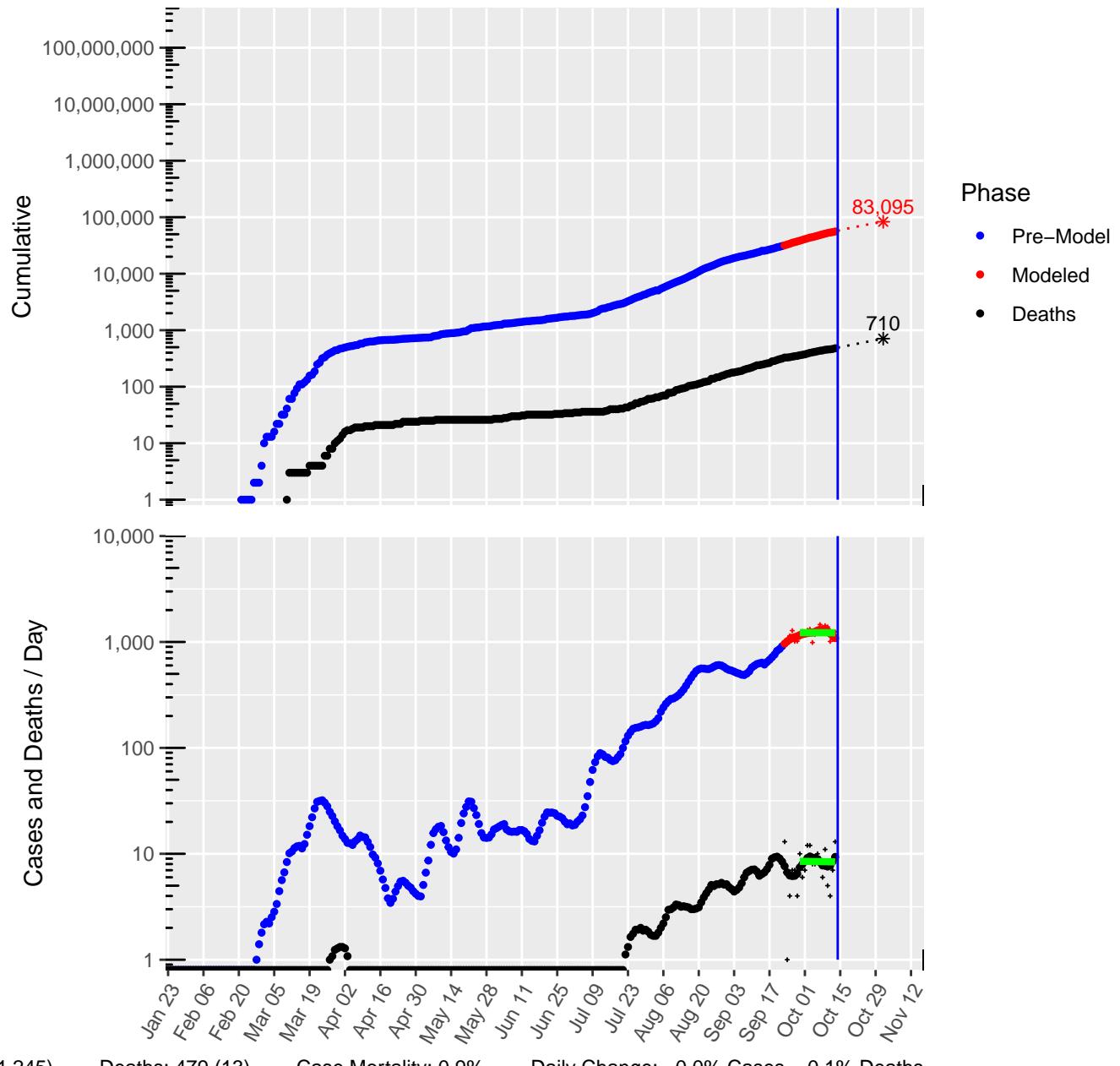
Israel projection as of 2020-10-14



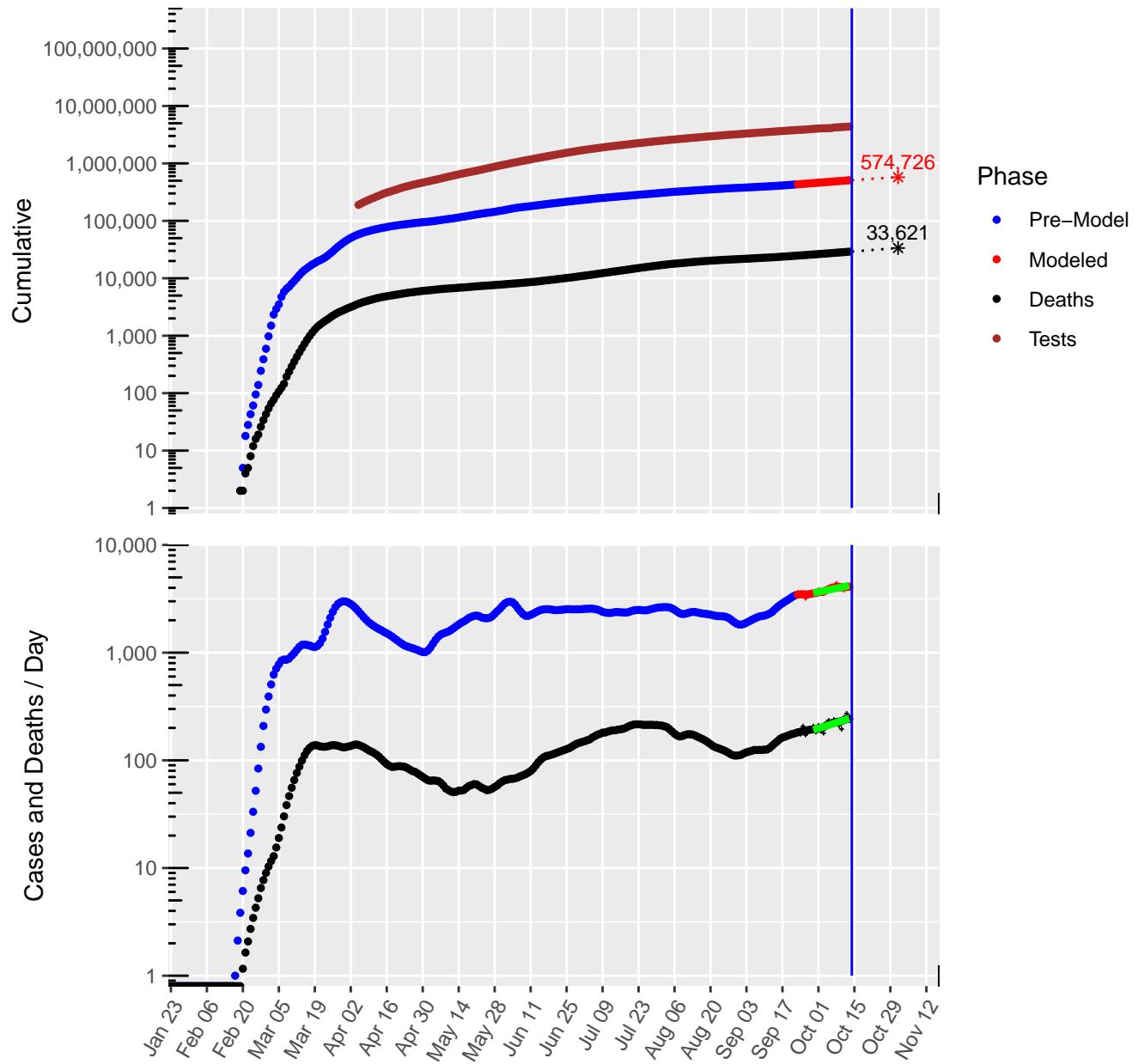
Turkey projection as of 2020-10-14



Lebanon projection as of 2020-10-14

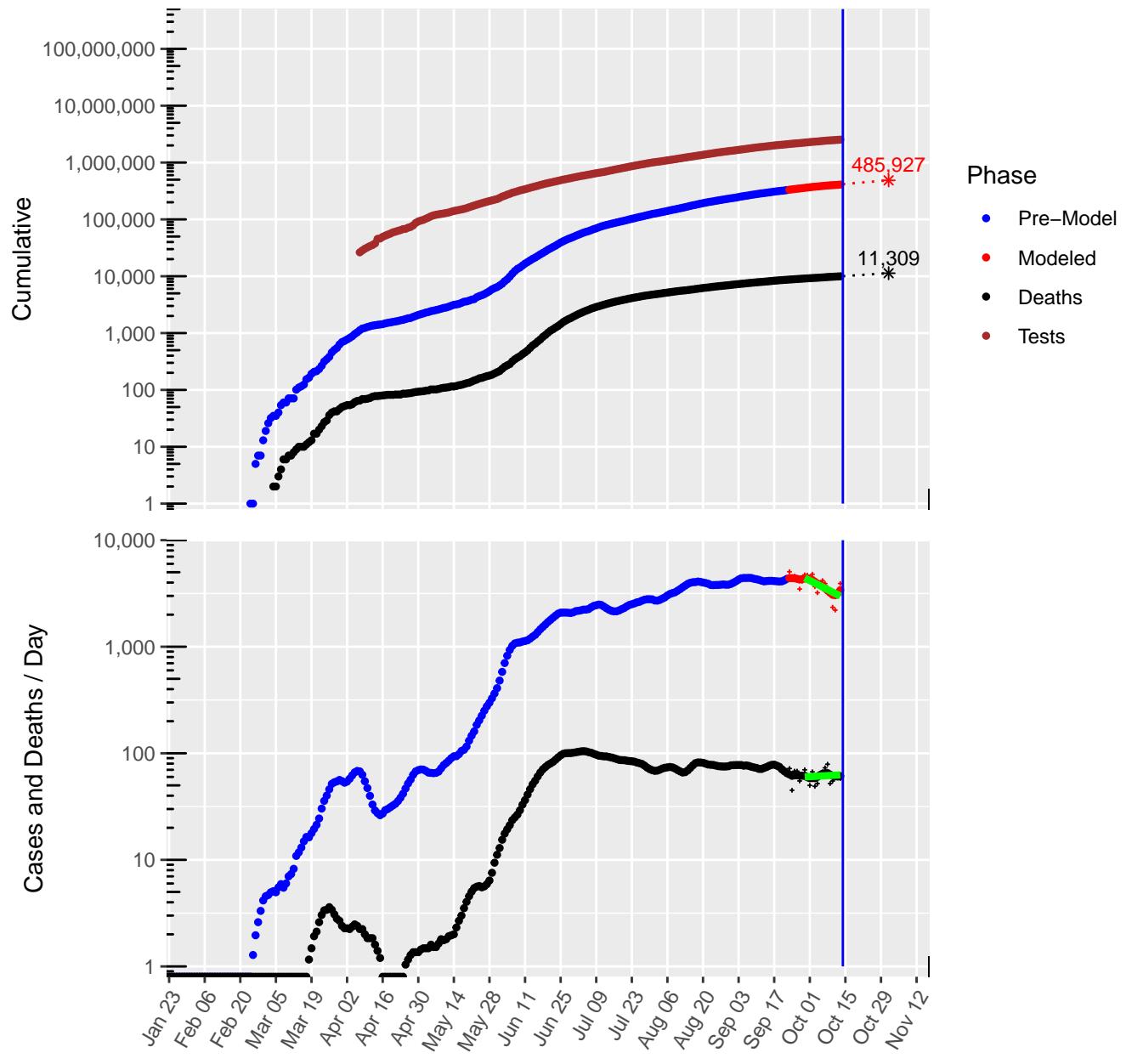


Iran projection as of 2020-10-14

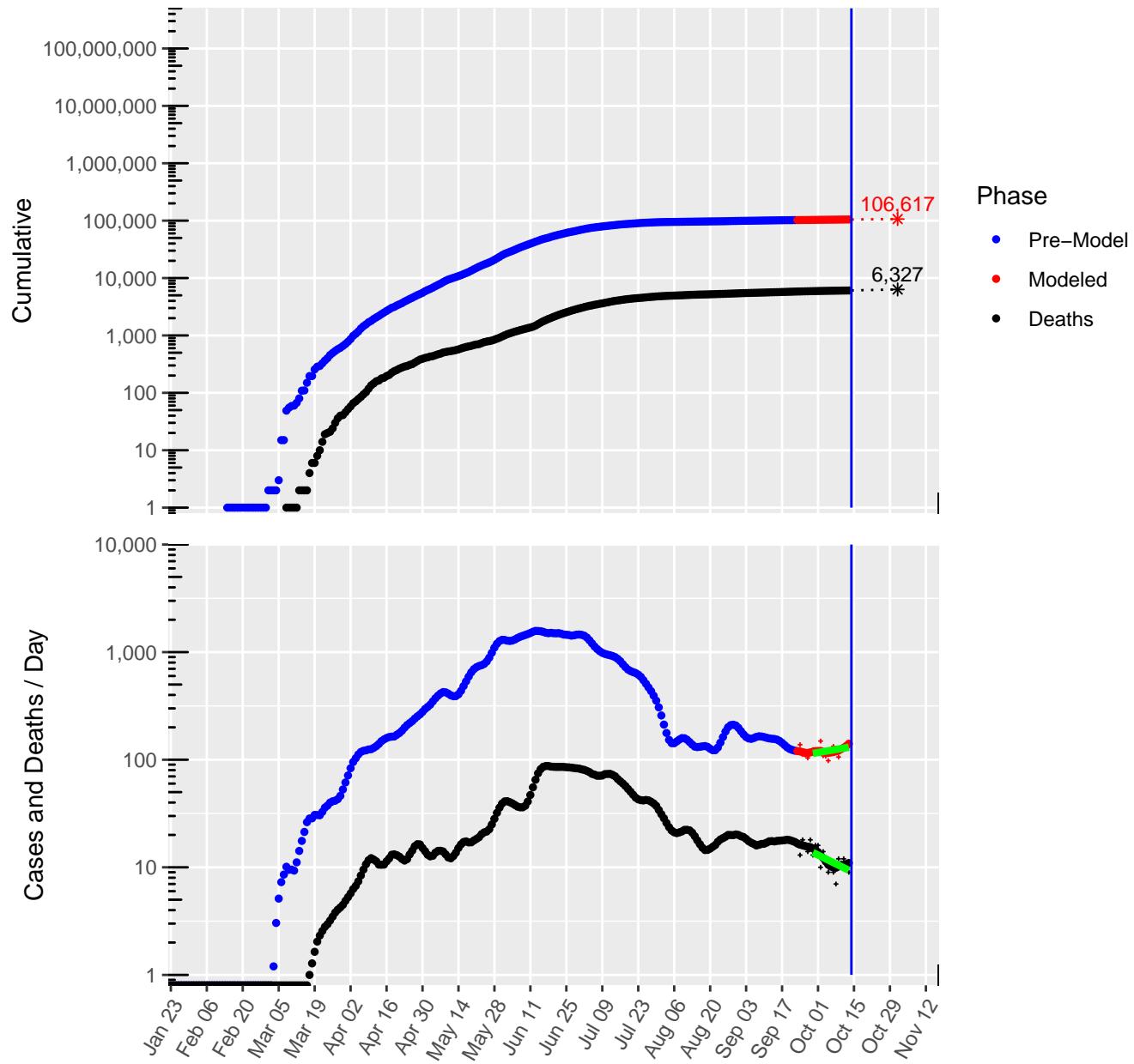


(3) -- Deaths: 29,070 (254) -- Case Mortality: 5.7% -- Daily Change: +1.1% Cases, +1.7% Deaths

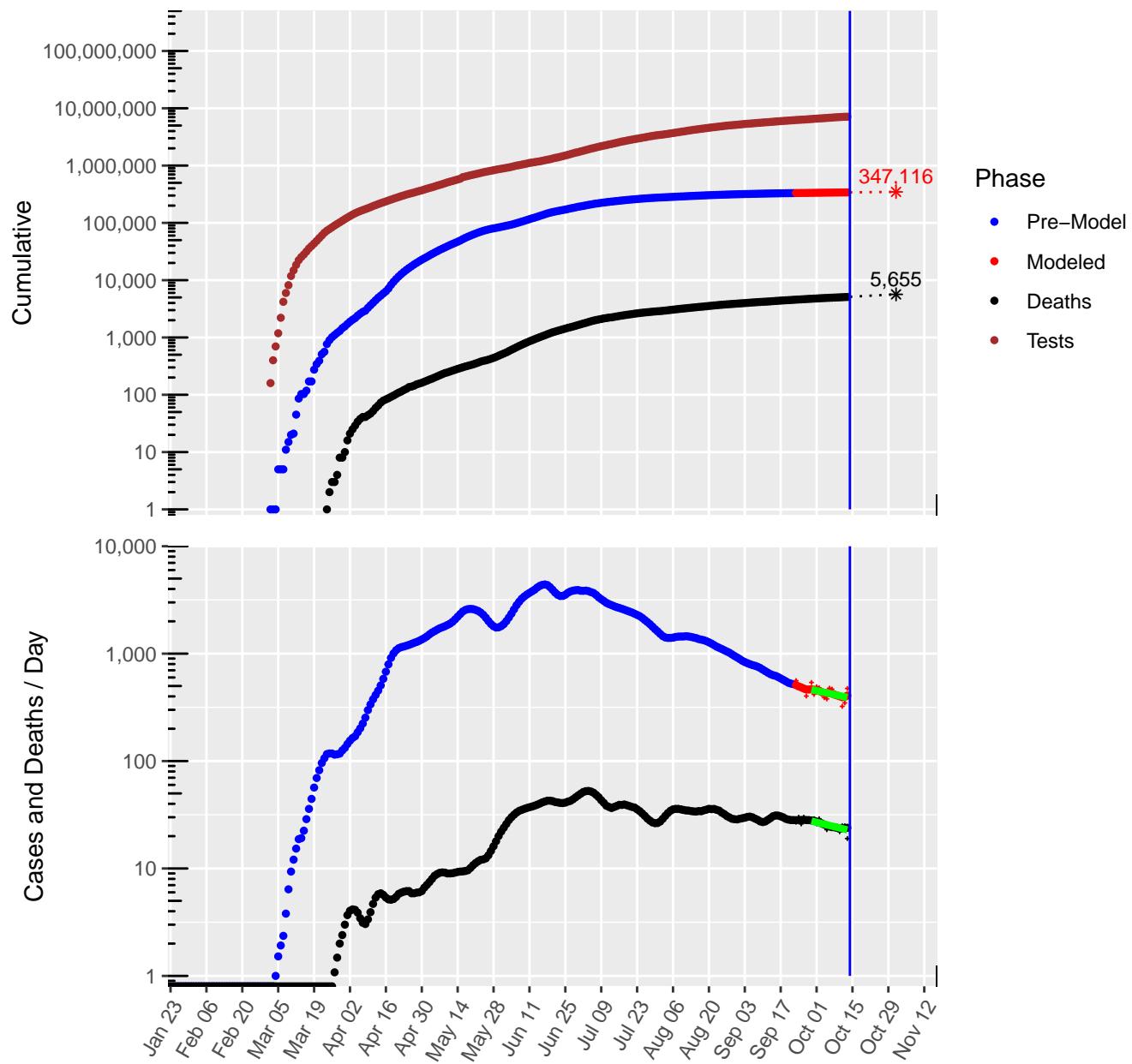
Iraq projection as of 2020-10-14



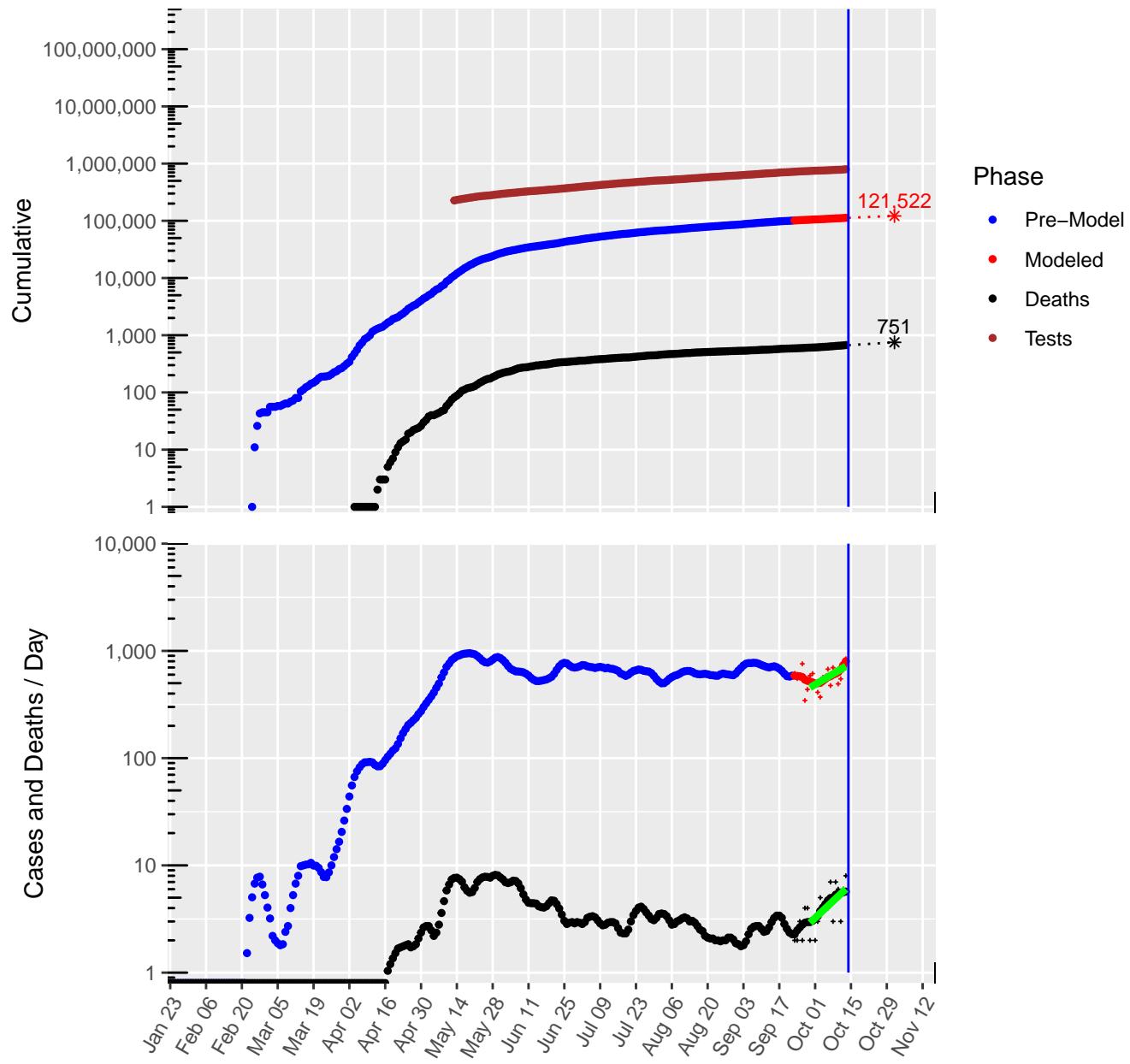
Egypt projection as of 2020-10-14



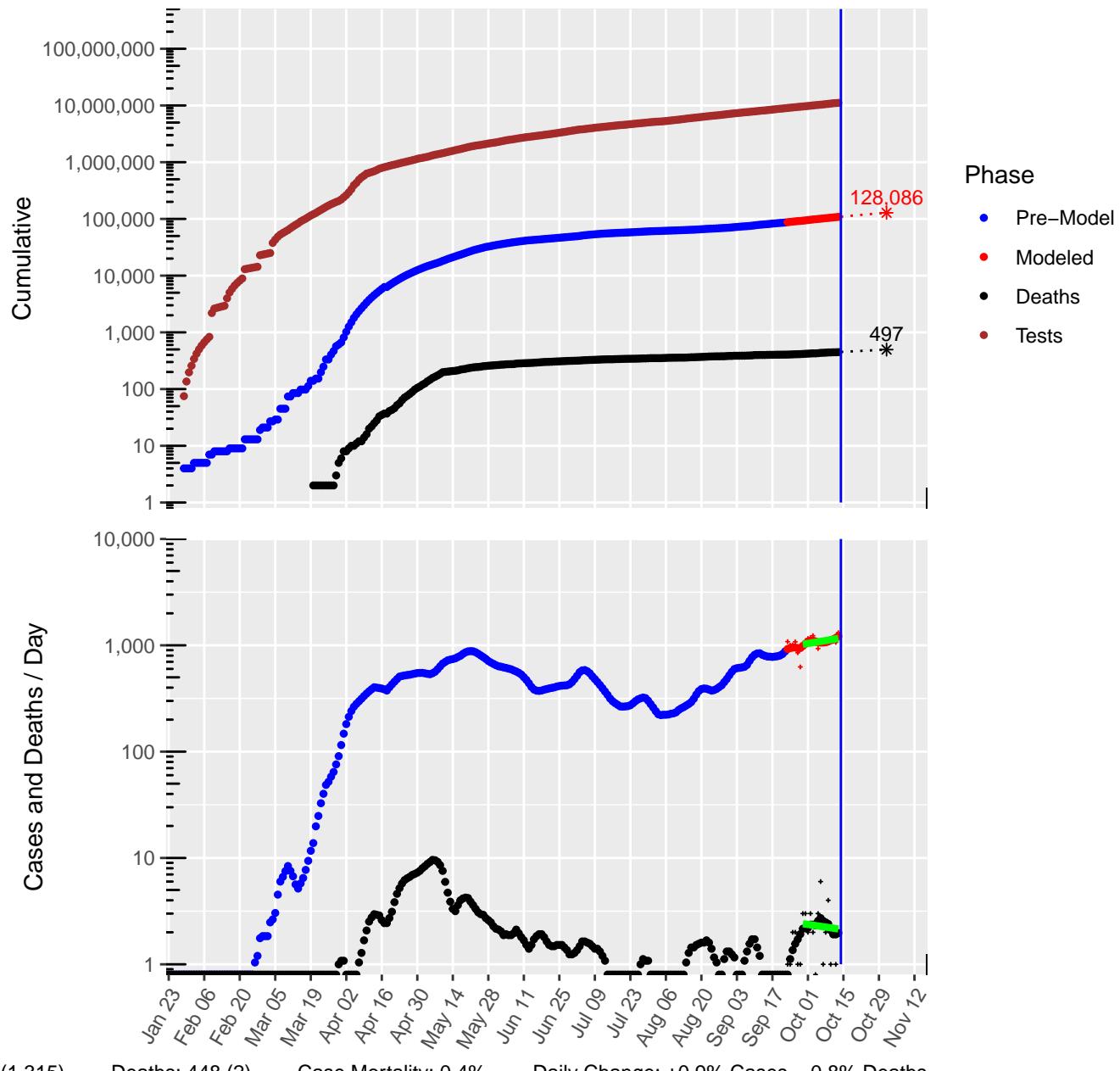
Saudi Arabia projection as of 2020-10-14



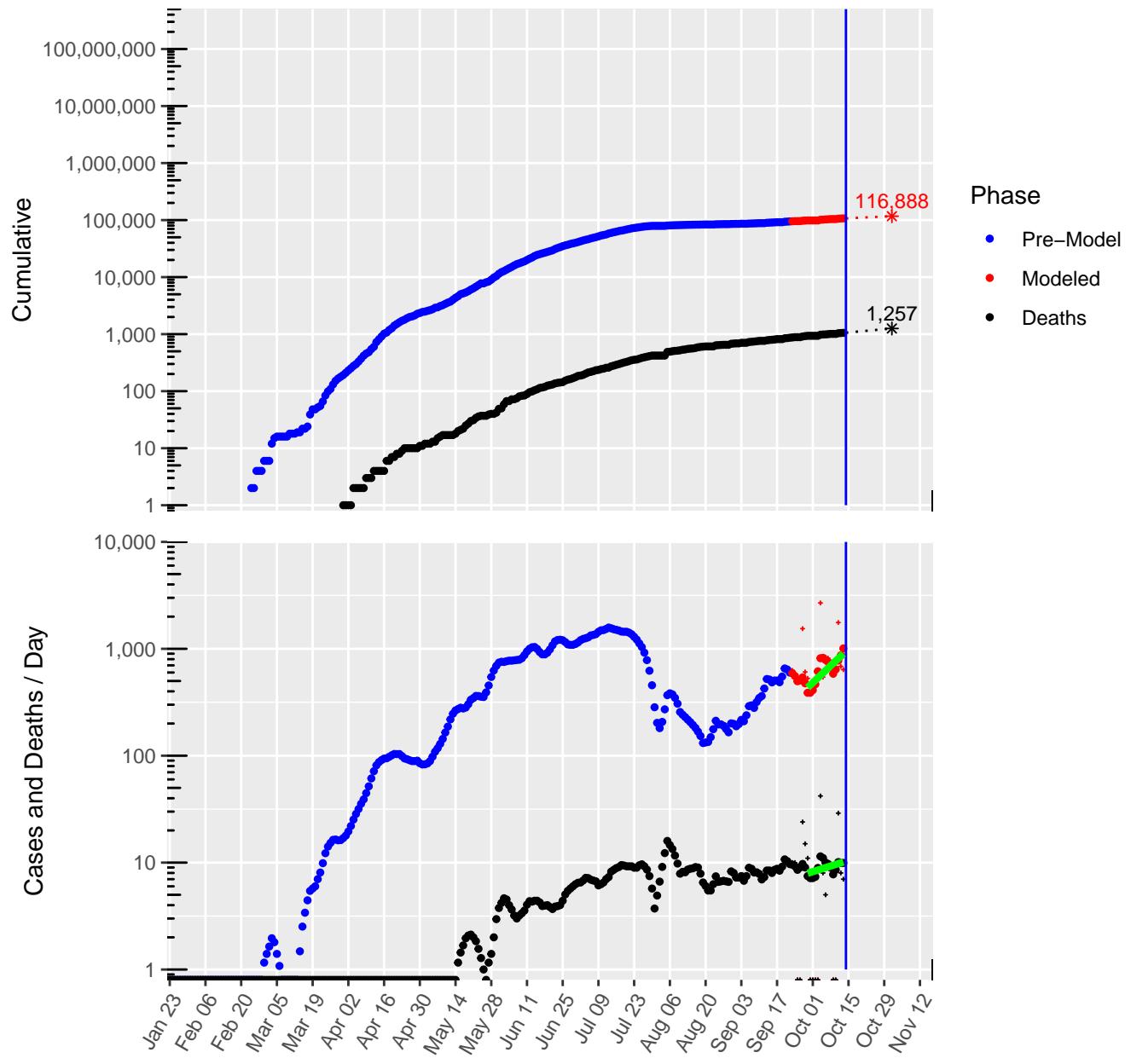
Kuwait projection as of 2020-10-14



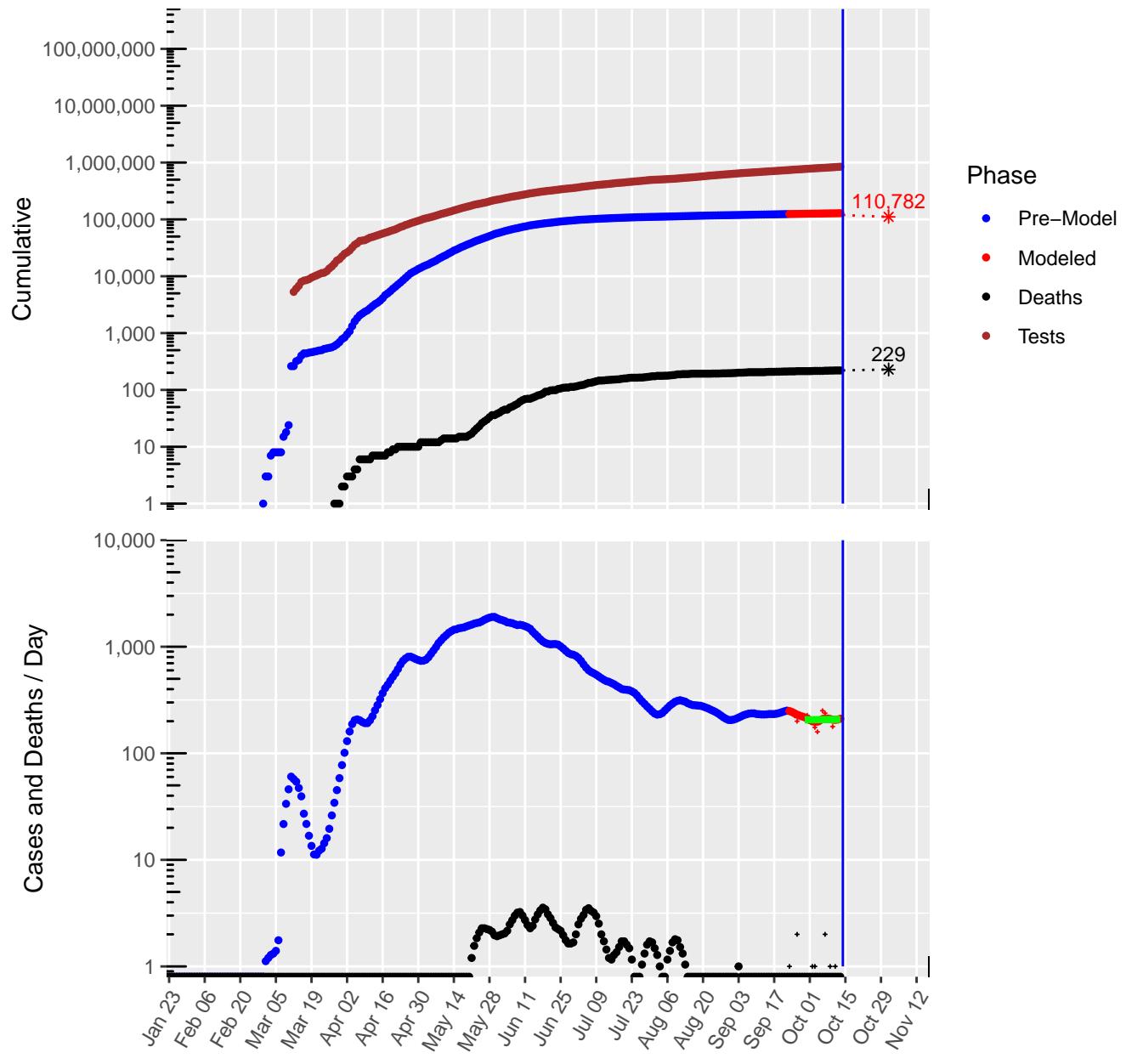
United Arab Emirates projection as of 2020-10-14



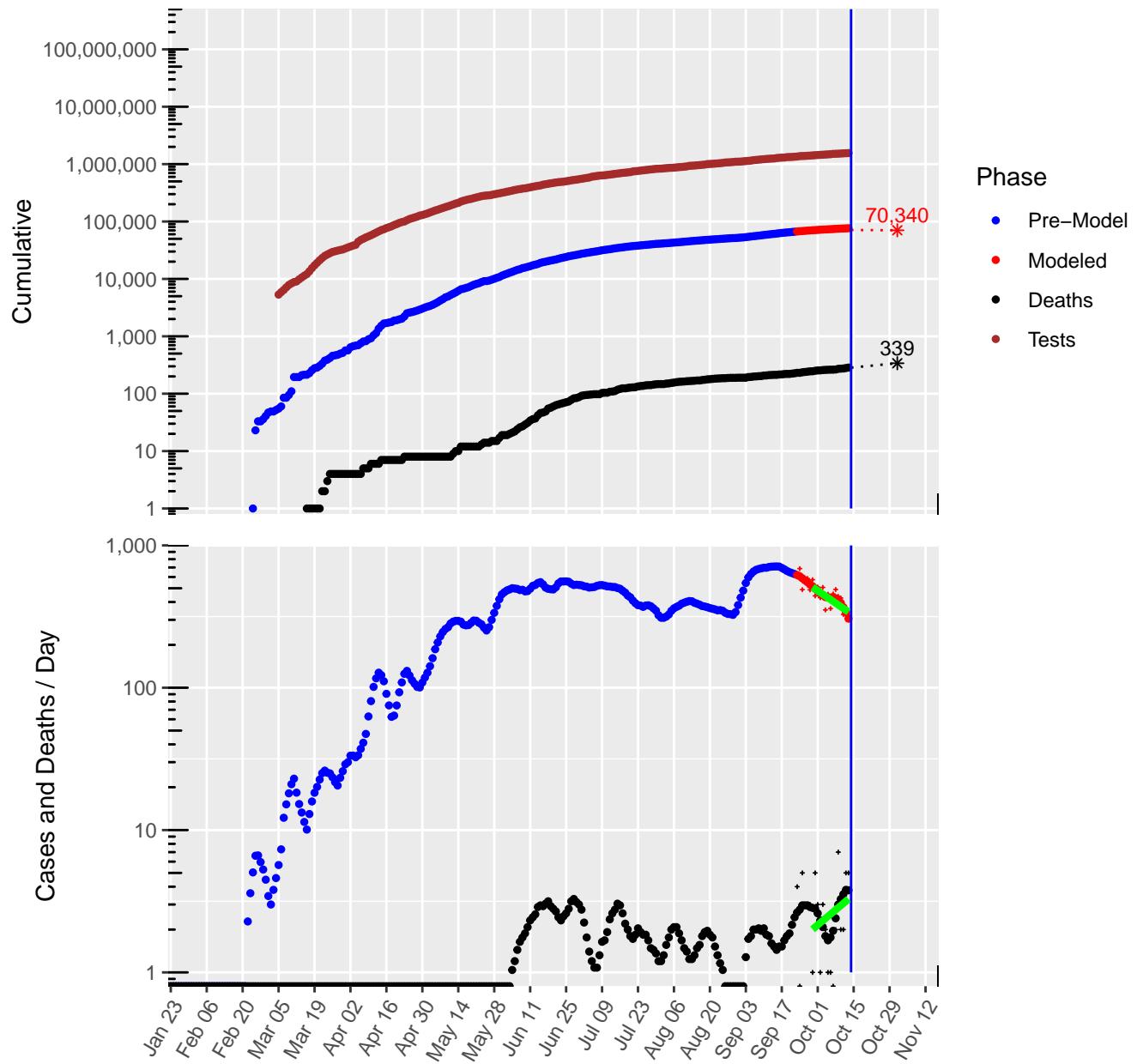
Oman projection as of 2020-10-14



Qatar projection as of 2020-10-14

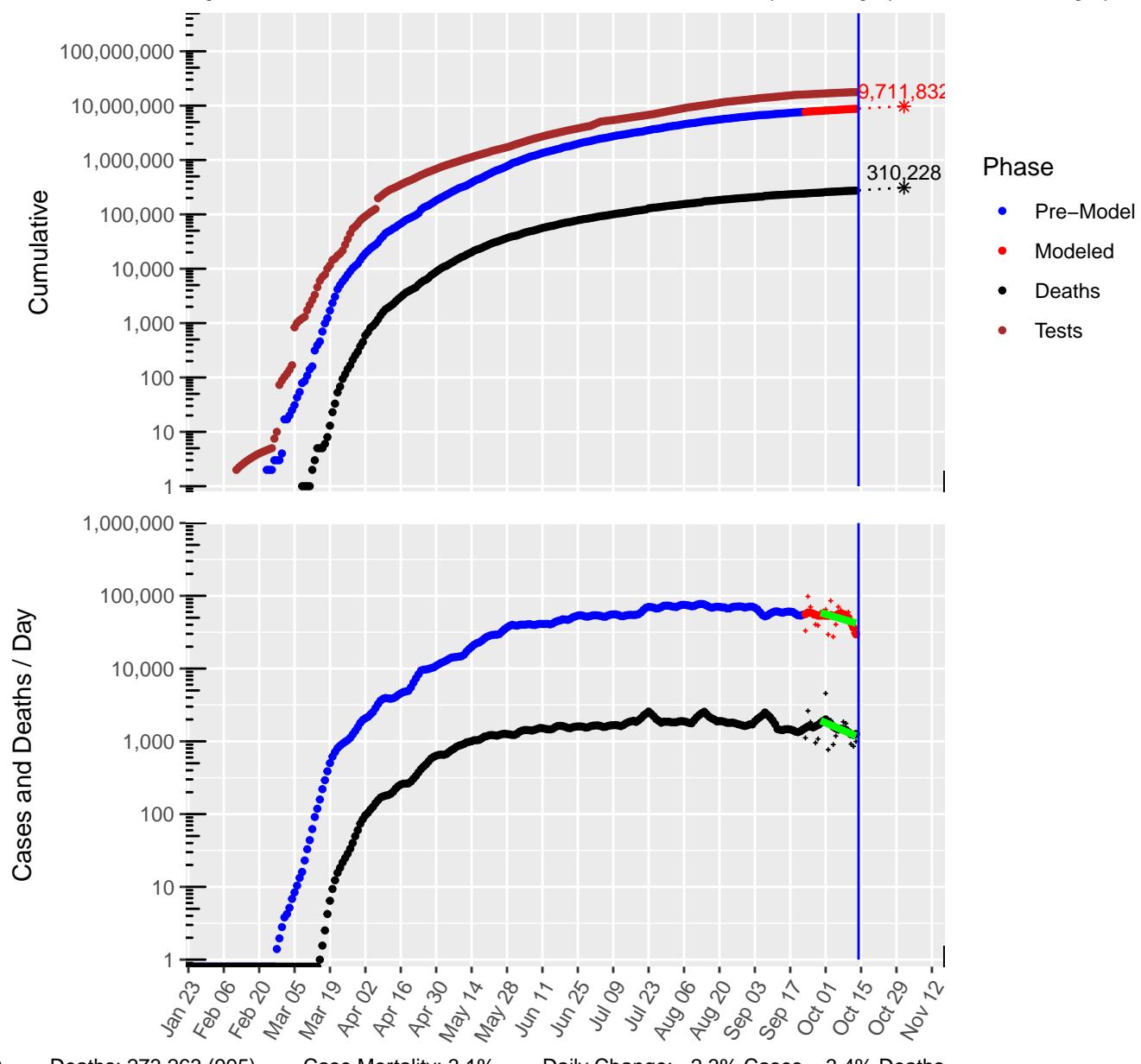


Bahrain projection as of 2020-10-14

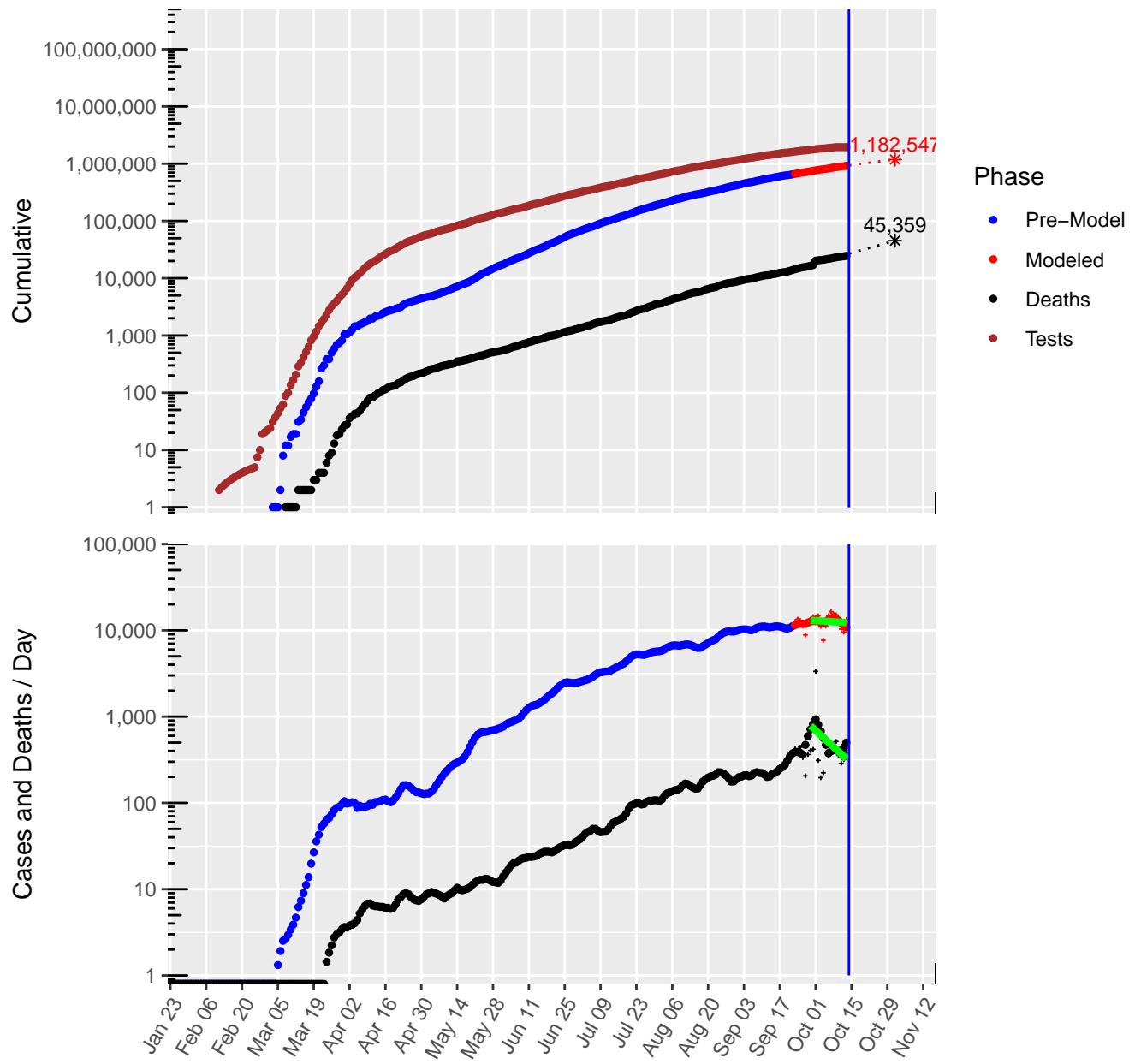


South America projection as of 2020-10-14

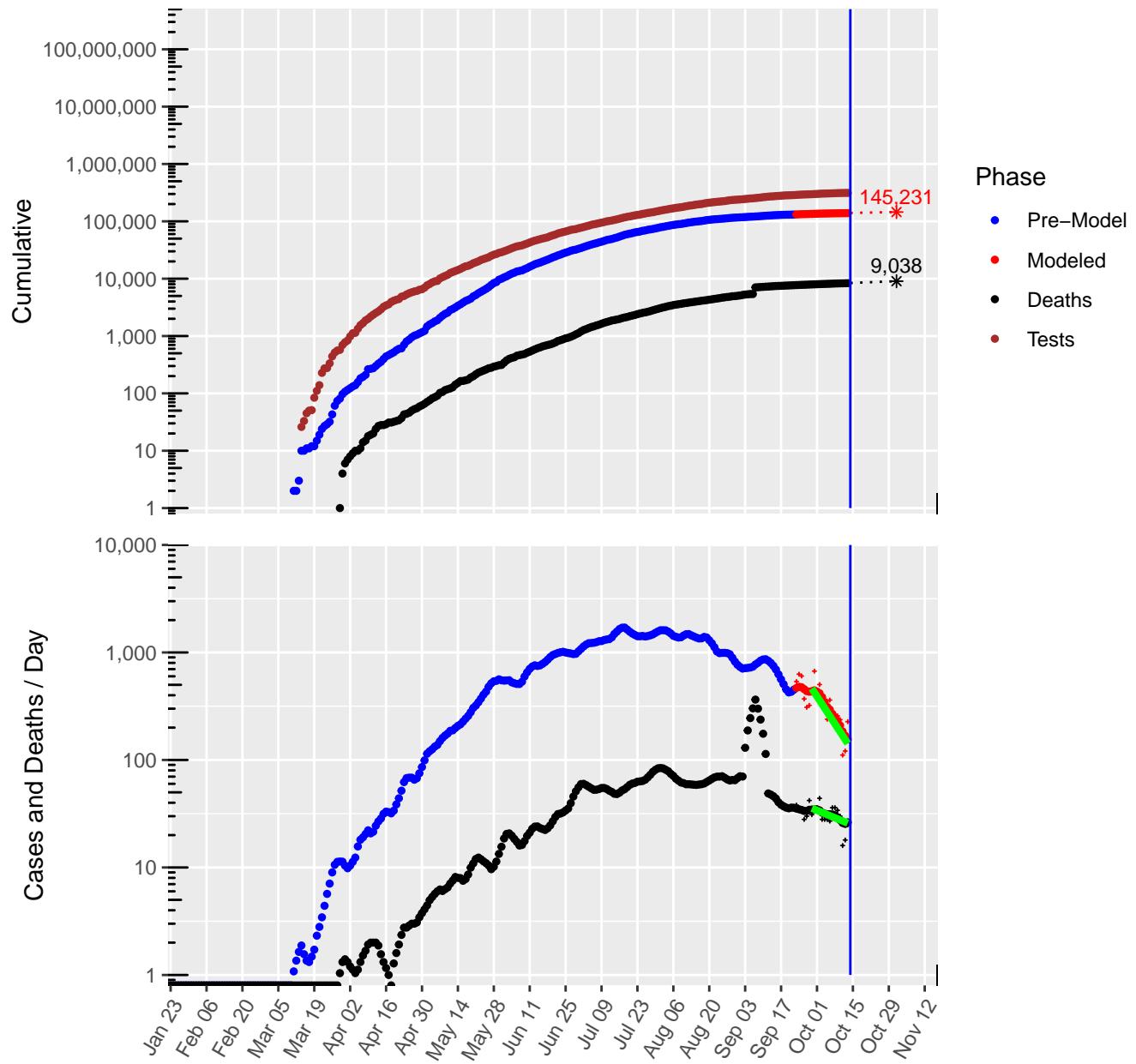
Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela



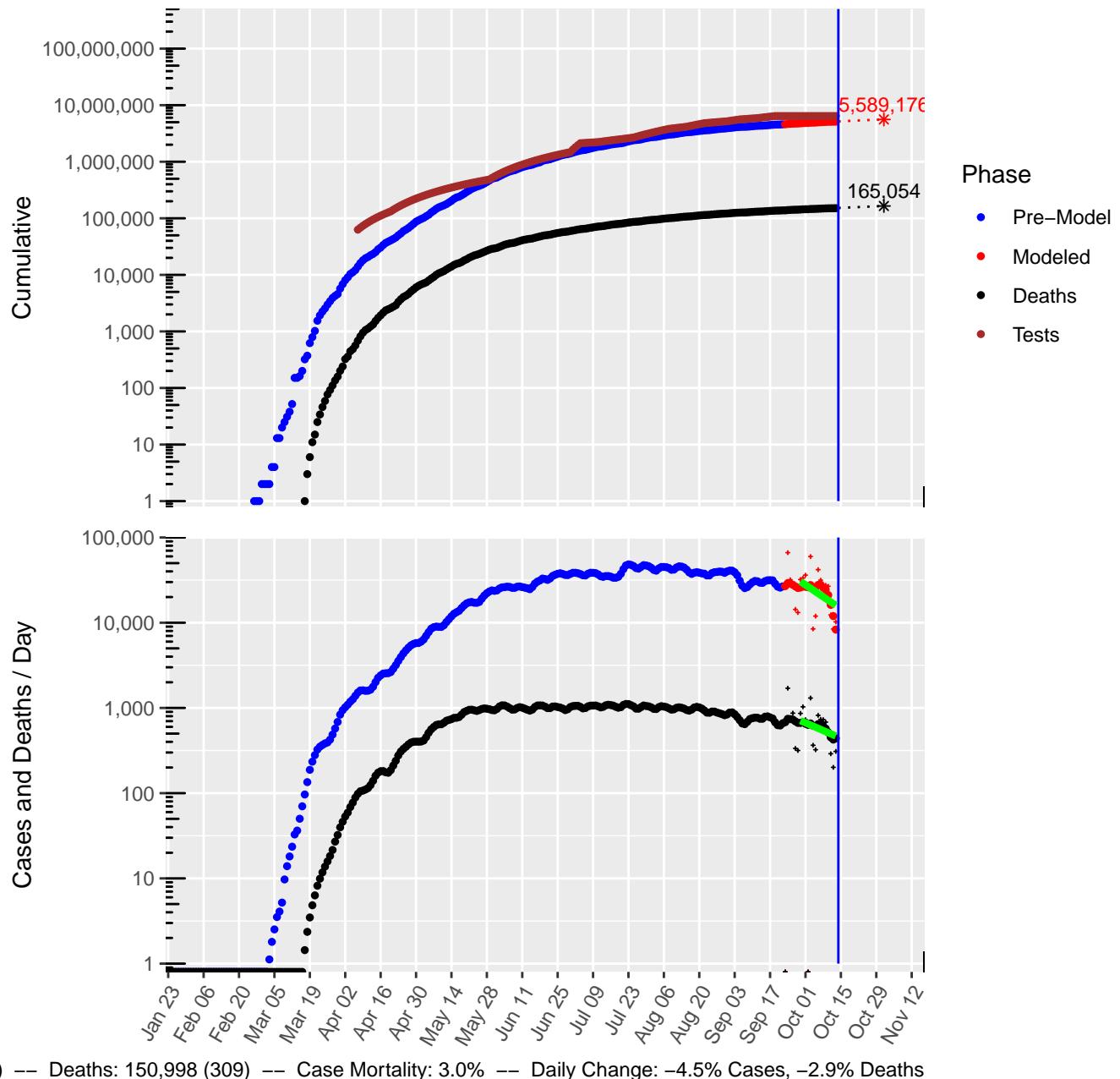
Argentina projection as of 2020-10-14



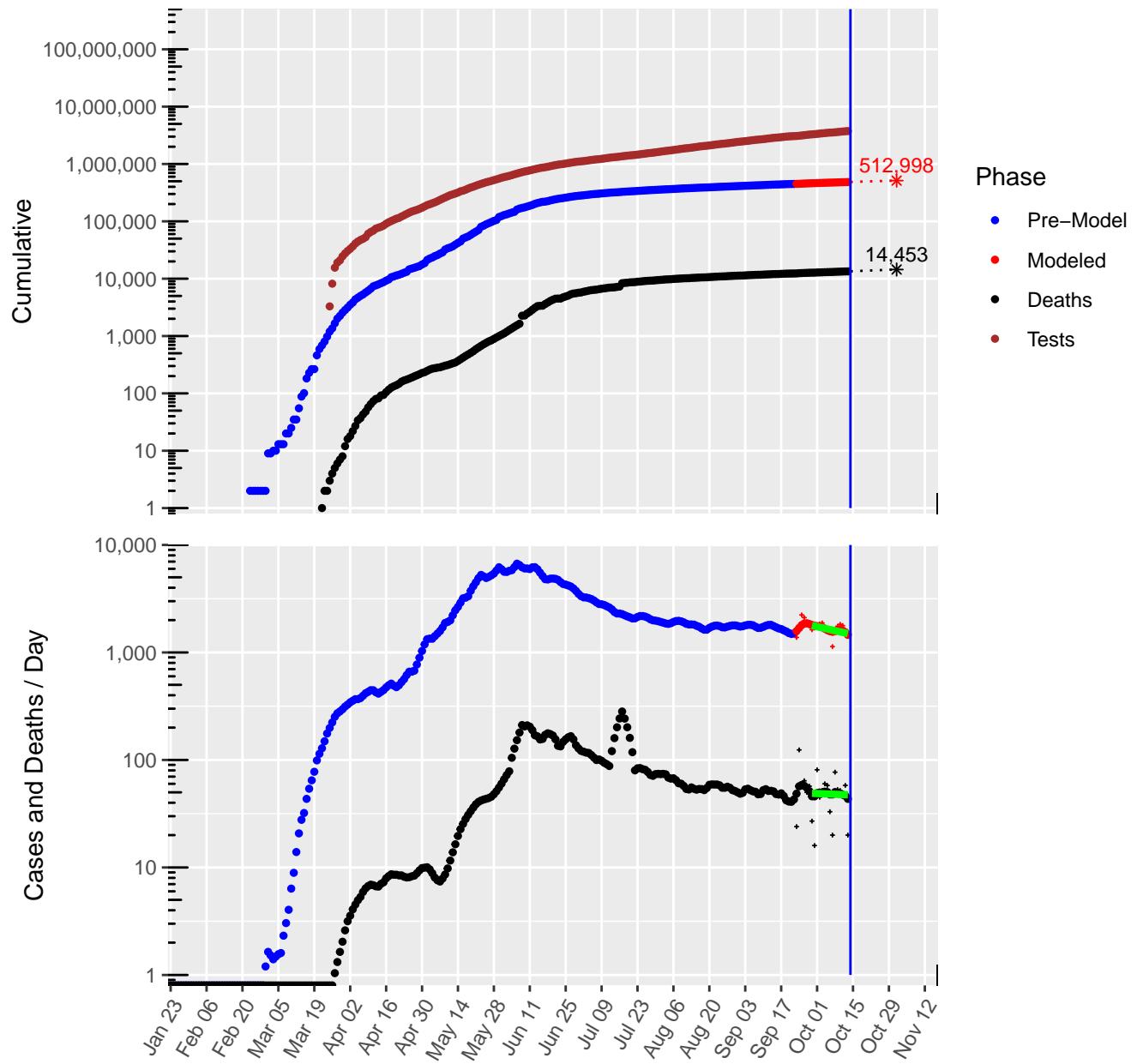
Bolivia projection as of 2020-10-14



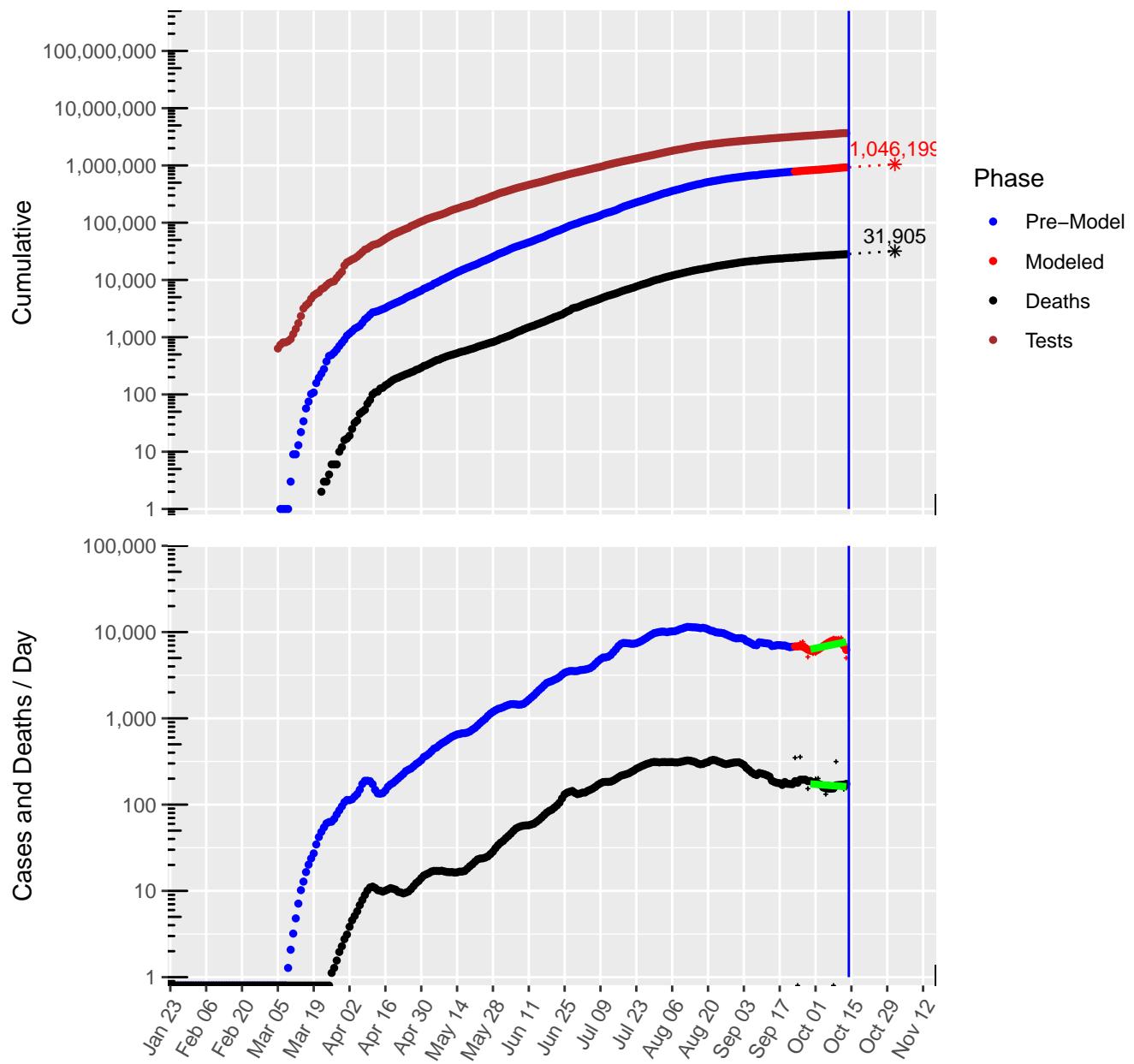
Brazil projection as of 2020-10-14



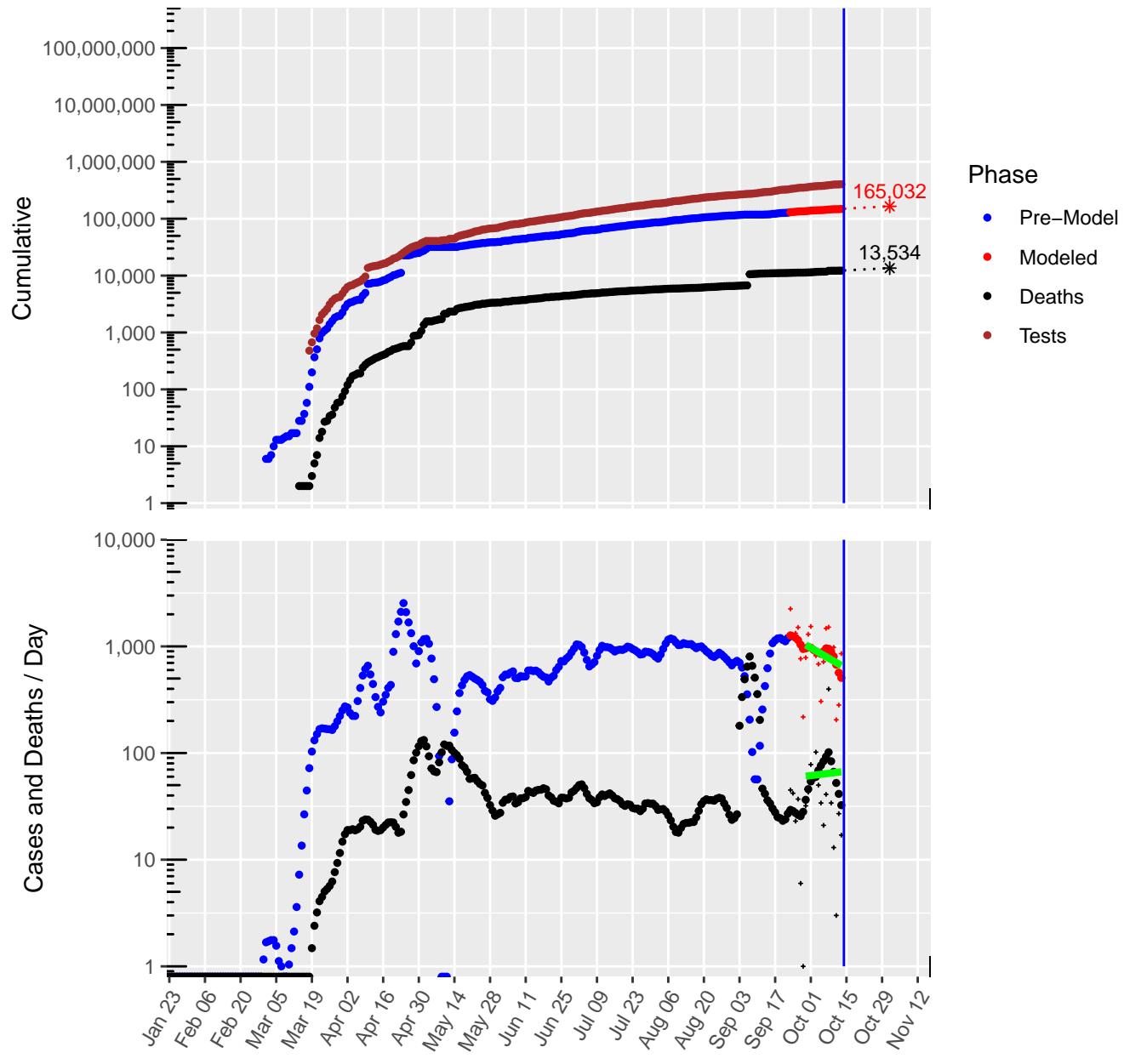
Chile projection as of 2020-10-14



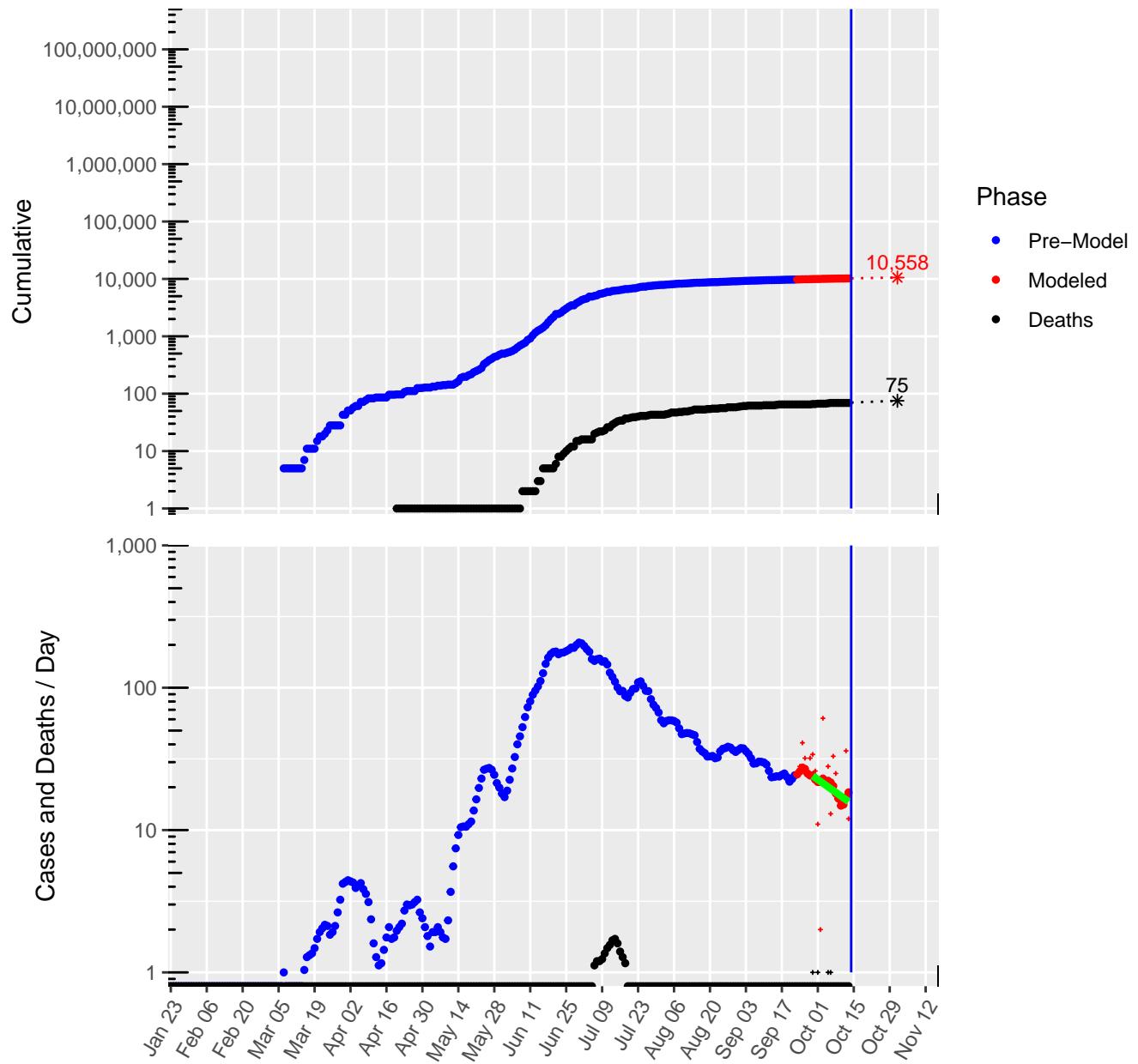
Colombia projection as of 2020-10-14



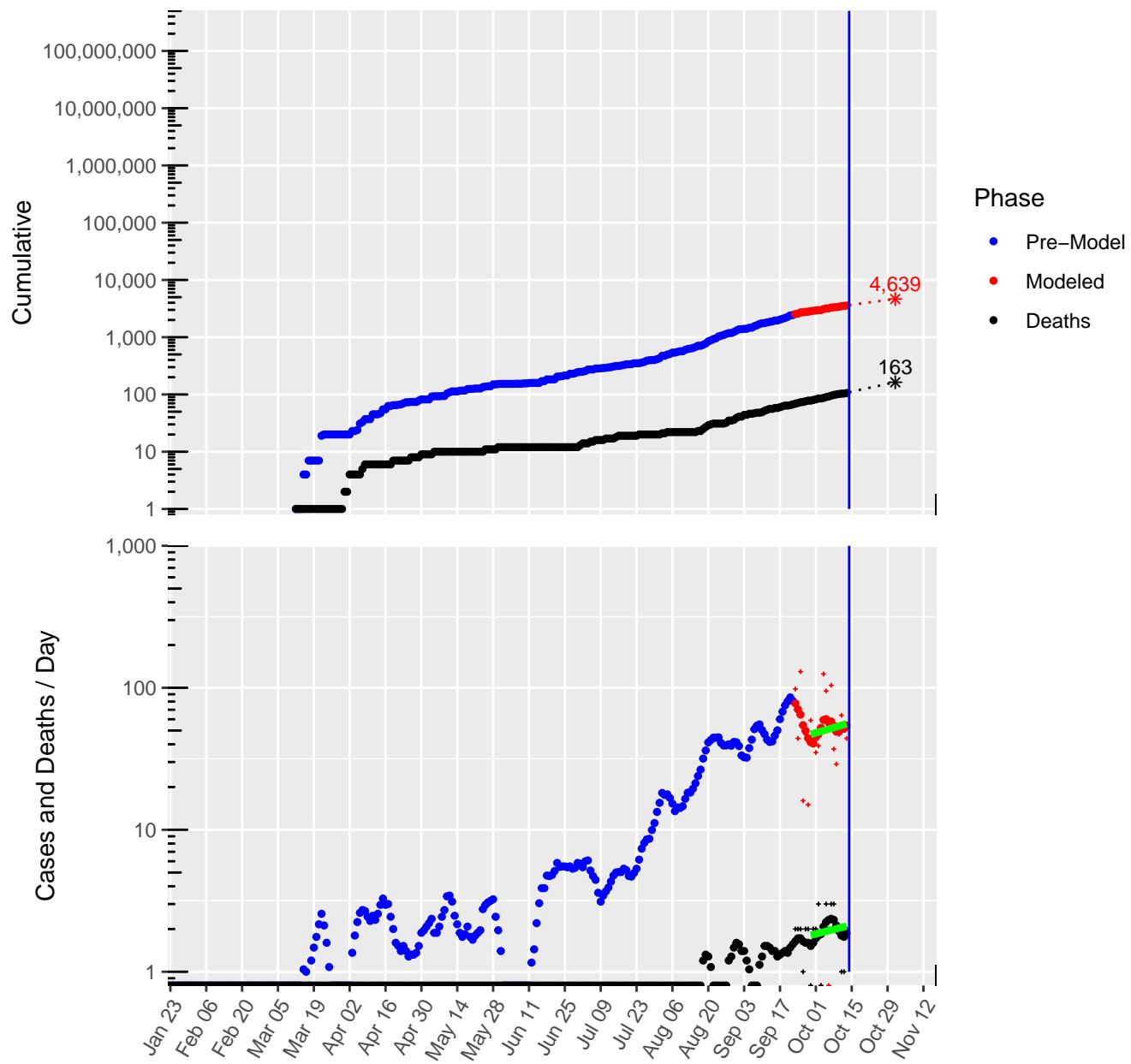
Ecuador projection as of 2020-10-14



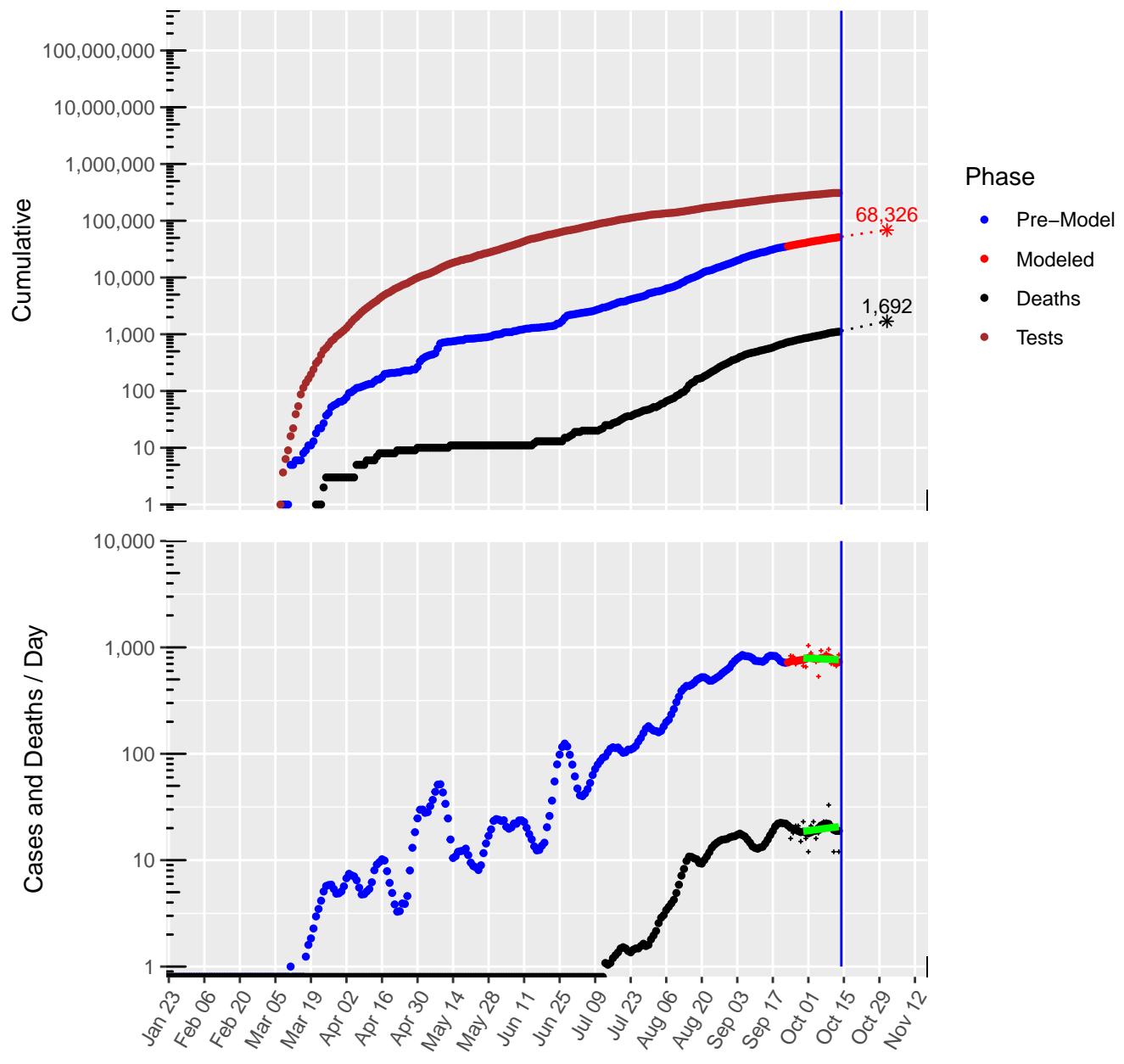
French Guiana projection as of 2020-10-14



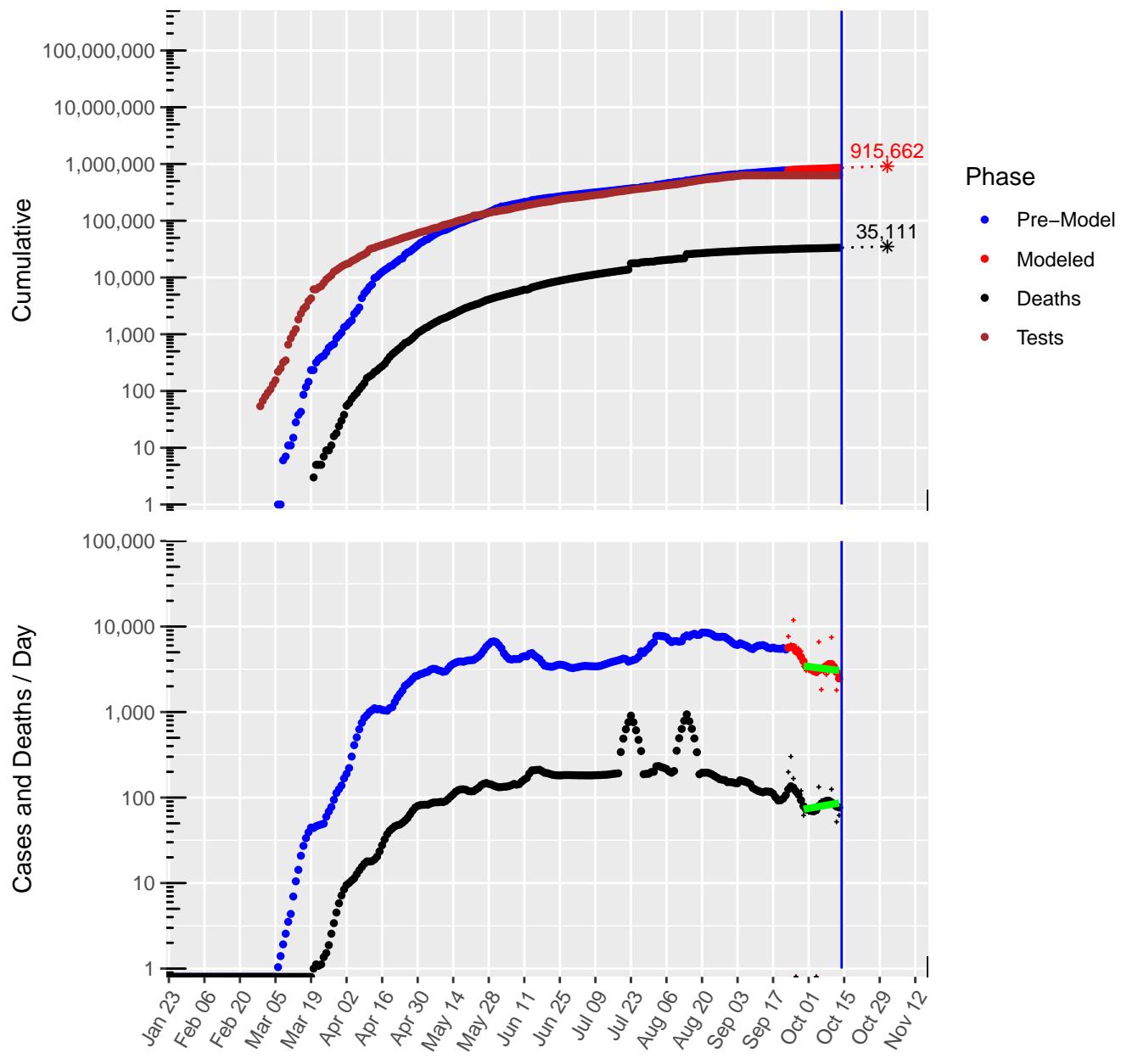
Guyana projection as of 2020-10-14



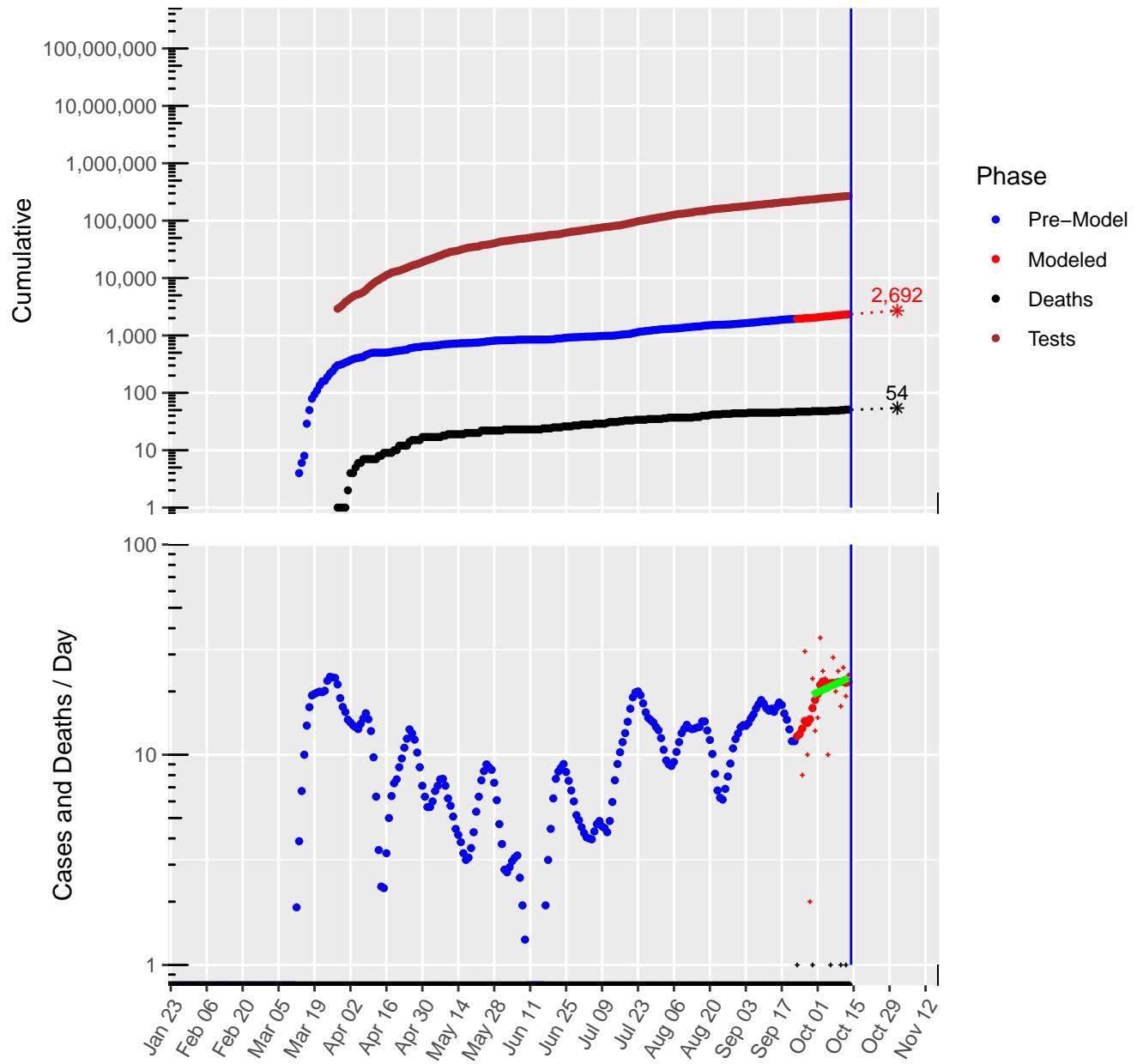
Paraguay projection as of 2020-10-14



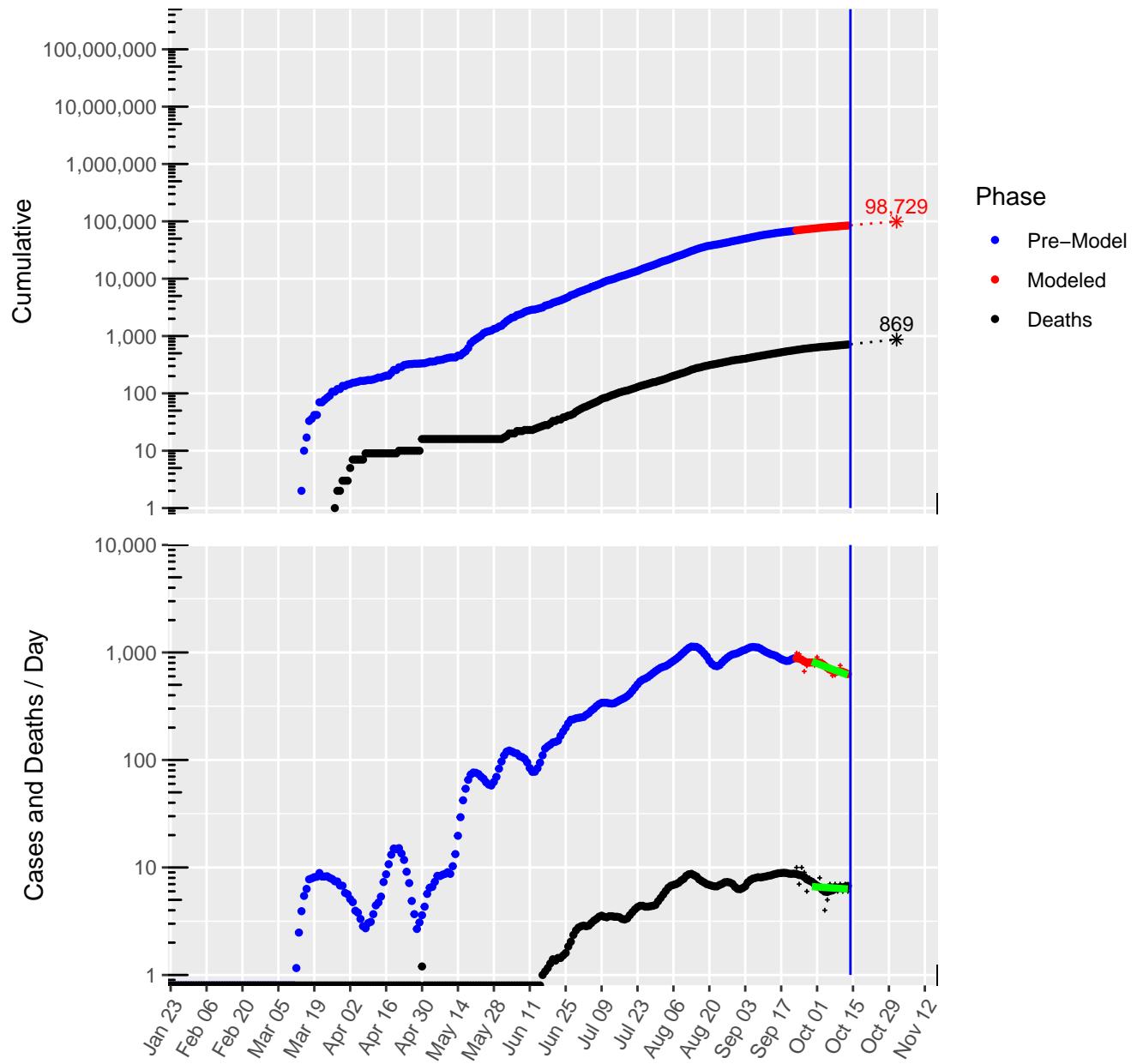
Peru projection as of 2020-10-14



Uruguay projection as of 2020-10-14

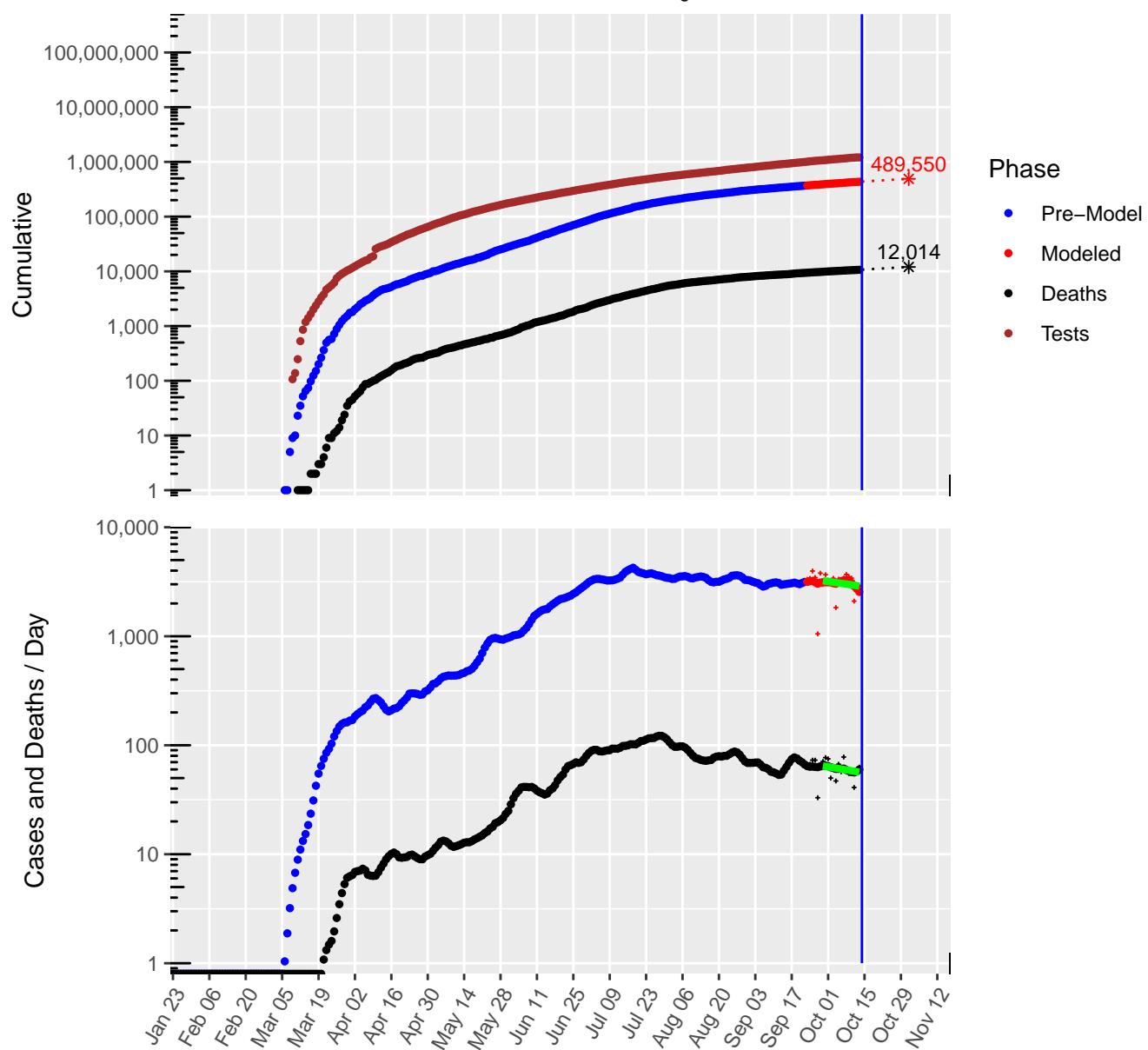


Venezuela projection as of 2020-10-14

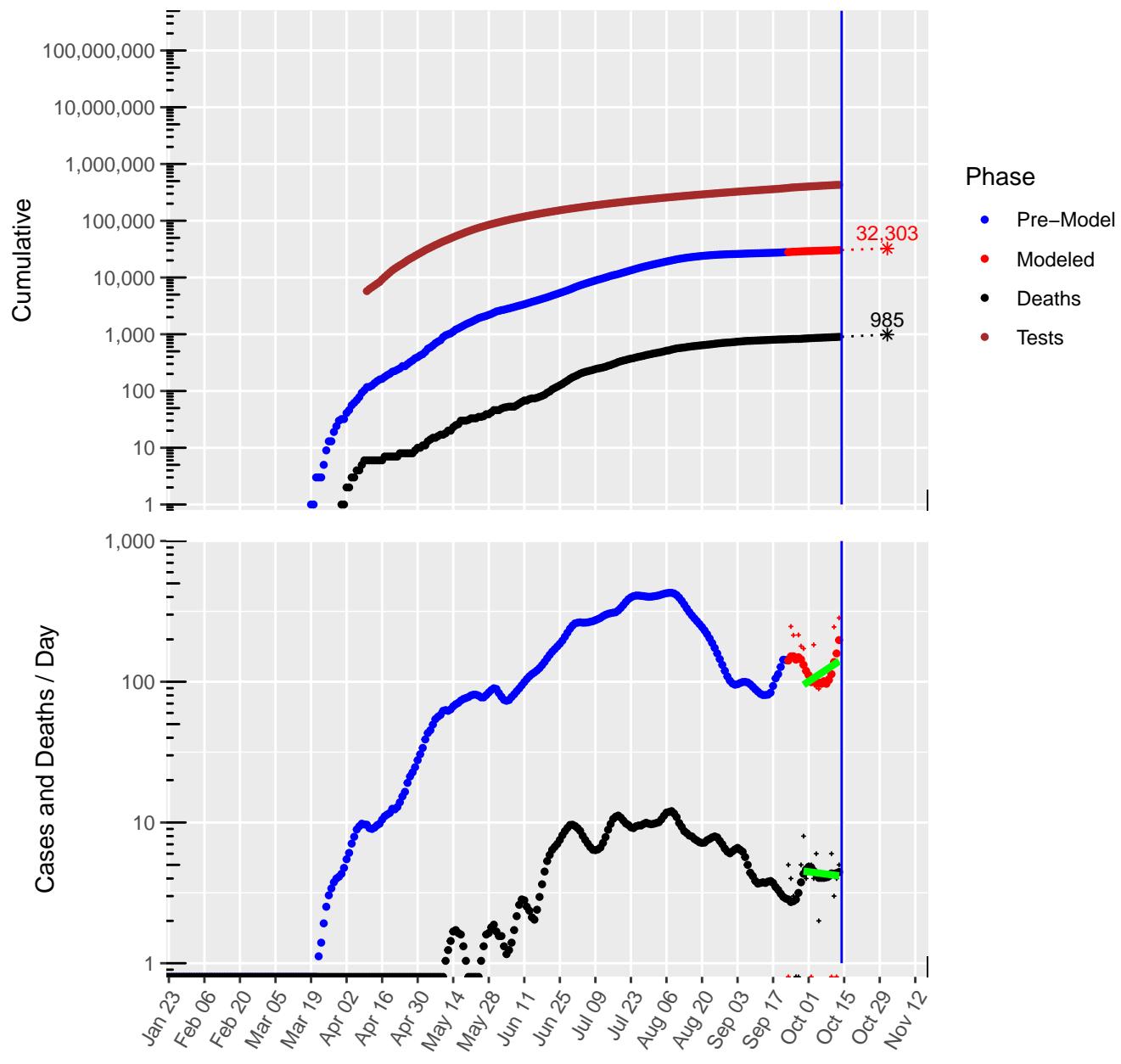


Central America projection as of 2020-10-14

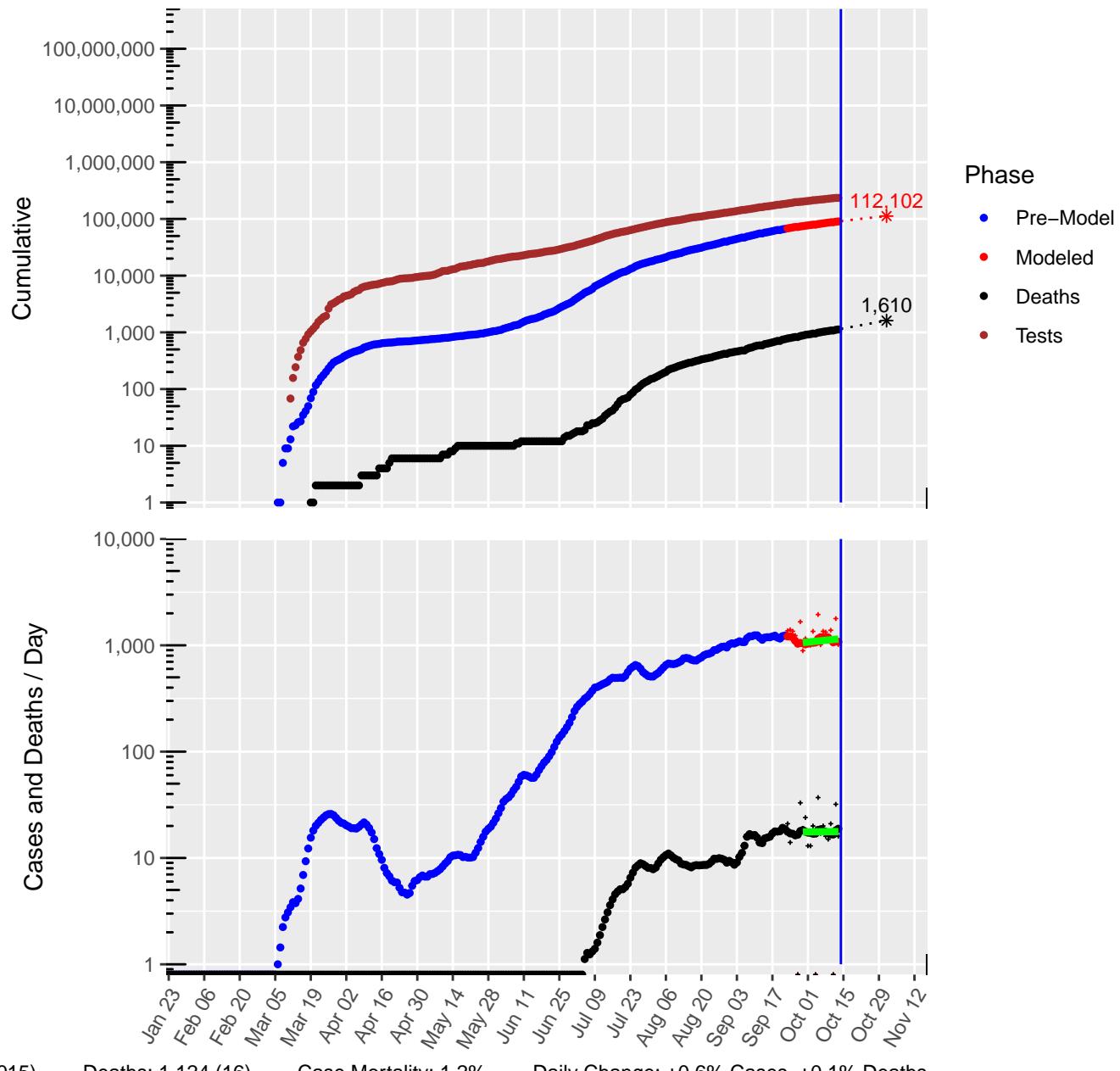
El Salvador, Costa Rica, Belize, Guatemala, Honduras, Nicaragua, and Panama



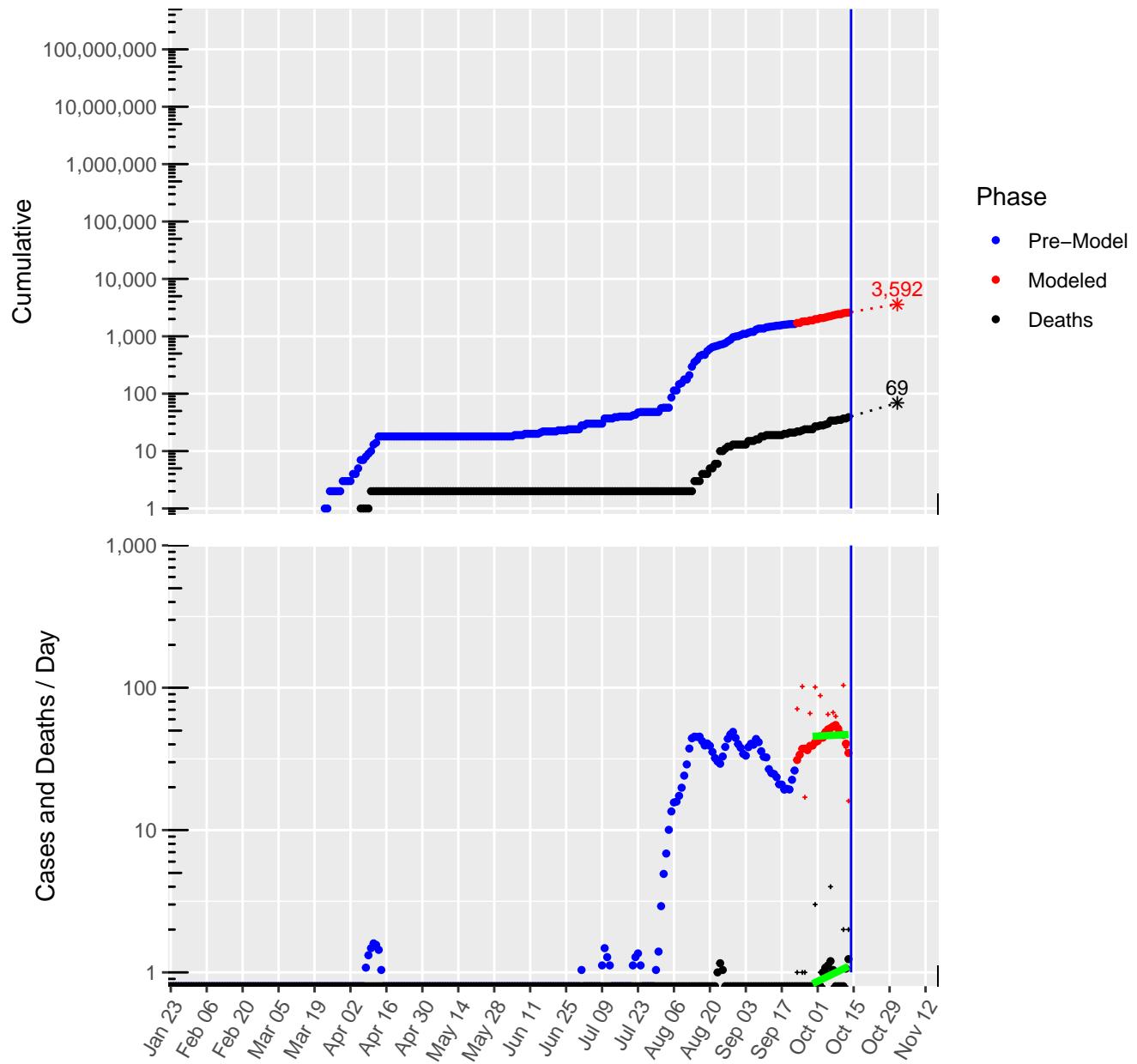
El Salvador projection as of 2020-10-14



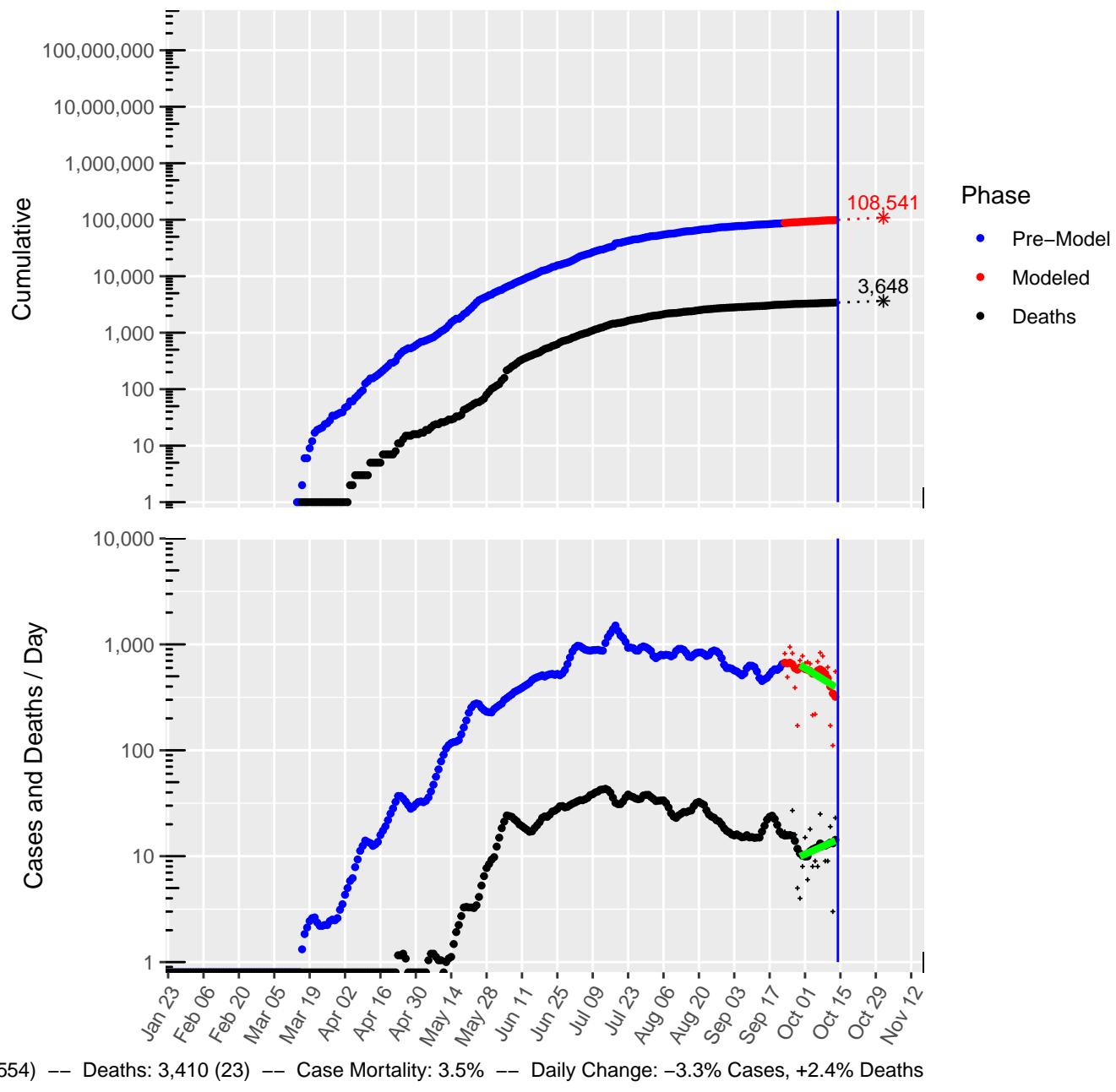
Costa Rica projection as of 2020-10-14



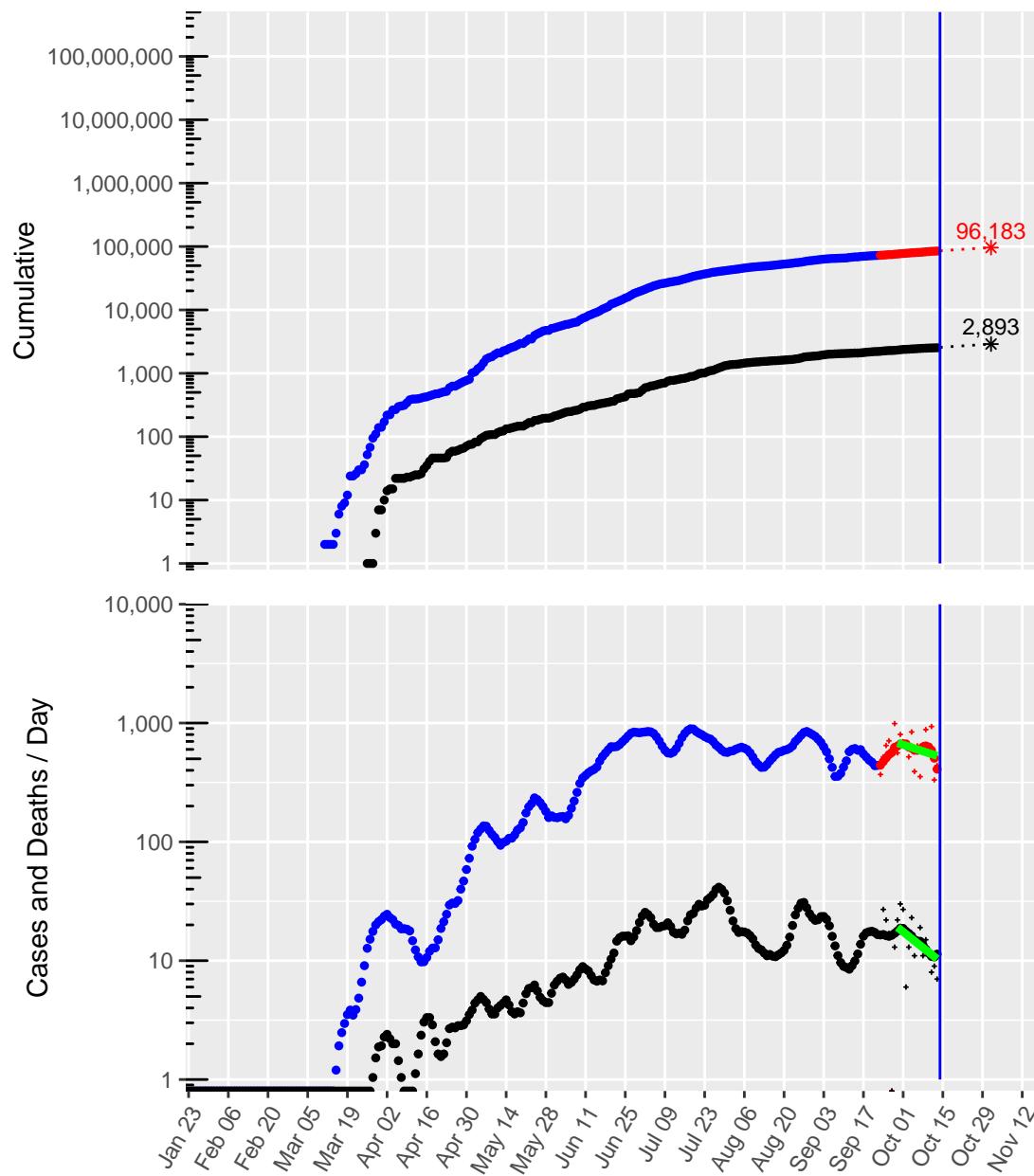
Belize projection as of 2020-10-14



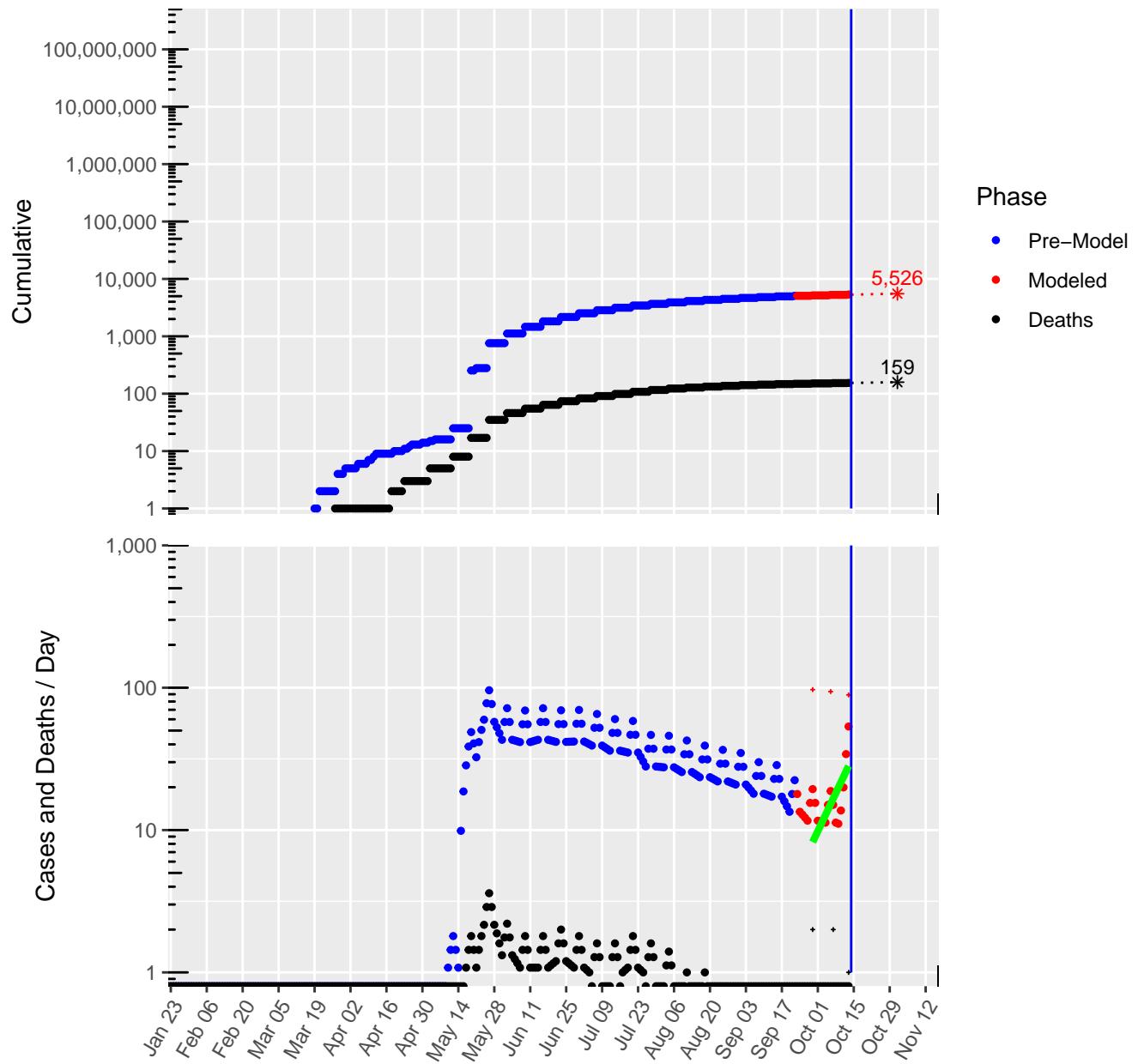
Guatemala projection as of 2020-10-14



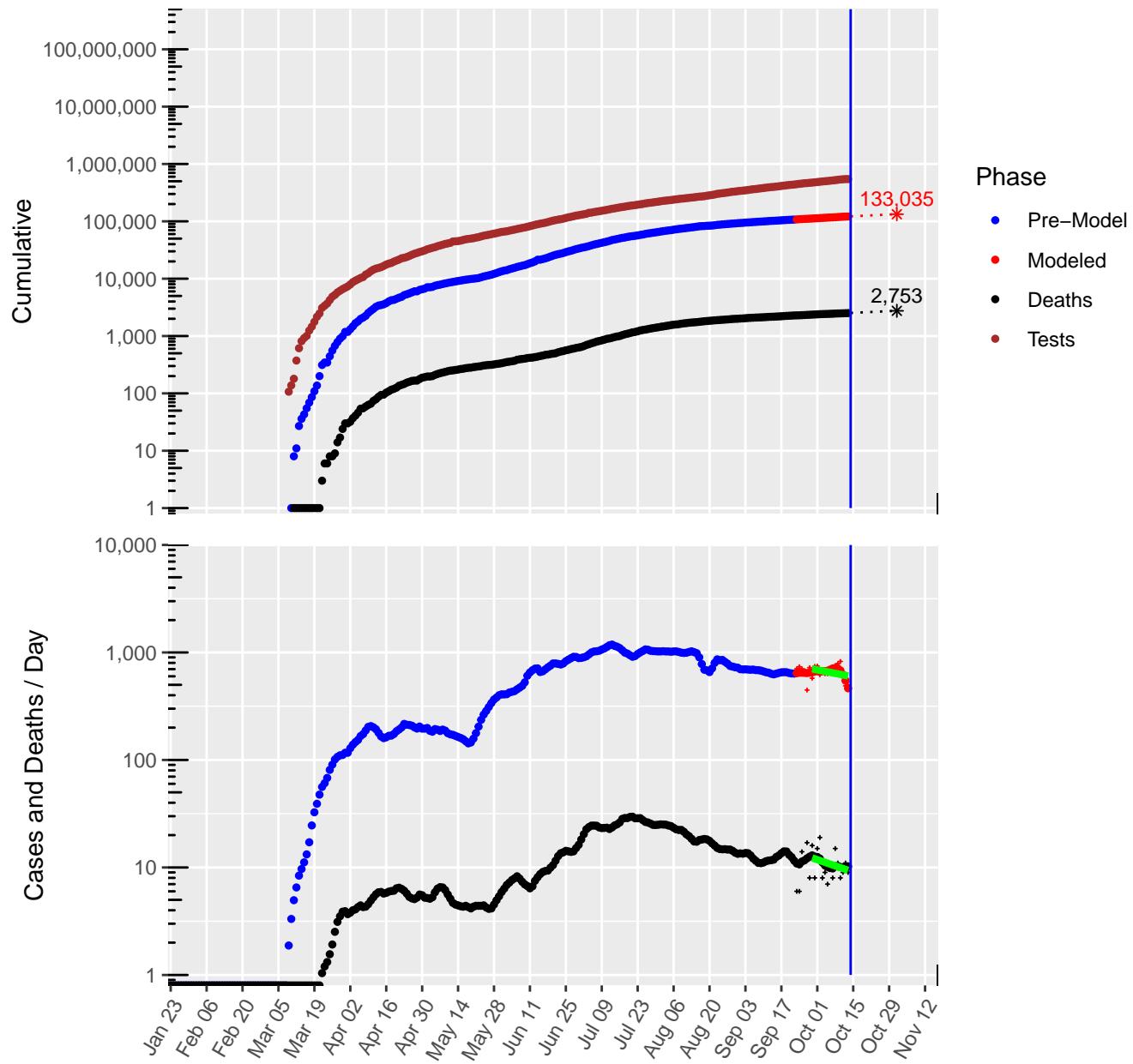
Honduras projection as of 2020-10-14



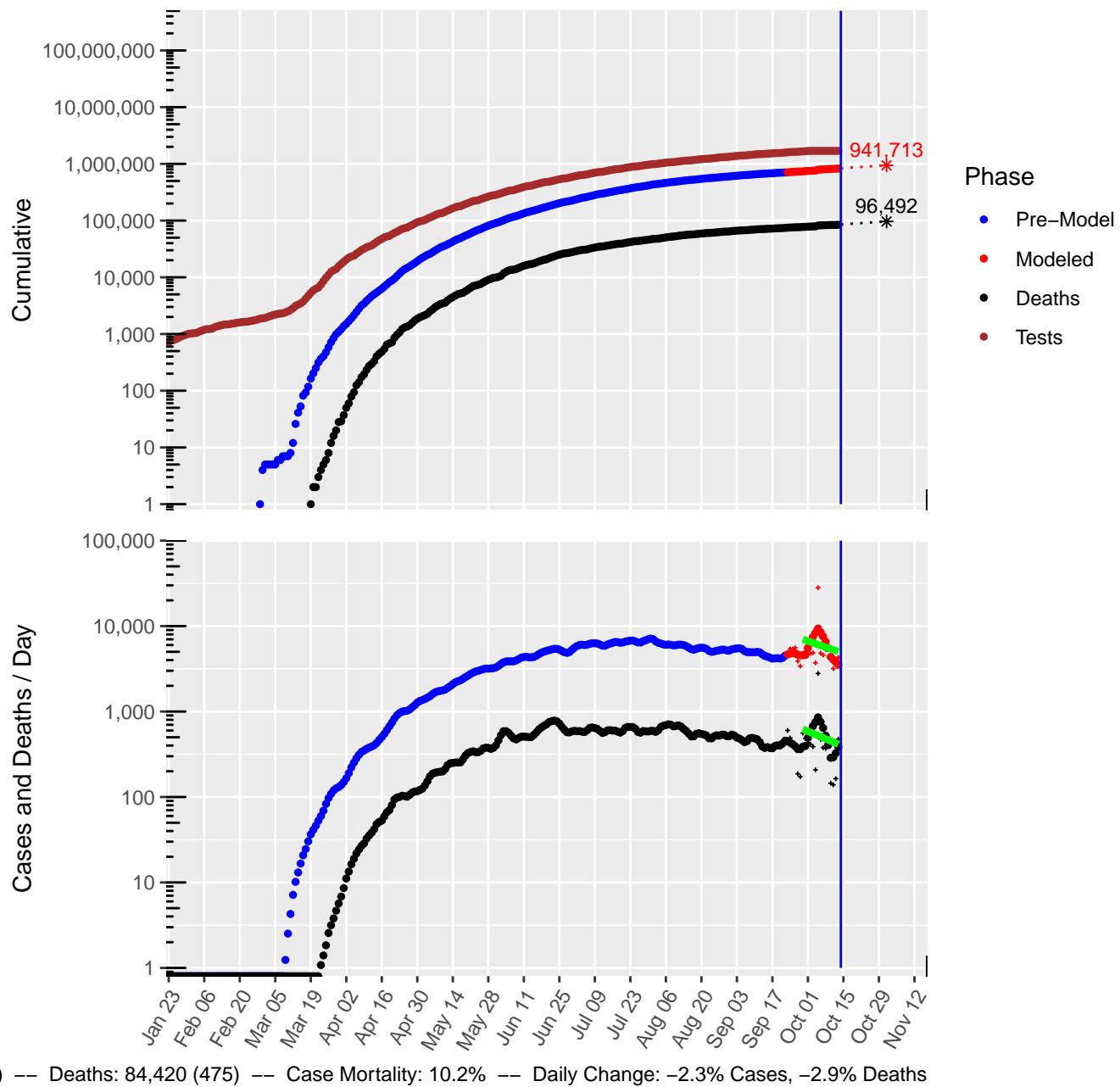
Nicaragua projection as of 2020-10-14



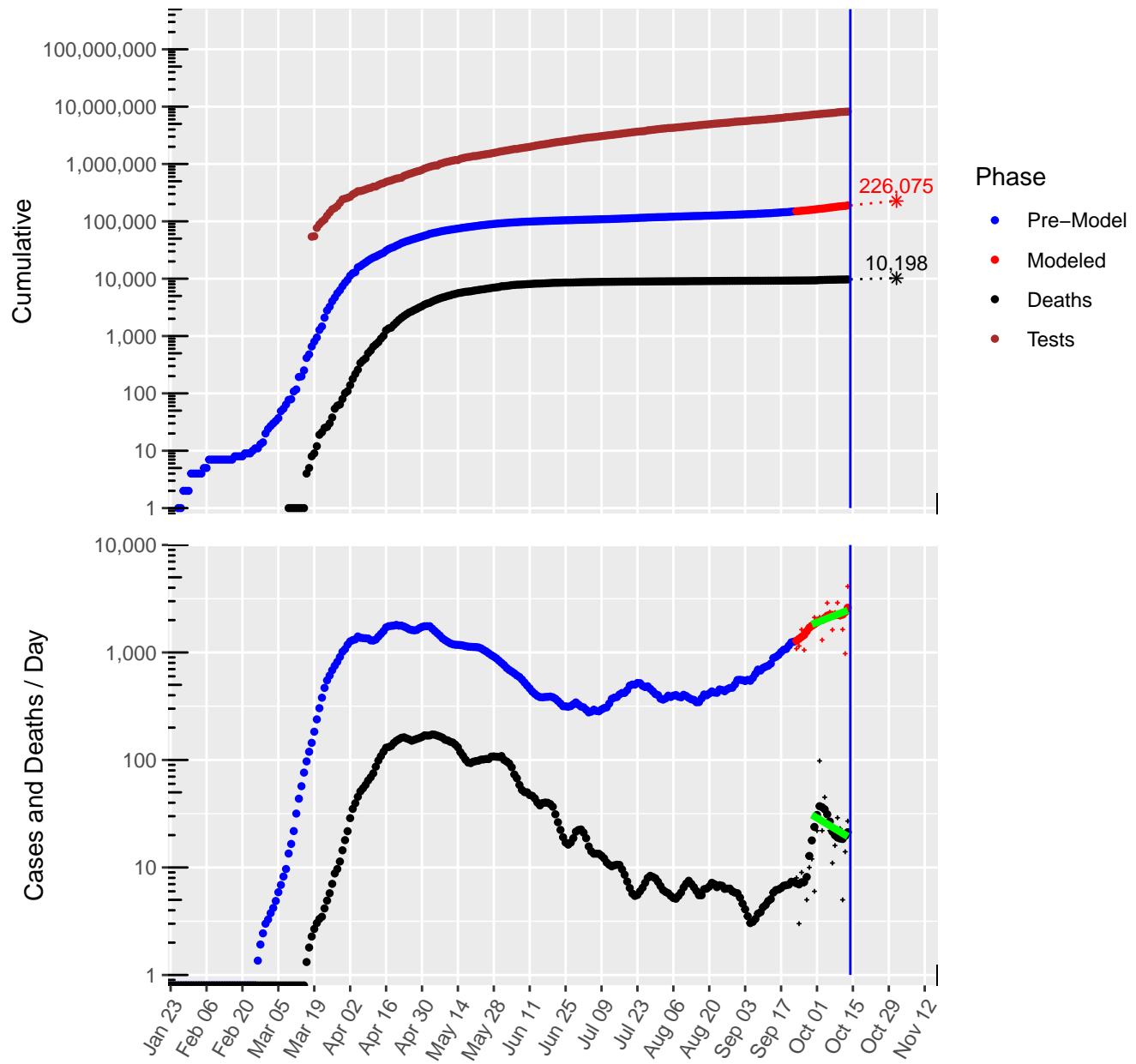
Panama projection as of 2020-10-14



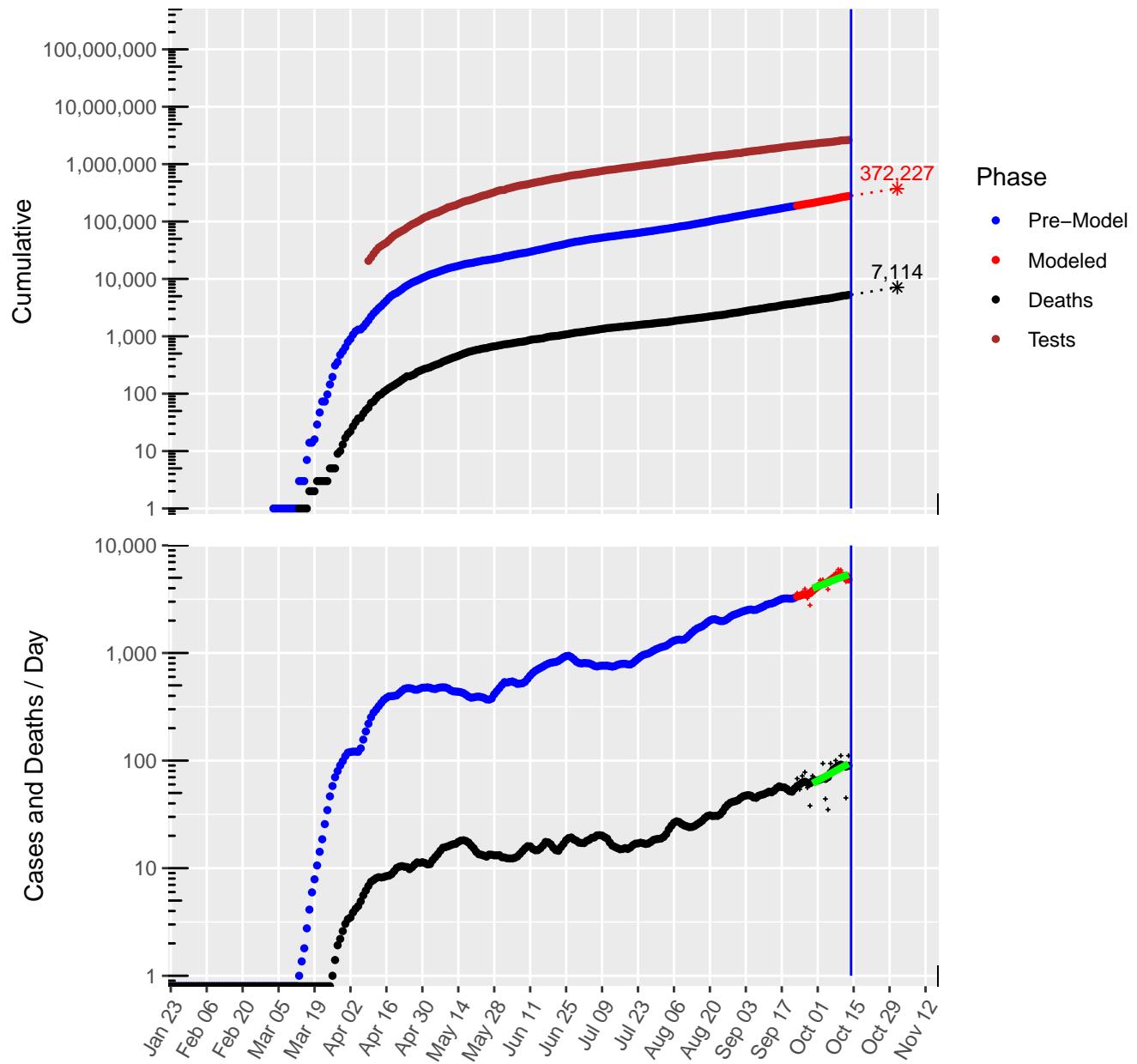
Mexico projection as of 2020-10-14



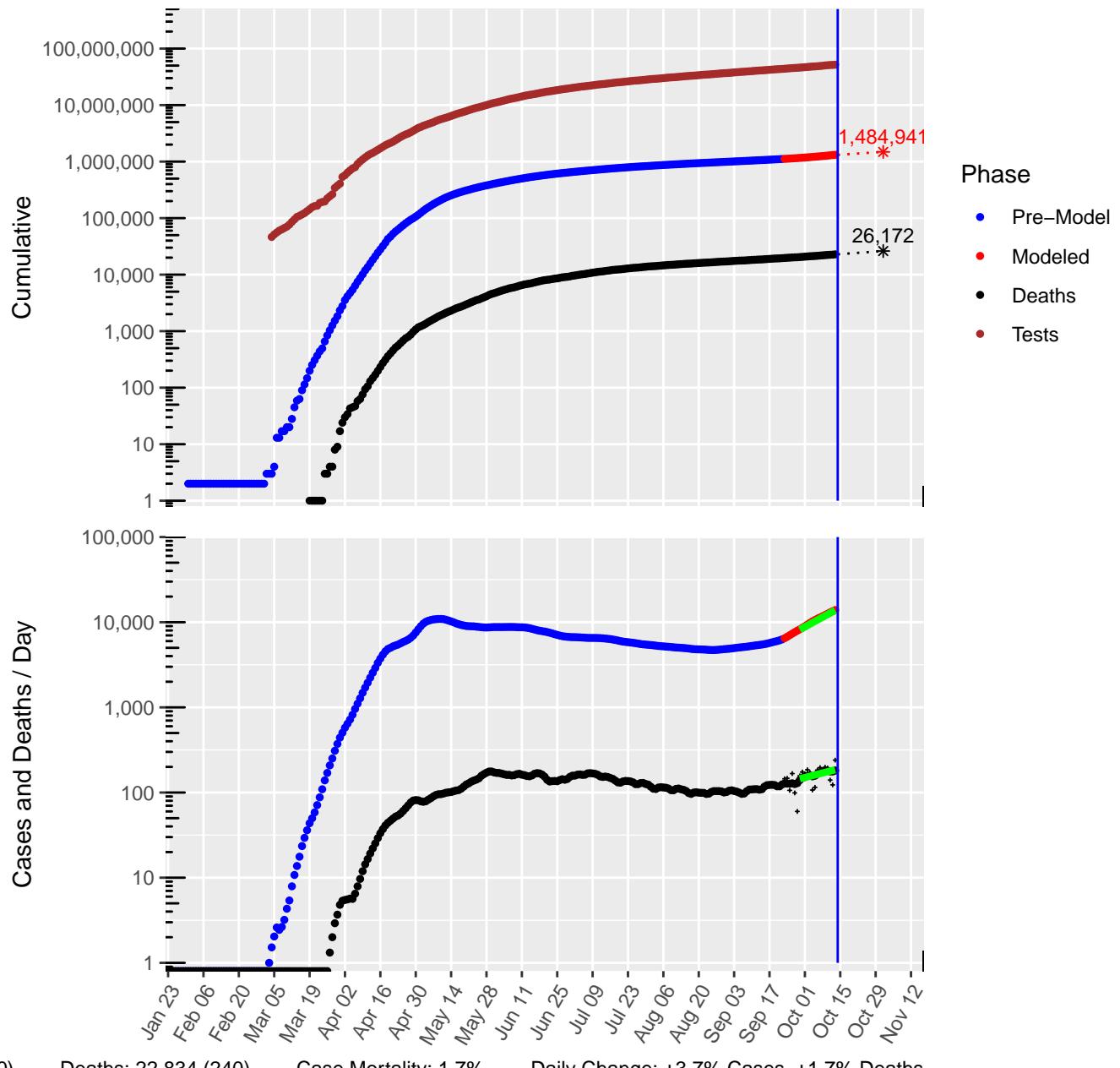
Canada projection as of 2020-10-14



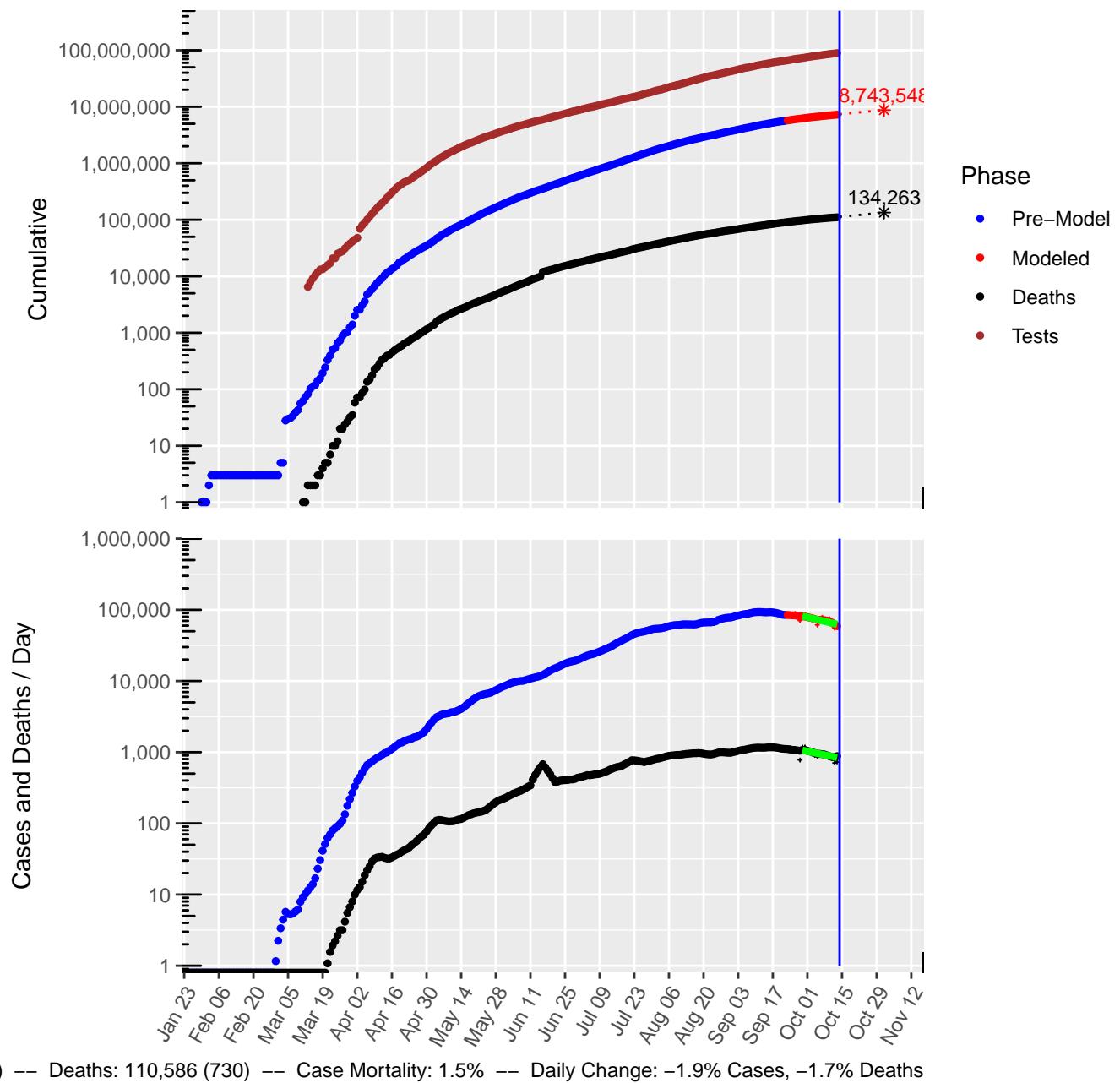
Ukraine projection as of 2020-10-14



Russia projection as of 2020-10-14



India projection as of 2020-10-14



Pakistan projection as of 2020-10-14

