Scatter plot of Log(Case Increase) vs Date for CA

Response Log[CaseIncrease]

Singularity Details

Term	Details
GathRecomAny	= 0
GathRestrict10	= 0
Quarantine	= 0
OtherBusinessClose	=RestaurantRestrict
NEBusinessClose	=StayAtHome

Effect Summary

Source	LogWorth		PValue
PublicMask	5.439		0.00000
EmergDec	3.285		0.00052
GathRestrictAny	0.630		0.23441
SchoolClose	0.490		0.32382
StayAtHome	.		.
RestaurantRestrict	.		.
Quarantine	.		.
OtherBusinessClose	.		.
NEBusinessClose	.		.
GathRestrict10	.		.
GathRecomAny	.		.

Summary of Fit

RSquare	0.87826
RSquare Adj	0.871433
Root Mean Square Error	0.859742
Mean of Response	6.057394
Observations (or Sum Wgts)	114

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	570.56964	95.0949	128.6534
Error	107	79.08968	0.7392	Prob > F
C. Total	113	649.65931		<.0001*

Parameter Estimates

Term		Estimate	Std Error	t Ratio	Prob>|t|	VIF
Intercept		1.2747568	0.229776	5.55	<.0001*	.
EmergDec		1.4246931	0.397983	3.58	0.0005*	2.6315789
GathRecomAny	Zeroed	0	0	.	.	0
GathRestrict10	Zeroed	0	0	.	.	0
GathRestrictAny		0.8243087	0.689327	1.20	0.2344	11.013158
NEBusinessClose	Biased	1.2940566	0.550675	2.35	0.0206*	8.8708952
OtherBusinessClose	Biased	0.6155352	0.701976	0.88	0.3825	13.380117
PublicMask		1.2657812	0.259083	4.89	<.0001*	2.4089069
Quarantine	Zeroed	0	0	.	.	0
RestaurantRestrict	Zeroed	0	0	.	.	0

SchoolClose		0.7779389	0.784833	0.99	0.3238	15.299708
StayAtHome	Zeroed	0	0	.	.	0

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F	
EmergDec	1	1	9.472168	12.8148	0.0005*	
GathRecomAny	1	0	0.000000	.	.	LostDFs
GathRestrict10	1	0	0.000000	.	.	LostDFs
GathRestrictAny	1	1	1.056976	1.4300	0.2344	
NEBusinessClose	1	0	0.000000	.	.	LostDFs
OtherBusinessClose	1	0	0.000000	.	.	LostDFs
PublicMask	1	1	17.643072	23.8692	<.0001*	
Quarantine	1	0	0.000000	.	.	LostDFs
RestaurantRestrict	1	0	0.000000	.	.	LostDFs
SchoolClose	1	1	0.726227	0.9825	0.3238	
StayAtHome	1	0	0.000000	.	.	LostDFs

First regression

Response Log[CaseIncrease]

Effect Summary

Source	LogWorth		PValue
PublicMask	5.402		0.00000
StayAtHome	5.336		0.00000
GathRestrictAny	3.413		0.00039
EmergDec	3.260		0.00055

Summary of Fit

RSquare	0.874663
RSquare Adj	0.870064
Root Mean Square Error	0.864308
Mean of Response	6.057394
Observations (or Sum Wgts)	114

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	4	568.23317	142.058	190.1644
Error	109	81.42614	0.747	Prob > F
C. Total	113	649.65931		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.2747568	0.230996	5.52	<.0001*
EmergDec	1.4246931	0.400097	3.56	0.0005*
GathRestrictAny	1.6385886	0.447322	3.66	0.0004*
PublicMask	1.2657812	0.26046	4.86	<.0001*
StayAtHome	1.8732508	0.388384	4.82	<.0001*

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
EmergDec	1	1	9.472168	12.6798	0.0005*
GathRestrictAny	1	1	10.023897	13.4184	0.0004*
PublicMask	1	1	17.643072	23.6177	<.0001*
StayAtHome	1	1	17.378243	23.2632	<.0001*

Correlation of Estimates

Corr

	Intercept	EmergDec	GathRestrictAny	PublicMask	StayAtHome
Intercept	1.0000	-0.5774	0.0000	0.0000	-0.0000
EmergDec	-0.5774	1.0000	-0.5963	-0.0000	0.0000
GathRestrictAny	0.0000	-0.5963	1.0000	0.0000	-0.5375
PublicMask	0.0000	-0.0000	0.0000	1.0000	-0.5681
StayAtHome	-0.0000	0.0000	-0.5375	-0.5681	1.0000

Final Regression

Time Series CaseIncreaseLog
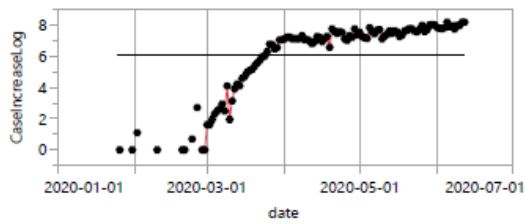
Mean	6.0573937
Std	2.3872088
N	114
Zero Mean ADF	0.8209779
Single Mean ADF	-3.471114
Trend ADF	-3.225744

Time Series Basic Diagnostics

Lag	AutoCorr	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8	Ljung-Box Q	p-Value
0	1.0000		.	.
1	0.6284		46.2067	<.0001*
2	0.6418		94.8349	<.0001*
3	0.5946		136.961	<.0001*
4	0.6113		181.890	<.0001*
5	0.6245		229.208	<.0001*
6	0.5334		264.047	<.0001*
7	0.5806		305.706	<.0001*
8	0.6111		352.301	<.0001*
9	0.5223		386.660	<.0001*
10	0.5929		431.353	<.0001*
11	0.5213		466.248	<.0001*
12	0.4121		488.265	<.0001*
13	0.3956		508.758	<.0001*
14	0.4041		530.356	<.0001*
15	0.4003		551.758	<.0001*
16	0.3426		567.594	<.0001*
17	0.2785		578.167	<.0001*
18	0.3636		596.377	<.0001*
19	0.3562		614.034	<.0001*
20	0.3124		627.762	<.0001*
21	0.2880		639.554	<.0001*
22	0.2486		648.440	<.0001*
23	0.1839		653.354	<.0001*
24	0.2376		661.653	<.0001*
25	0.2001		667.599	<.0001*

Lag	Partial	-.8 -.6 -.4 -.2 0 .2 .4 .6 .8
0	1.0000	
1	0.6284	
2	0.4080	
3	0.1973	
4	0.2048	
5	0.2063	
6	-0.0435	
7	0.1149	
8	0.2034	
9	-0.0916	
10	0.1464	
11	0.0063	
12	-0.3459	
13	-0.1548	
14	0.0595	
15	-0.1197	
16	-0.0727	
17	-0.0559	
18	0.0361	
19	0.1675	
20	0.1187	
21	0.0235	
22	0.0575	
23	-0.1343	
24	0.0779	
25	0.0402	
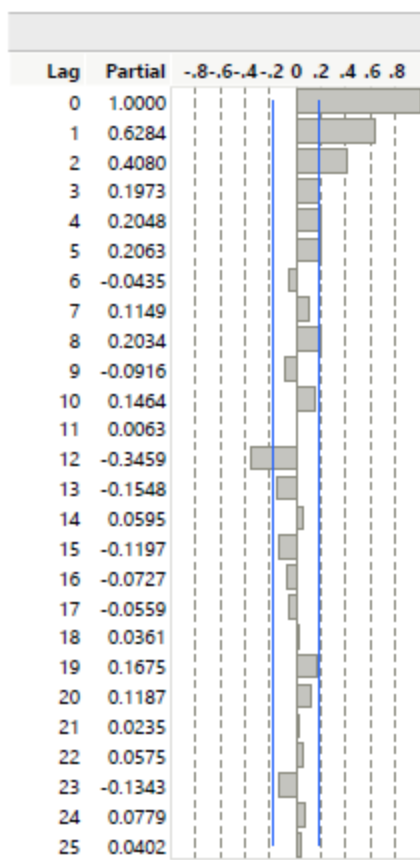
Time Series CaseIncreaseLog

Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights
☑	☐	▬ ARI(1, 1)	104	0.1441364	97.671952	102.99883	0.976	93.671952	0.934554
☑	☐	▬ ARI(20, 1)	85	0.1270273	104.14000	160.07222	0.981	62.139996	0.036820
☑	☐	▬ ARI(14, 1)	91	0.1368762	104.64346	144.59505	0.979	74.643464	0.028626

Difference: (1-B)^1
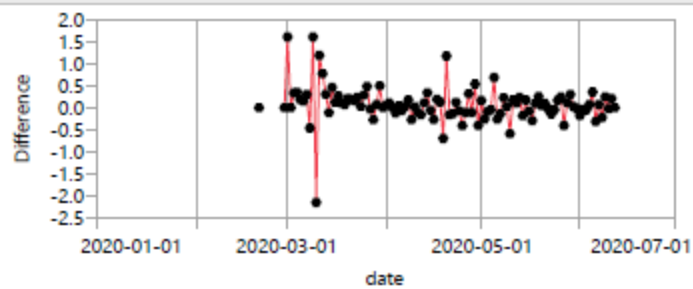
Mean	0.0771887
Std	0.4159142
N	106
Zero Mean ADF	-15.12105
Single Mean ADF	-15.94364
Trend ADF	-17.01925

Time Series CaseIncreaseLog

Model: ARI(1, 1)

Model Summary

DF	104	Stable	Yes
Sum of Squared Errors	14.990183	Invertible	Yes
Variance Estimate	0.14413638		
Standard Deviation	0.37965297		
Akaike's 'A' Information Criterion	97.6719516		
Schwarz's Bayesian Criterion	102.99883		
RSquare	0.97553015		
RSquare Adj	0.9753097		
MAPE	.		
MAE	0.23716256		
-2LogLikelihood	93.6719516		

Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob>|t|	Constant Estimate	Mu
AR1	1	-0.4234418	0.0872822	-4.85	<.0001*	0.11102155	0.07799514
Intercept	0	0.0779951	0.0257955	3.02	0.0031*		

Forecast
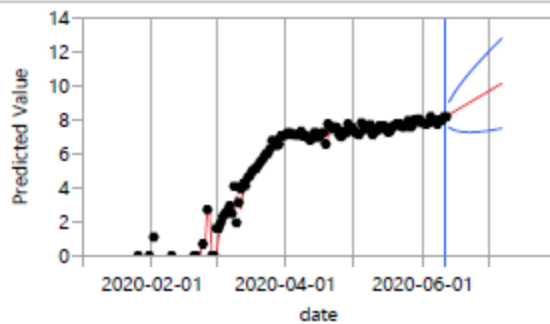
Time Series

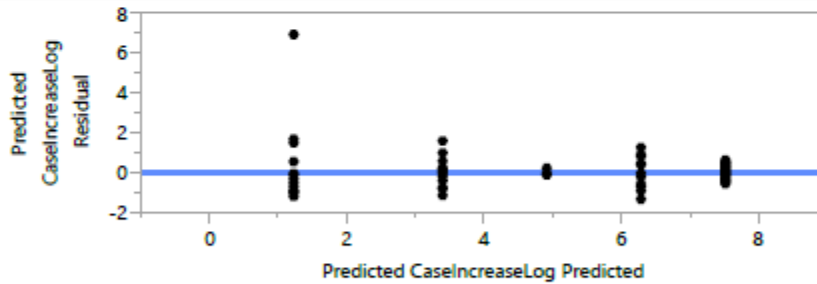Final Arima

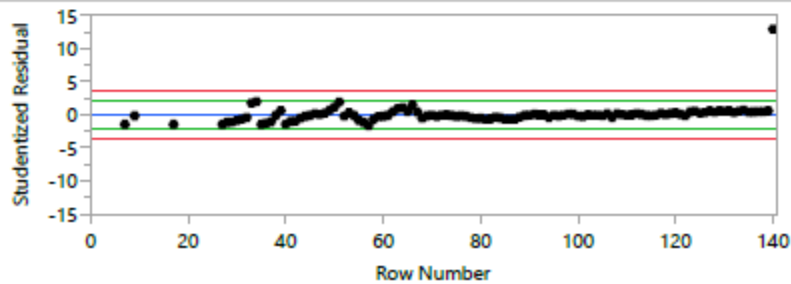## Response Predicted CaseIncreaseLog

Actual by Predicted Plot

RMSE=0.8712 RSq=0.88 PValue=<.0001
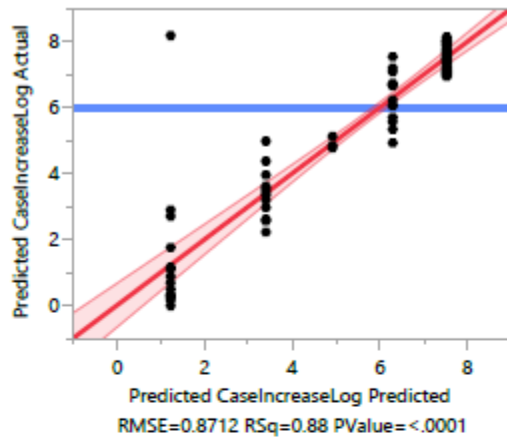
Effect Summary

Source	LogWorth		PValue
EmergDec	8.843		0.00000
PublicMask	5.097		0.00001
RestaurantRestrict	2.088		0.00816
StayAtHome	1.809		0.01553

Residual by Predicted Plot

Studentized Residuals

Response Predicted CaseIncreaseLog

Studentized Residuals

Externally studentized residuals with 95% simultaneous limits (Bonferroni) in red, individual limits in green.

AICc	BIC
307.4114	323.2209

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.2323953	0.211289	5.83	<.0001*
EmergDec	2.1673596	0.328462	6.60	<.0001*
PublicMask	1.2294031	0.262526	4.68	<.0001*
RestaurantRestrict	1.5146409	0.562335	2.69	0.0082*
StayAtHome	1.3712179	0.557993	2.46	0.0155*

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
EmergDec	1	1	33.044115	43.5404	<.0001*
PublicMask	1	1	16.643535	21.9302	<.0001*
RestaurantRestrict	1	1	5.505929	7.2548	0.0082*
StayAtHome	1	1	4.583082	6.0389	0.0155*

Residual Normal Quantile Plot
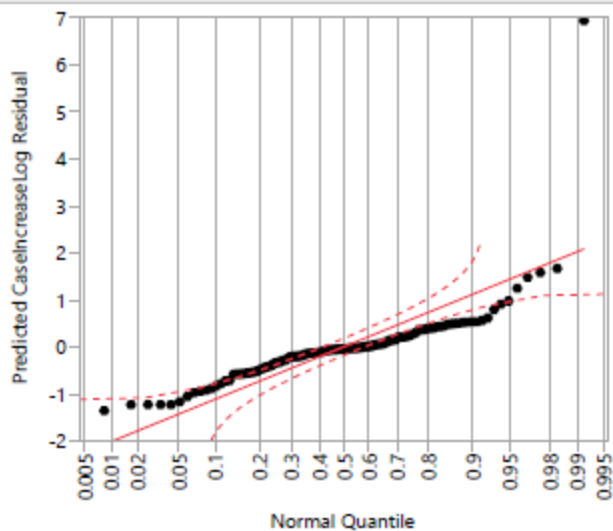
Response Predicted CaseIncreaseLog

Prediction Profiler
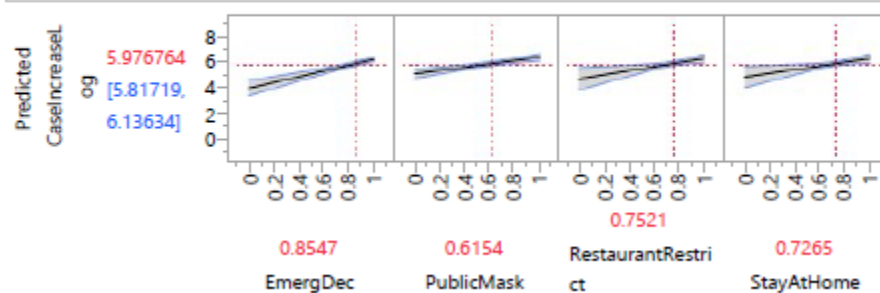
Final Arima result. We found that EmergDec, PublicMask, RestaurantRestrict, and StayAtHome policies were the most effective for California.