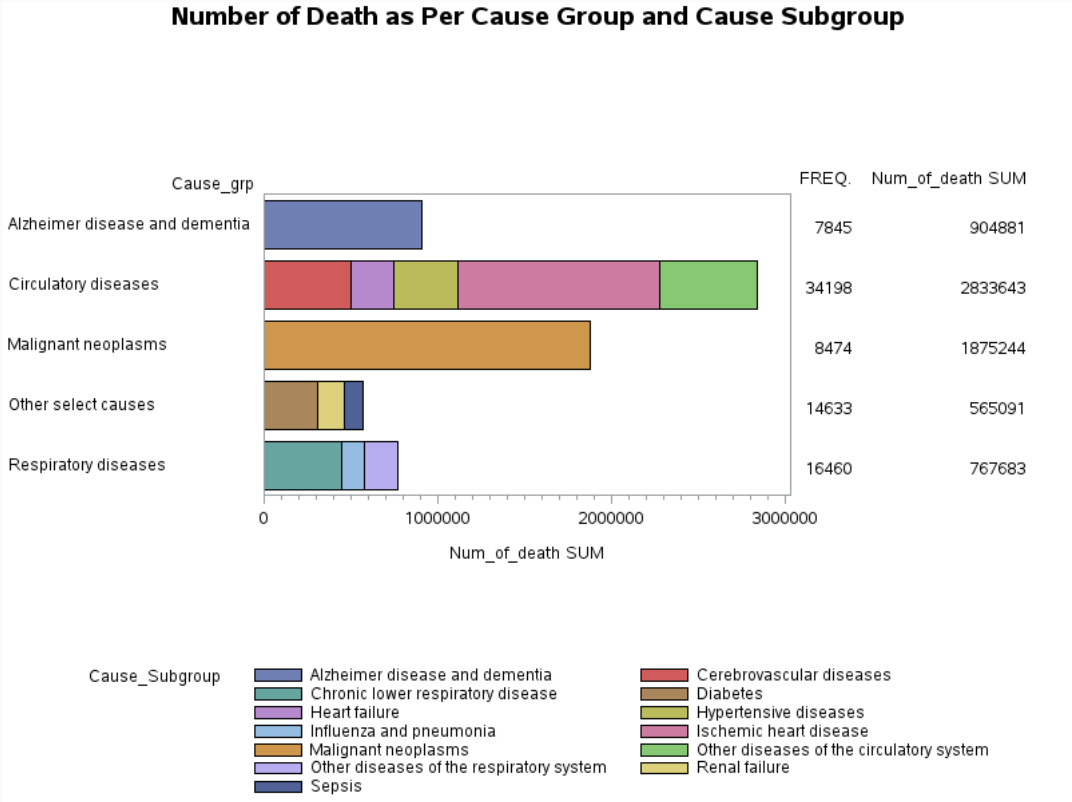
The FREQ Procedure

Cause_grp	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alzheimer disease and dementia	7845	9.61	7845	9.61
Circulatory diseases	34198	41.90	42043	51.52
Malignant neoplasms	8474	10.38	50517	61.90
Other select causes	14633	17.93	65150	79.83
Respiratory diseases	16460	20.17	81610	100.00

Cause_Subgroup	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Alzheimer disease and dementia	7845	9.61	7845	9.61
Cerebrovascular diseases	7015	8.60	14860	18.21
Chronic lower respiratory disease	7004	8.58	21864	26.79
Diabetes	6304	7.72	28168	34.52
Heart failure	5543	6.79	33711	41.31
Hypertensive diseases	6101	7.48	39812	48.78
Influenza and pneumonia	4237	5.19	44049	53.98
Ischemic heart disease	8222	10.07	52271	64.05
Malignant neoplasms	8474	10.38	60745	74.43
Other diseases of the circulatory system	7317	8.97	68062	83.40
Other diseases of the respiratory system	5219	6.40	73281	89.79
Renal failure	4441	5.44	77722	95.24
Sepsis	3888	4.76	81610	100.00

Number of Death as Per Cause Group and Cause Subgroup



Number of Death as Per Cause Group and Cause Subgroup

The CONTENTS Procedure

Data Set Name	CDSDATA.MORTDATA	Observations	81610
Member Type	DATA	Variables	17
Engine	V9	Indexes	0
Created	05/20/2023 16:56:43	Observation Length	200
Last Modified	05/20/2023 16:56:43	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Engine/Host Dependent Information	
Data Set Page Size	131072
Number of Data Set Pages	125
First Data Page	1
Max Obs per Page	654
Obs in First Data Page	634
Number of Data Set Repairs	0

Engine/Host Dependent Information	
Filename	/home/u63249036/sasuser.v94/Assignment/mortdata.sas7bdat
Release Created	9.0401M7
Host Created	Linux
Inode Number	93585540
Access Permission	rw-r--r--
Owner Name	u63249036
File Size	16MB
File Size (bytes)	16515072

Variables in Creation Order					
#	Variable	Type	Len	Format	Informat
1	Jurisdiction_code	Num	8	BEST12.	BEST32.
2	Jurisdiction	Char	20	$20.	$20.
3	Week_end_date	Num	8	DDMMYY10.	DDMMYY10.
4	State Abbreviation	Char	2	$2.	$2.
5	Year	Num	8	BEST12.	BEST32.
6	Week	Num	8	BEST12.	BEST32.
7	Cause_grp	Char	30	$30.	$30.
8	Num_of_death	Num	8	BEST12.	BEST32.
9	Cause_Subgroup	Char	40	$40.	$40.
10	Time_Period	Char	9	$9.	$9.
11	Avg_Num_of_Deaths_Time	Num	8	BEST12.	BEST32.
12	Diff_2015_to_2020	Num	8	BEST12.	BEST32.
13	Percent_Diff_2015_to_2020	Num	8	BEST12.	BEST32.
14	Cause_grp_cod	Num	8	BEST12.	BEST32.
15	Cause_subgrp_cod	Num	8	BEST12.	BEST32.
16	log_Num_deaths	Num	8		
17	log_Avg_Num_deaths	Num	8		

Number of Death as Per Cause Group and Cause Subgroup

Obs	Jurisdiction_code	Jurisdiction	Week_end_date	State Abbreviation	Year	Week	Cause_grp	Num_of_death	Cause_Subgroup	Time_Period	Avg_Num_of_Deaths_Time	Diff_2015_to_2020	Percent_Diff
1	1	Alabama	04/01/2020	AL	2020	1	Alzheimer disease and dementia	102	Alzheimer disease and dementia	2020	102	-1	
2	1	Alabama	09/01/2021	AL	2021	1	Alzheimer disease and dementia	122	Alzheimer disease and dementia	2021	122	19	
3	1	Alabama	08/01/2022	AL	2022	1	Alzheimer disease and dementia	100	Alzheimer disease and dementia	2022	100	-3	
4	1	Alabama	07/01/2023	AL	2023	1	Alzheimer disease and dementia	113	Alzheimer disease and dementia	2023	113	10	
5	1	Alabama	11/01/2020	AL	2020	2	Alzheimer disease and dementia	96	Alzheimer disease and dementia	2020	96	-6	
6	1	Alabama	16/01/2021	AL	2021	2	Alzheimer disease and dementia	114	Alzheimer disease and dementia	2021	114	12	
7	1	Alabama	15/01/2022	AL	2022	2	Alzheimer disease and dementia	137	Alzheimer disease and dementia	2022	137	35	
8	1	Alabama	14/01/2023	AL	2023	2	Alzheimer disease and dementia	107	Alzheimer disease and dementia	2023	107	5	
9	1	Alabama	18/01/2020	AL	2020	3	Alzheimer disease and dementia	106	Alzheimer disease and dementia	2020	106	-4	
10	1	Alabama	23/01/2021	AL	2021	3	Alzheimer disease and dementia	120	Alzheimer disease and dementia	2021	120	10	

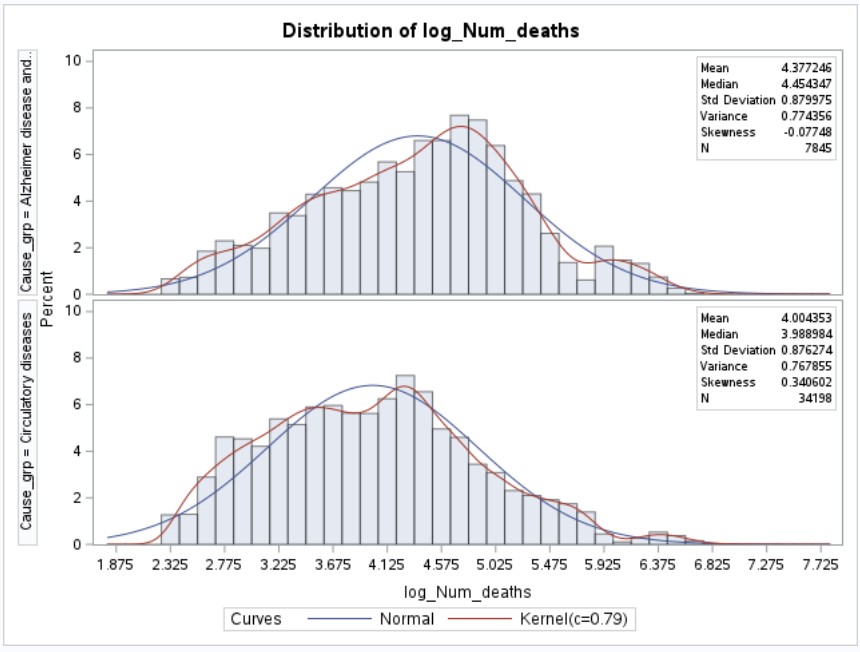
Summary Statistics of Number of Deaths
Number of Deaths By Year as per Casue

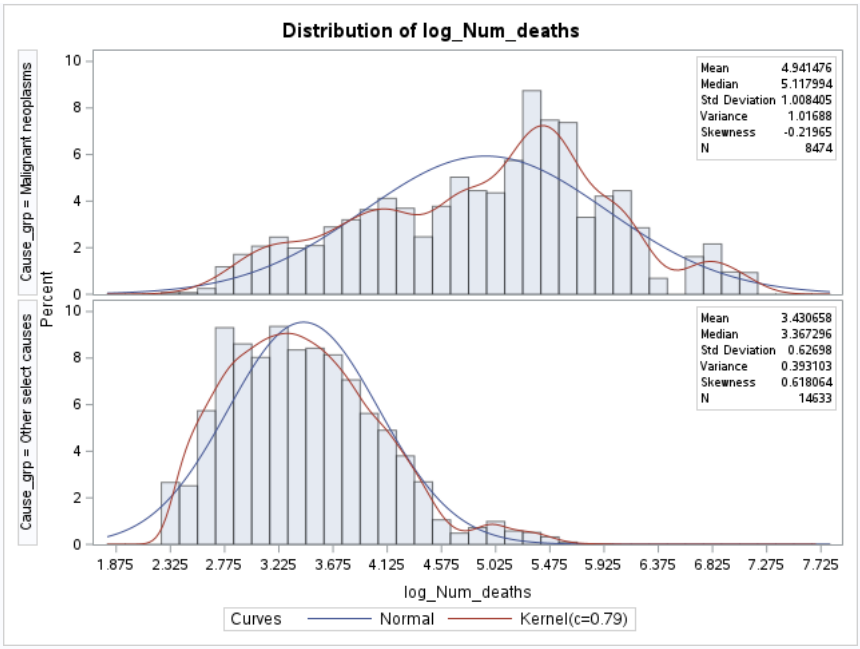
			Year			
			2020	2021	2022	2023
Cause_grp						
Alzheimer disease and dementia	Num_of_death	N	2623	2528	2546	148
		Min	11.00	11.00	11.00	13.00
		Q1	41.00	41.00	43.00	47.50
		Median	88.00	82.50	87.50	102.50
		Mean	118.35	110.90	115.82	129.81
		Q3	149.00	139.00	146.00	165.00
		Max	793.00	785.00	734.00	640.00
		StdDev	111.97	105.03	110.19	118.50
Circulatory diseases	Num_of_death	N	11407	11091	11060	640

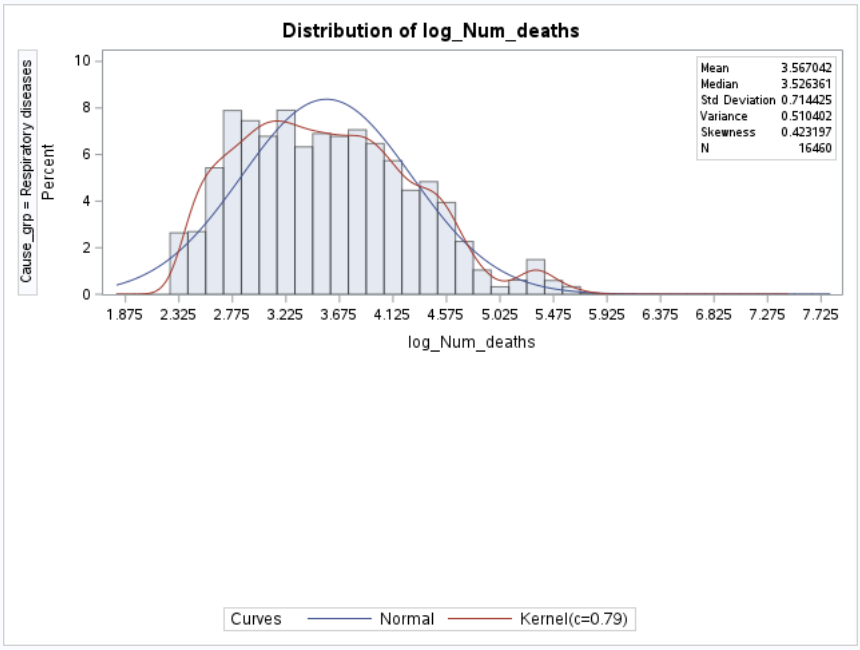
			Year			
			2020	2021	2022	2023
		Min	11.00	11.00	11.00	11.00
		Q1	27.00	28.00	29.00	29.00
		Median	53.00	54.00	55.00	55.00
		Mean	82.03	82.99	83.57	83.01
		Q3	95.00	98.00	98.00	98.00
		Max	1323.00	1114.00	944.00	715.00
		StdDev	97.93	94.83	93.57	90.15
Malignant neoplasms	Num_of_death	N	2806	2755	2754	159
		Min	11.00	11.00	11.00	16.00
		Q1	64.00	66.00	65.00	64.00
		Median	166.00	167.00	167.00	150.00
		Mean	219.78	221.23	223.07	218.40
		Q3	270.00	274.00	276.00	277.00
		Max	1235.00	1240.00	1258.00	1153.00
		StdDev	222.78	224.29	226.81	218.91
Other select causes	Num_of_death	N	4882	4744	4729	278
		Min	11.00	11.00	11.00	12.00
		Q1	18.00	19.00	20.00	20.00
		Median	29.00	30.00	29.00	29.00
		Mean	37.90	38.92	39.07	38.32
		Q3	45.00	46.00	46.00	46.00
		Max	380.00	356.00	302.00	228.00
		StdDev	32.63	32.97	32.52	30.11
Respiratory diseases	Num_of_death	N	5580	5264	5284	332
		Min	11.00	11.00	11.00	11.00
		Q1	20.00	20.00	20.00	23.00
		Median	34.00	33.00	34.00	37.00
		Mean	47.55	45.05	46.90	52.41
		Q3	60.00	56.00	59.00	68.00
		Max	325.00	293.00	308.00	276.00
		StdDev	42.77	39.17	40.71	44.00

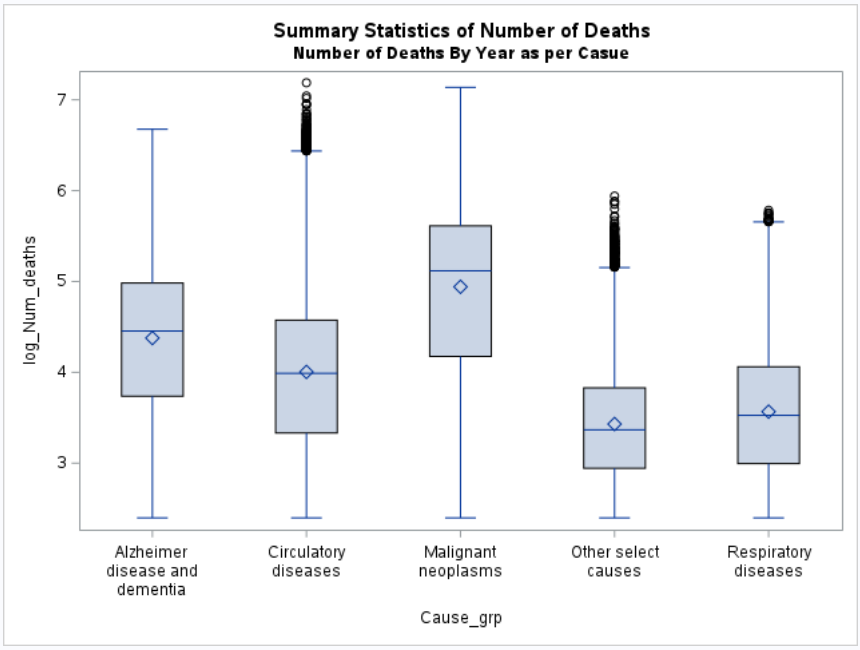
Summary Statistics of Number of Deaths
Number of Deaths By Year as per Casue

The UNIVARIATE Procedure





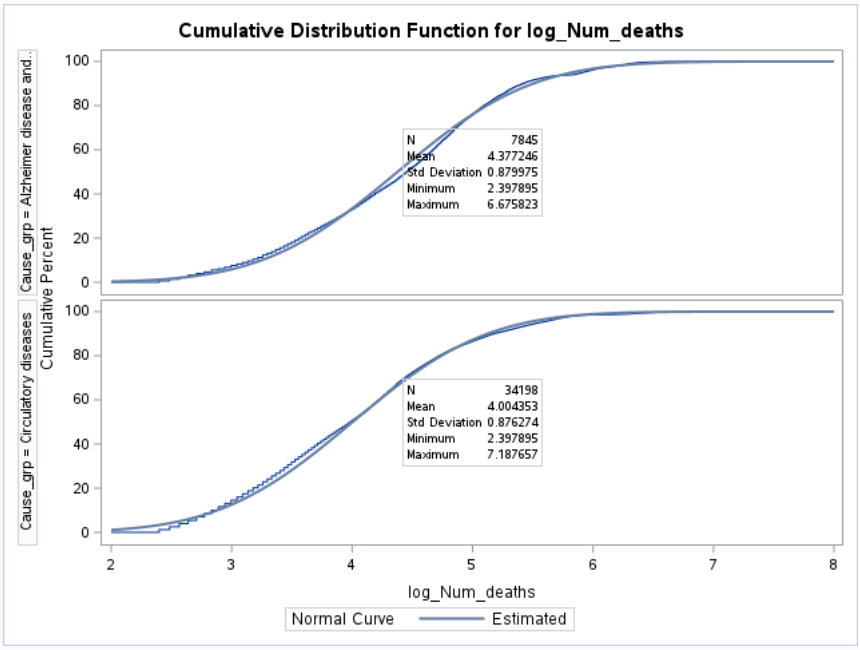


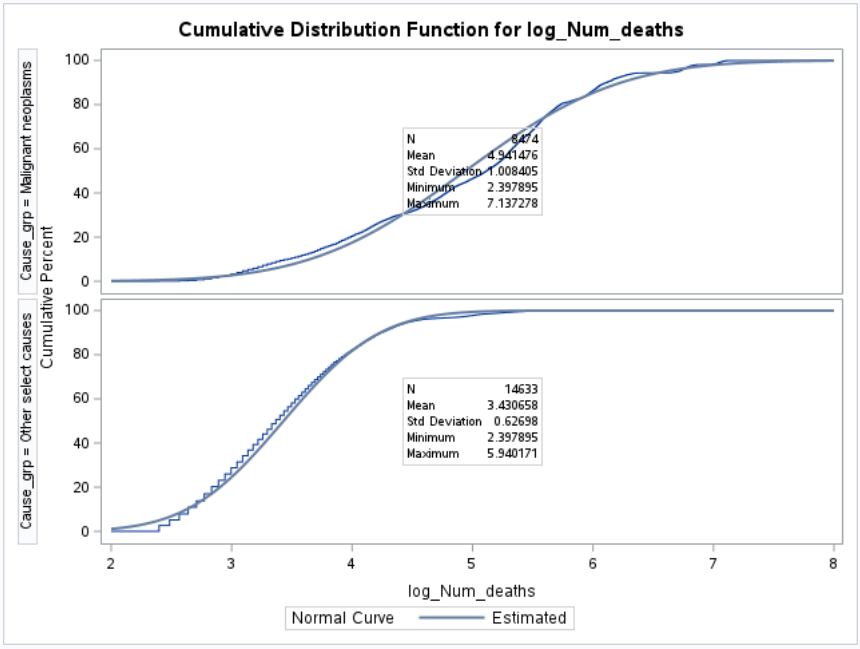


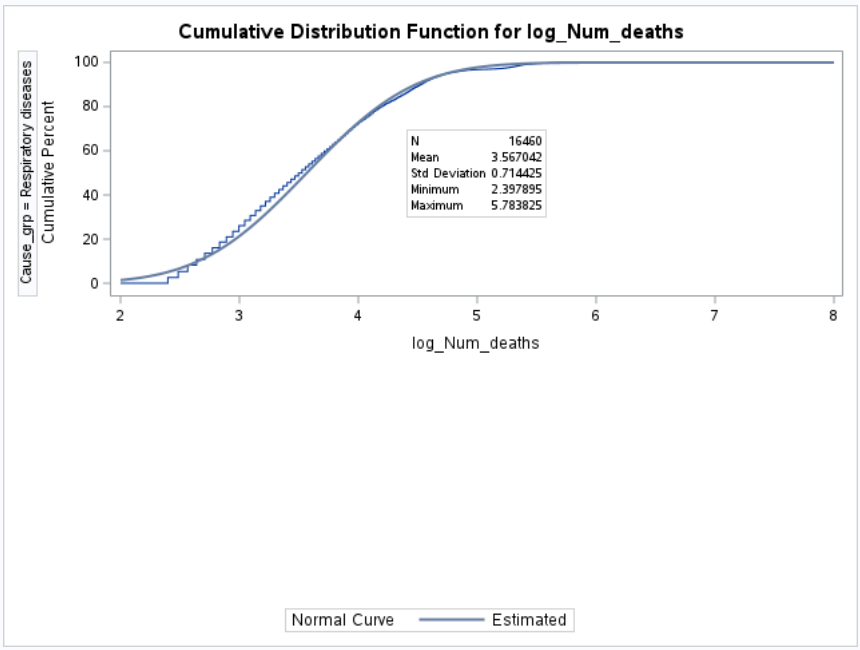
Summary Statistics of Number of Deaths

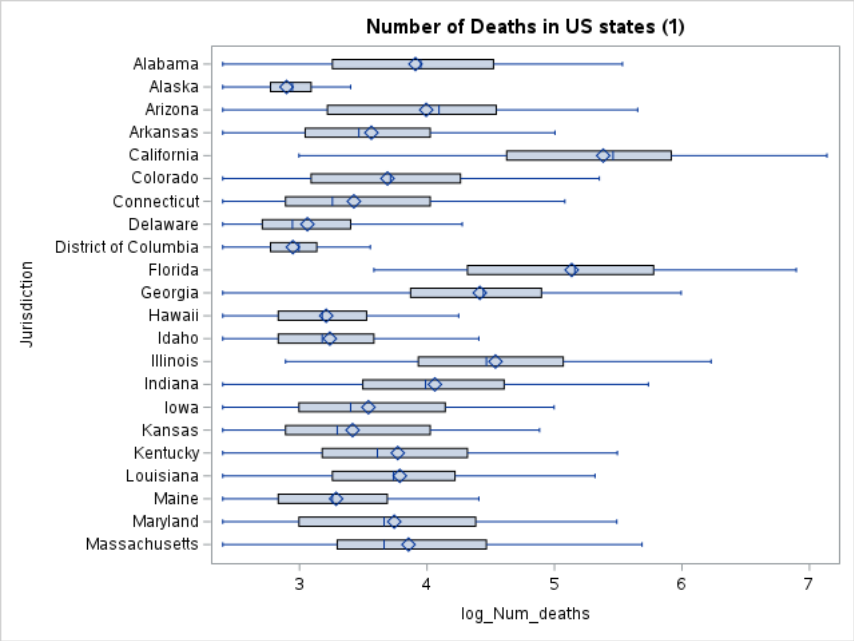
Number of Deaths By Year as per Casue

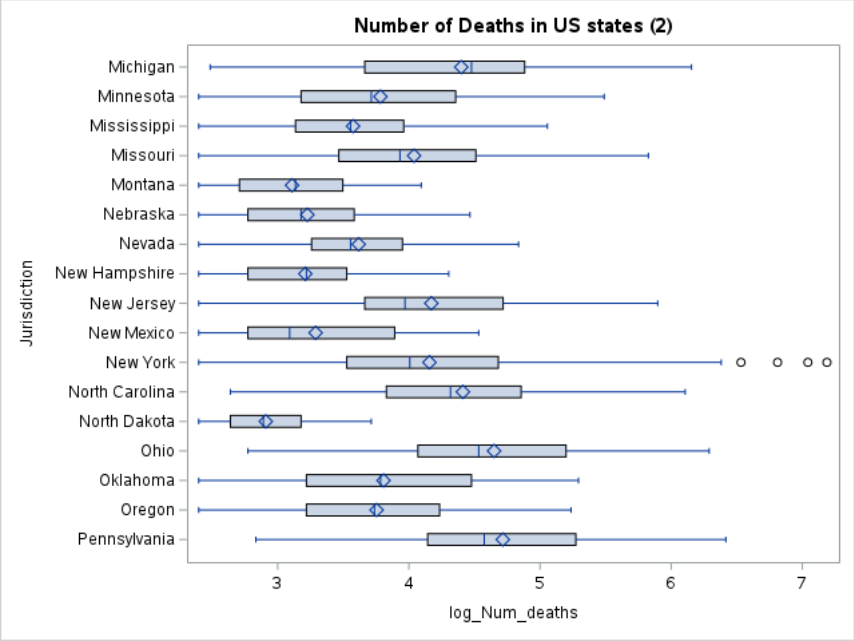
The UNIVARIATE Procedure

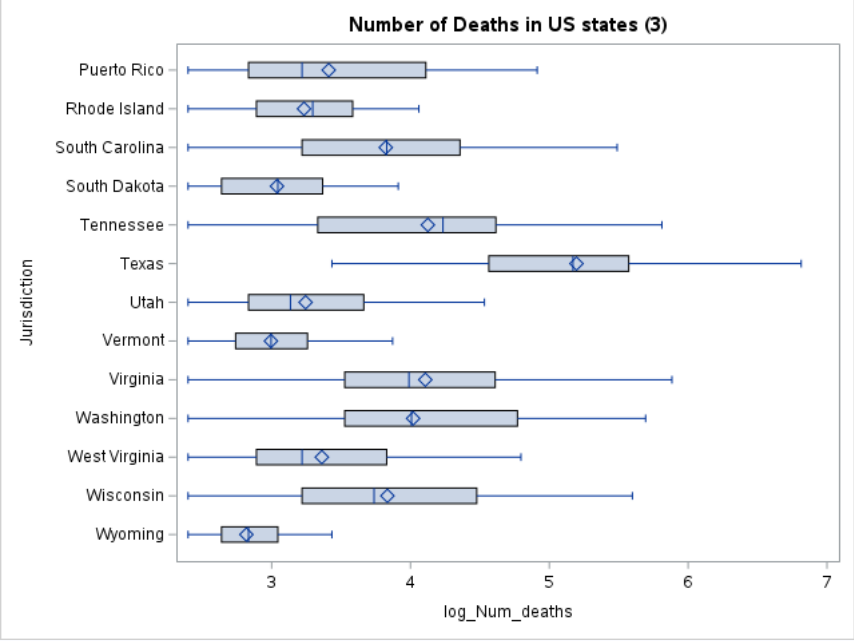


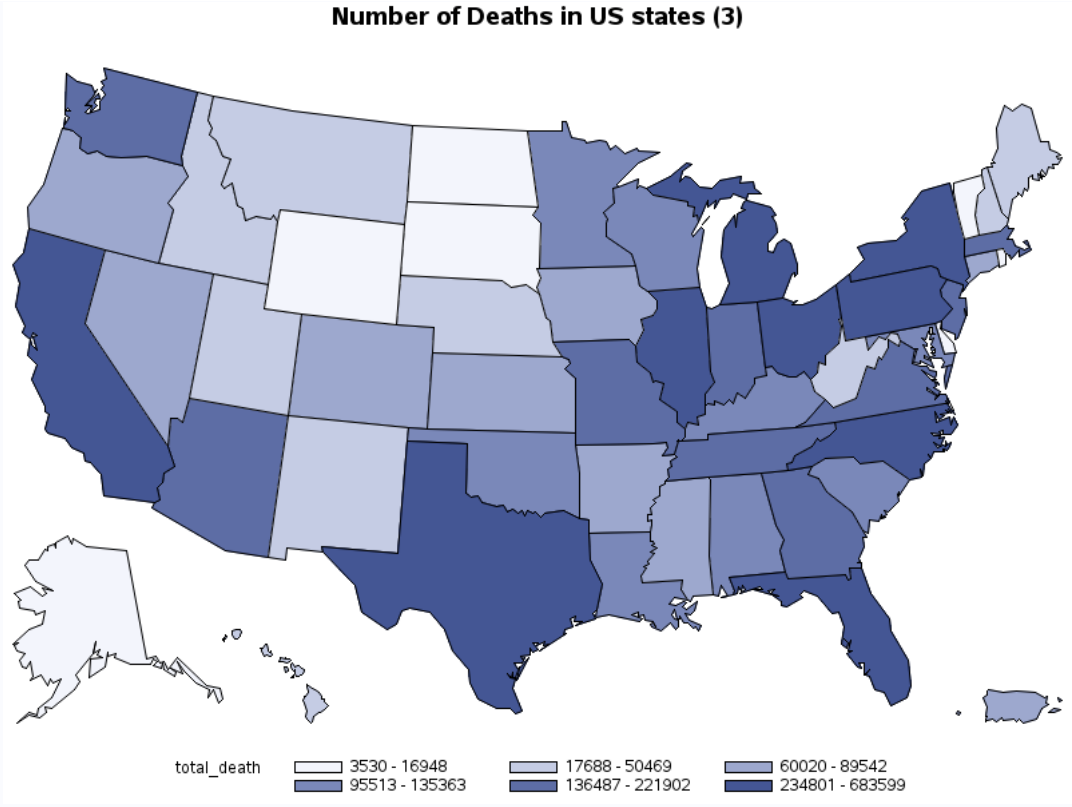


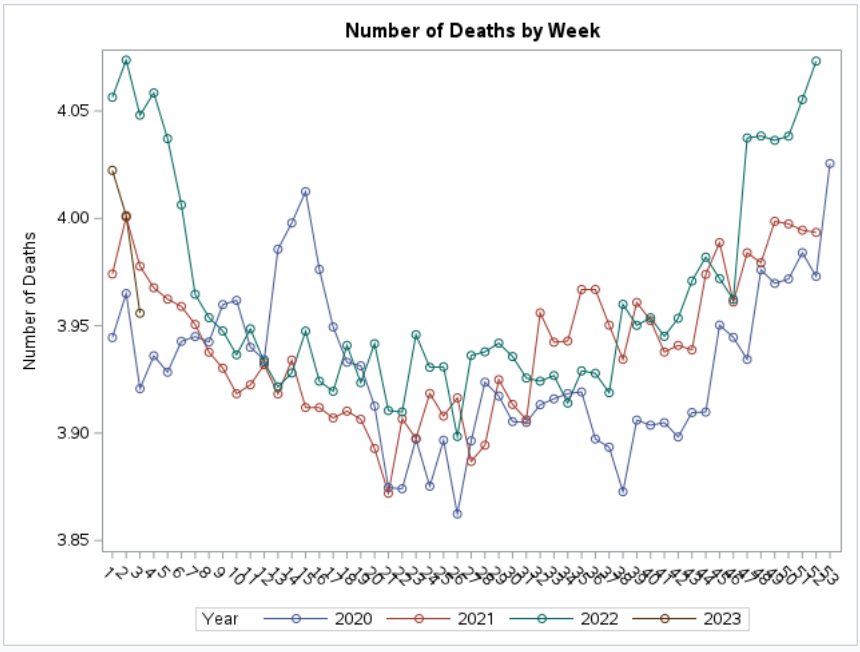


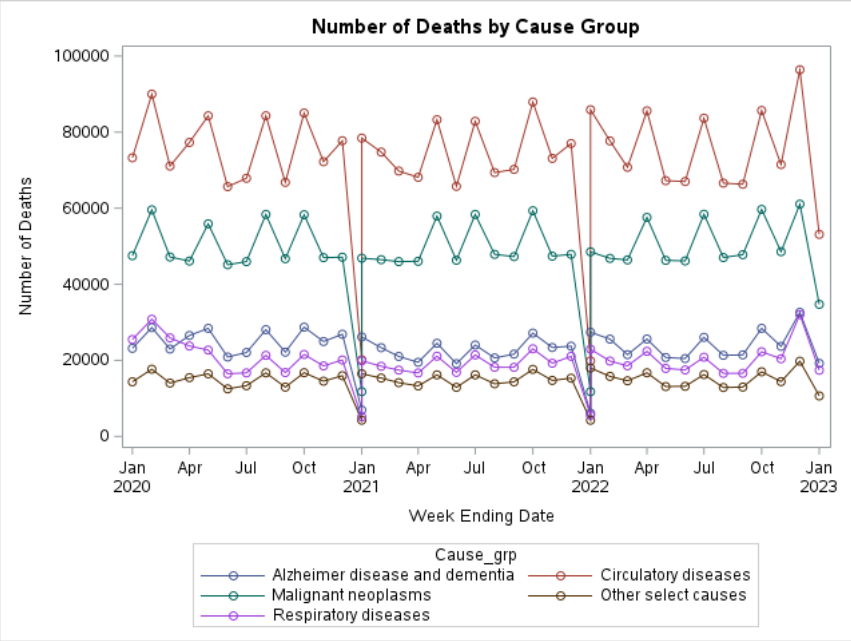

Number of Deaths in US states (1)
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Jurisdiction
3
4
5
6
7
log_Num_deaths


Number of Deaths in US states (2)
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Jurisdiction
3
4
5
6
7
log_Num_deaths


Number of Deaths in US states (3)
Puerto Rico
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
Jurisdiction
3
4
5
6
7
log_Num_deaths


Number of Deaths in US states (3)
total_death
3530 - 16948
17688 - 50469
60020 - 89542
95513 - 135363
136487 - 221902
234801 - 683599


Number of Deaths by Week
Number of Deaths
4.05
4.00
3.95
3.90
3.85
Year
2020
2021
2022
2023



Number of Deaths by Cause Group

The ANOVA Procedure

Class Level Information		
Class	Levels	Values
Cause_grp	5	Alzheimer disease and dementia Circulatory diseases Malignant neoplasms Other select causes Respiratory diseases
Year	4	2020 2021 2022 2023

Number of Observations Read	81610
Number of Observations Used	81610

Number of Deaths by Cause Group

The ANOVA Procedure

Dependent Variable: log_Num_deaths

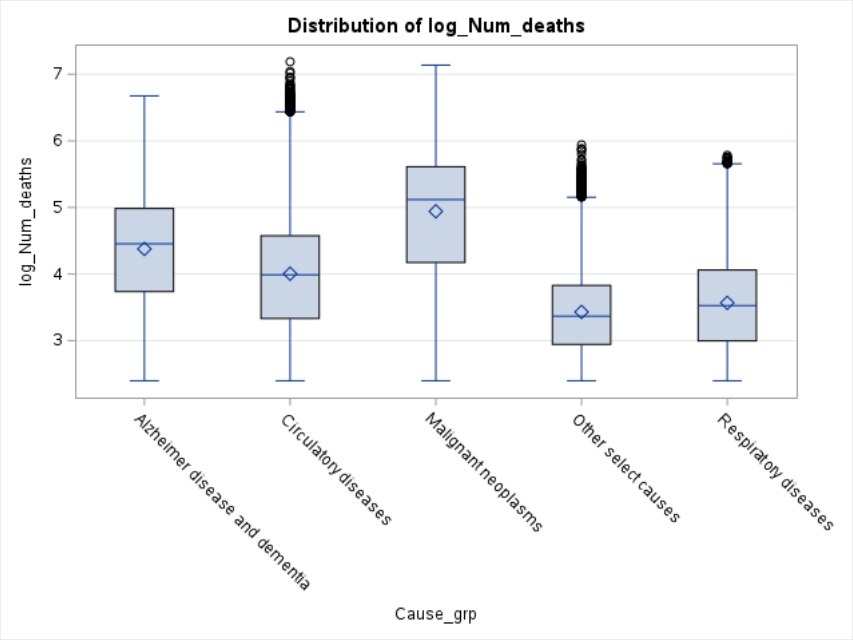
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	19	16259.87514	855.78290	1268.04	<.0001
Error	81590	55064.03922	0.67489		
Corrected Total	81609	71323.91436			

R-Square	Coeff Var	Root MSE	log_Num_deaths Mean
0.227972	20.81663	0.821515	3.946438

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Cause_grp	4	16222.88382	4055.72095	6009.48	<.0001
Year	3	18.53648	6.17883	9.16	<.0001
Cause_grp*Year	12	18.45484	1.53790	2.28	0.0069

Number of Deaths by Cause Group

The ANOVA Procedure



Number of Deaths by Cause Group

The ANOVA Procedure

Tukey's Studentized Range (HSD) Test for log_Num_deaths

Note: This test controls the Type I experimentwise error rate.

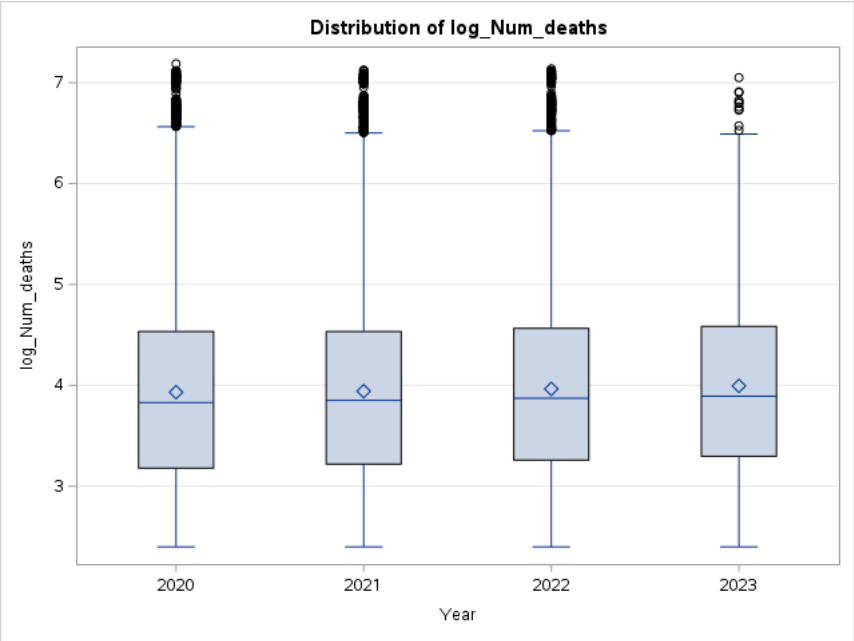
Alpha	0.05
Error Degrees of Freedom	81590
Error Mean Square	0.674887
Critical Value of Studentized Range	3.85774

Comparisons significant at the 0.05 level are indicated by *.**

Cause_grp Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
Malignant neoplasms - Alzheimer disease and dementia	0.564229	0.529118	0.599340	***
Malignant neoplasms - Circulatory diseases	0.937122	0.909929	0.964316	***
Malignant neoplasms - Respiratory diseases	1.374433	1.344471	1.404395	***
Malignant neoplasms - Other select causes	1.510817	1.480226	1.541409	***
Alzheimer disease and dementia - Malignant neoplasms	-0.564229	-0.599340	-0.529118	***
Alzheimer disease and dementia - Circulatory diseases	0.372893	0.344840	0.400947	***
Alzheimer disease and dementia - Respiratory diseases	0.810204	0.779460	0.840949	***
Alzheimer disease and dementia - Other select causes	0.946588	0.915230	0.977946	***
Circulatory diseases - Malignant neoplasms	-0.937122	-0.964316	-0.909929	***
Circulatory diseases - Alzheimer disease and dementia	-0.372893	-0.400947	-0.344840	***
Circulatory diseases - Respiratory diseases	0.437311	0.416052	0.458570	***
Circulatory diseases - Other select causes	0.573695	0.551558	0.595832	***
Respiratory diseases - Malignant neoplasms	-1.374433	-1.404395	-1.344471	***
Respiratory diseases - Alzheimer disease and dementia	-0.810204	-0.840949	-0.779460	***
Respiratory diseases - Circulatory diseases	-0.437311	-0.458570	-0.416052	***
Respiratory diseases - Other select causes	0.136384	0.110923	0.161845	***
Other select causes - Malignant neoplasms	-1.510817	-1.541409	-1.480226	***
Other select causes - Alzheimer disease and dementia	-0.946588	-0.977946	-0.915230	***
Other select causes - Circulatory diseases	-0.573695	-0.595832	-0.551558	***
Other select causes - Respiratory diseases	-0.136384	-0.161845	-0.110923	***

Number of Deaths by Cause Group

The ANOVA Procedure



Number of Deaths by Cause Group

The ANOVA Procedure

Tukey's Studentized Range (HSD) Test for log_Num_deaths

Note: This test controls the Type I experimentwise error rate.

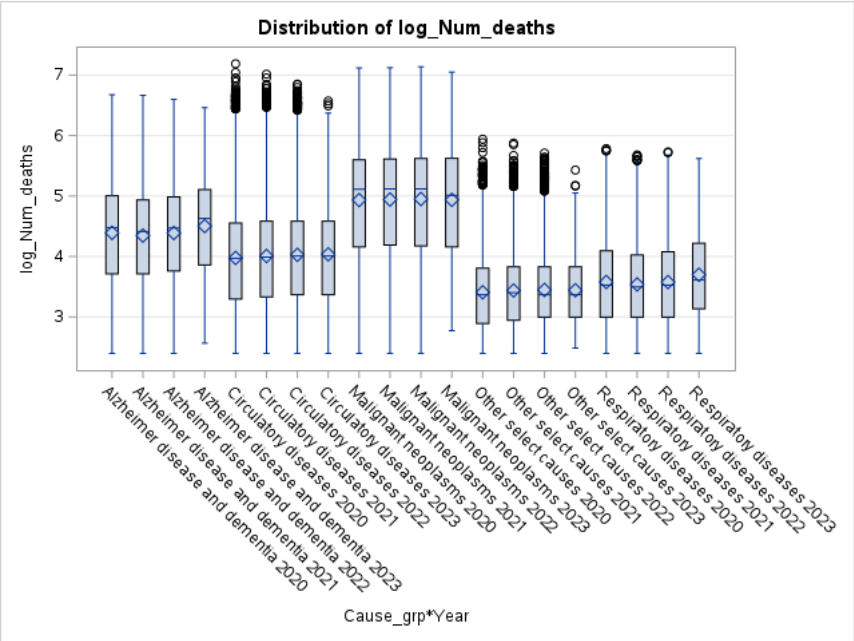
Alpha	0.05
Error Degrees of Freedom	81590
Error Mean Square	0.674887
Critical Value of Studentized Range	3.63322

Comparisons significant at the 0.05 level are indicated by *.**

Year Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
2023 - 2022	0.029719	-0.025325	0.084762	
2023 - 2021	0.052395	-0.002647	0.107438	
2023 - 2020	0.062391	0.007400	0.117383	***
2022 - 2023	-0.029719	-0.084762	0.025325	
2022 - 2021	0.022677	0.004299	0.041055	***
2022 - 2020	0.032673	0.014450	0.050896	***
2021 - 2023	-0.052395	-0.107438	0.002647	
2021 - 2022	-0.022677	-0.041055	-0.004299	***
2021 - 2020	0.009996	-0.008225	0.028217	
2020 - 2023	-0.062391	-0.117383	-0.007400	***
2020 - 2022	-0.032673	-0.050896	-0.014450	***
2020 - 2021	-0.009996	-0.028217	0.008225	

Number of Deaths by Cause Group

The ANOVA Procedure



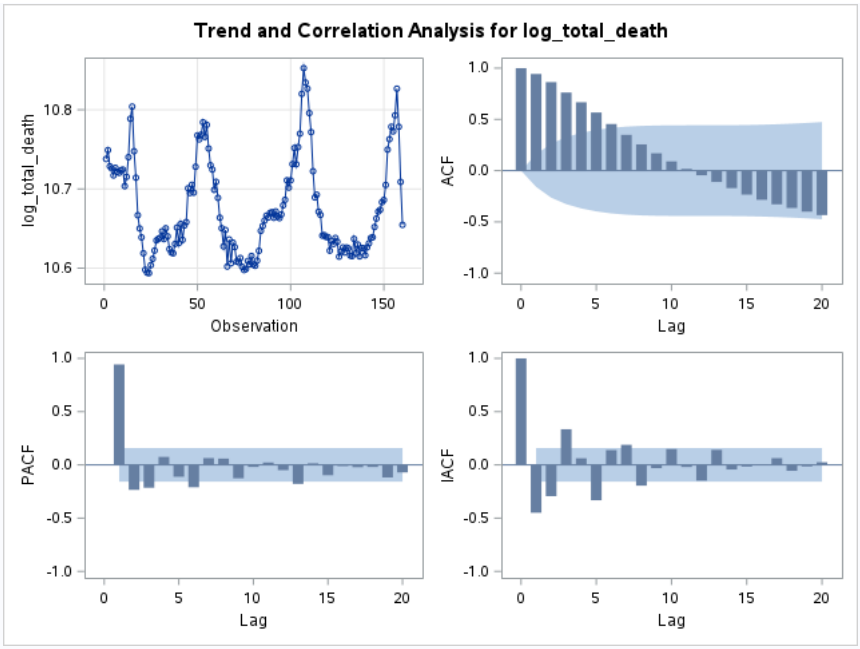
Level of Cause_grp	Level of Year	N	log_Num_deaths	
			Mean	Std Dev
Alzheimer disease and dementia	2020	2623	4.39058651	0.89990081
Alzheimer disease and dementia	2021	2528	4.34543727	0.86578348
Alzheimer disease and dementia	2022	2546	4.38777775	0.87224670
Alzheimer disease and dementia	2023	148	4.50298723	0.88290058
Circulatory diseases	2020	11407	3.97647763	0.89235607
Circulatory diseases	2021	11091	4.00803383	0.87537314
Circulatory diseases	2022	11060	4.02764711	0.86131879
Circulatory diseases	2023	640	4.03485478	0.84641121
Malignant neoplasms	2020	2806	4.93267433	1.01223627
Malignant neoplasms	2021	2755	4.94190591	1.00664778
Malignant neoplasms	2022	2754	4.95027621	1.00741860
Malignant neoplasms	2023	159	4.93690966	0.99615747
Other select causes	2020	4882	3.40810263	0.63089363
Other select causes	2021	4744	3.43733144	0.62960280
Other select causes	2022	4729	3.44662668	0.62111756
Other select causes	2023	278	3.44124343	0.60402796
Respiratory diseases	2020	5580	3.57800952	0.72447788
Respiratory diseases	2021	5264	3.53787960	0.70700303
Respiratory diseases	2022	5284	3.57622703	0.71077322
Respiratory diseases	2023	332	3.69891223	0.69832338

Number of Deaths by Cause Group

The ARIMA Procedure

Name of Variable = log_total_death	
Mean of Working Series	10.67669
Standard Deviation	0.060963
Number of Observations	160

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	525.93	6	<.0001	0.943	0.864	0.762	0.667	0.567	0.455
12	564.51	12	<.0001	0.349	0.256	0.169	0.090	0.017	-0.045
18	639.94	18	<.0001	-0.111	-0.170	-0.234	-0.284	-0.329	-0.364



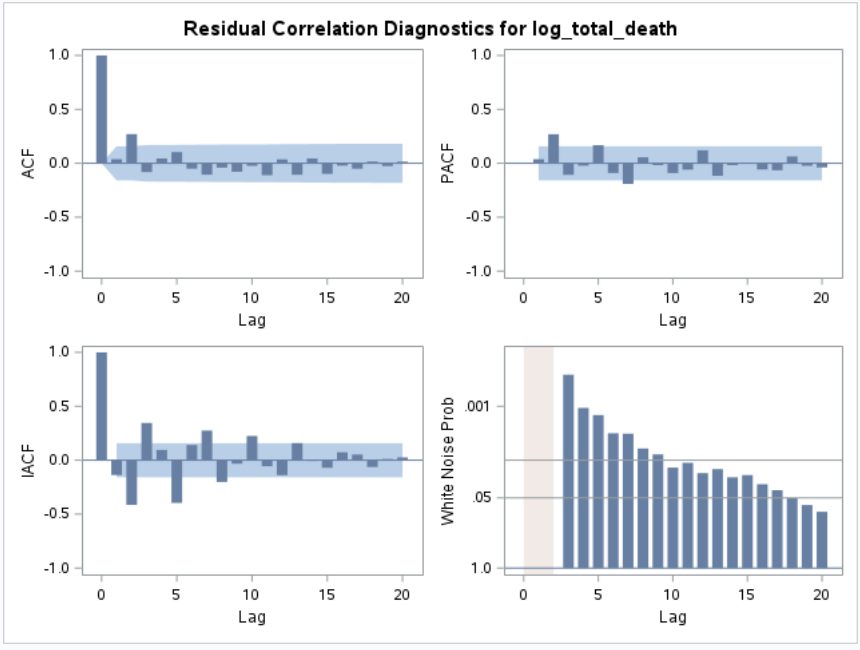
Conditional Least Squares Estimation					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	10.72399	0.01838	583.38	<.0001	0
MA1,1	-0.16370	0.08211	-1.99	0.0479	1
AR1,1	0.95967	0.02473	38.80	<.0001	1

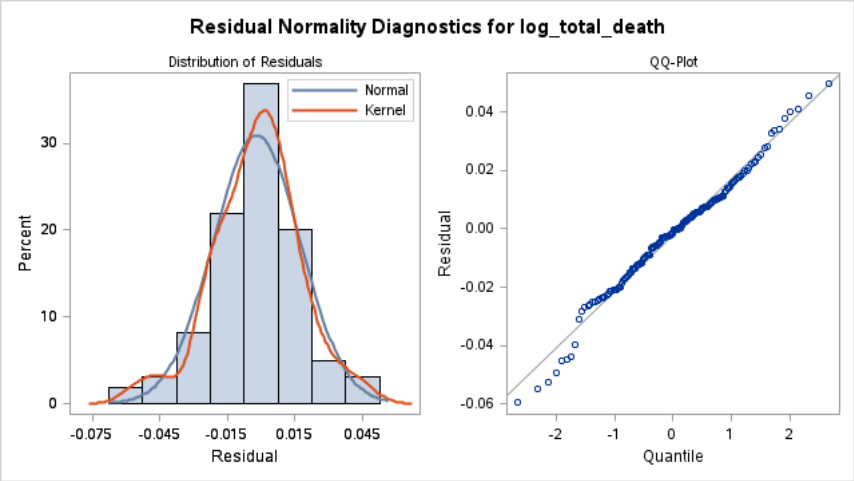
Constant Estimate	0.432501
Variance Estimate	0.000384
Std Error Estimate	0.019585
AIC	-801.526
SBC	-792.3
Number of Residuals	160

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates			
Parameter	MU	MA1,1	AR1,1
MU	1.000	0.021	0.241
MA1,1	0.021	1.000	0.240
AR1,1	0.241	0.240	1.000

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	16.55	4	0.0024	0.047	0.276	-0.075	0.052	0.110	-0.041
12	21.18	10	0.0199	-0.096	-0.031	-0.067	-0.012	-0.099	0.047
18	24.94	16	0.0709	-0.093	0.058	-0.083	-0.009	-0.037	0.027
24	32.39	22	0.0709	-0.015	0.026	-0.132	0.075	-0.084	0.094
30	38.05	28	0.0975	-0.119	-0.041	-0.055	-0.084	-0.036	-0.045





Model for variable log_total_death	
Estimated Mean	10.72399

Autoregressive Factors	
Factor 1:	1 - 0.95967 B**(1)

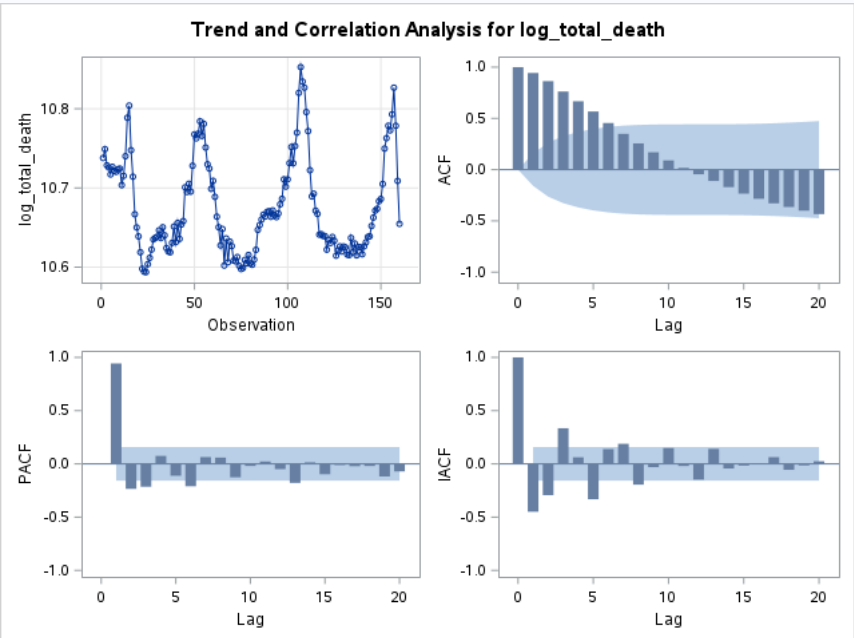
Moving Average Factors	
Factor 1:	1 + 0.1637 B**(1)

Number of Deaths by Cause Group

The ARIMA Procedure

Name of Variable = log_total_death	
Mean of Working Series	10.67669
Standard Deviation	0.060963
Number of Observations	160

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	525.93	6	<.0001	0.943	0.864	0.762	0.667	0.567	0.455
12	564.51	12	<.0001	0.349	0.256	0.169	0.090	0.017	-0.045
18	639.94	18	<.0001	-0.111	-0.170	-0.234	-0.284	-0.329	-0.364



Conditional Least Squares Estimation					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	10.72399	0.01838	583.38	<.0001	0
MA1,1	-0.16370	0.08211	-1.99	0.0479	1
AR1,1	0.95967	0.02473	38.80	<.0001	1

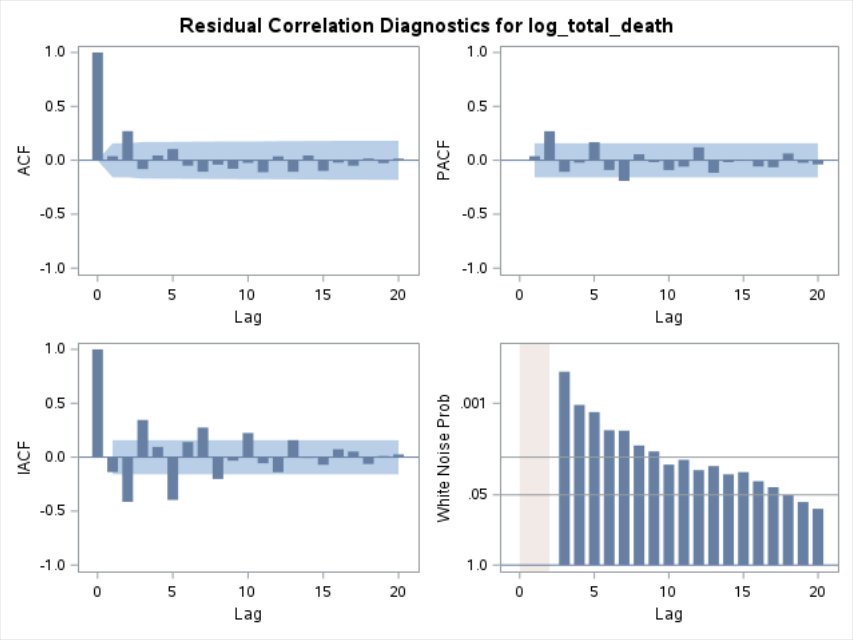
Constant Estimate	0.432501
Variance Estimate	0.000384
Std Error Estimate	0.019585
AIC	-801.526

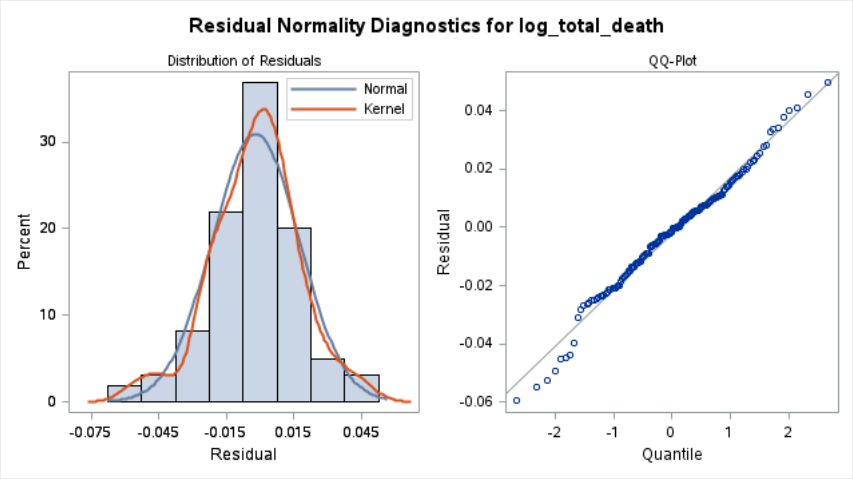
SBC	-792.3
Number of Residuals	160

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates			
Parameter	MU	MA1,1	AR1,1
MU	1.000	0.021	0.241
MA1,1	0.021	1.000	0.240
AR1,1	0.241	0.240	1.000

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	16.55	4	0.0024	0.047	0.276	-0.075	0.052	0.110	-0.041
12	21.18	10	0.0199	-0.096	-0.031	-0.067	-0.012	-0.099	0.047
18	24.94	16	0.0709	-0.093	0.058	-0.083	-0.009	-0.037	0.027
24	32.39	22	0.0709	-0.015	0.026	-0.132	0.075	-0.084	0.094
30	38.05	28	0.0975	-0.119	-0.041	-0.055	-0.084	-0.036	-0.045





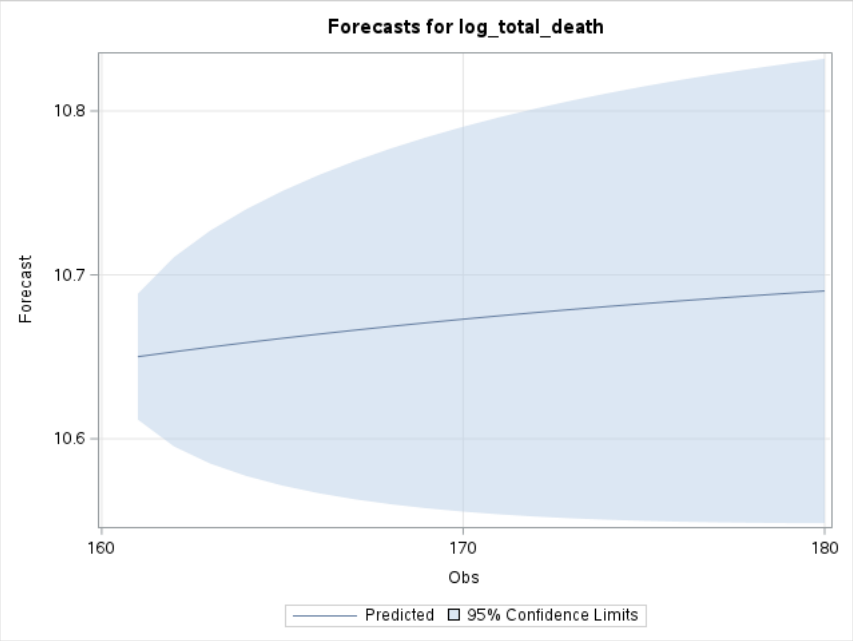
Model for variable log_total_death	
Estimated Mean	10.72399

Autoregressive Factors	
Factor 1:	1 - 0.95967 B**(1)

Moving Average Factors	
Factor 1:	1 + 0.1637 B**(1)

Forecasts for variable log_total_death				
Obs	Forecast	Std Error	95% Confidence Limits	
161	10.6501	0.0196	10.6117	10.6885
162	10.6531	0.0295	10.5953	10.7108
163	10.6559	0.0362	10.5849	10.7269
164	10.6587	0.0415	10.5773	10.7400
165	10.6613	0.0458	10.5714	10.7512
166	10.6638	0.0495	10.5668	10.7608

Forecasts for variable log_total_death				
Obs	Forecast	Std Error	95% Confidence Limits	
167	10.6663	0.0526	10.5631	10.7694
168	10.6686	0.0554	10.5600	10.7771
169	10.6708	0.0578	10.5576	10.7841
170	10.6730	0.0599	10.5555	10.7904
171	10.6750	0.0618	10.5539	10.7961
172	10.6770	0.0635	10.5525	10.8014
173	10.6789	0.0650	10.5514	10.8063
174	10.6807	0.0664	10.5506	10.8108
175	10.6825	0.0676	10.5499	10.8150
176	10.6841	0.0688	10.5494	10.8189
177	10.6857	0.0698	10.5490	10.8225
178	10.6873	0.0707	10.5487	10.8258
179	10.6888	0.0715	10.5486	10.8290
180	10.6902	0.0723	10.5485	10.8319



Number of Deaths by Cause Group

The GLM Procedure

Number of Observations Read	160
Number of Observations Used	160

Number of Deaths by Cause Group

The GLM Procedure

Dependent Variable: log_total_death

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	18234.87245	18234.87245	657822	<.0001
Error	159	4.40749	0.02772		
Uncorrected Total	160	18239.27995			

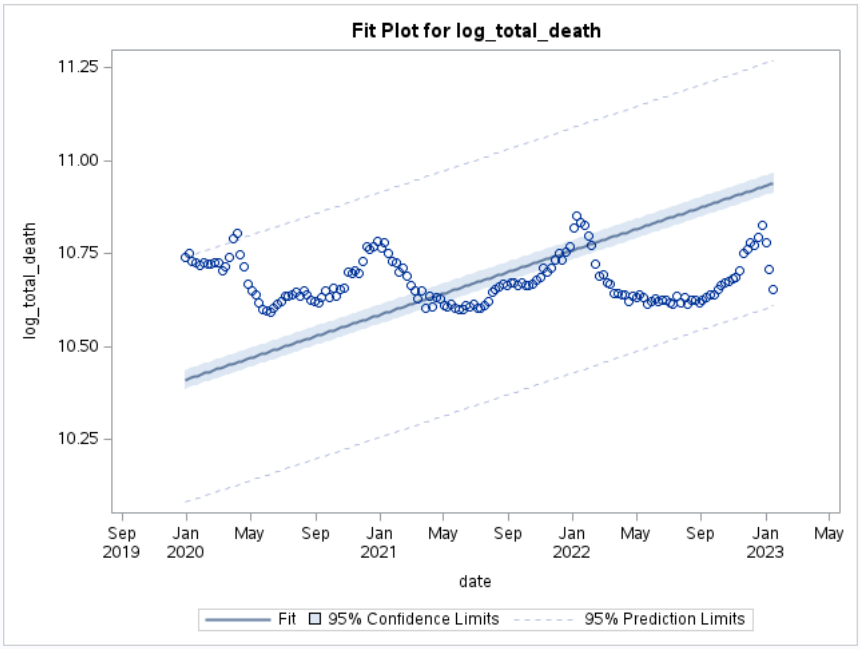
R-Square	Coeff Var	Root MSE	log_total_death Mean
0.999758	1.559410	0.166493	10.67669

Note: No intercept term is used: R-square is not corrected for the mean.

Source	DF	Type I SS	Mean Square	F Value	Pr > F
date	1	18234.87245	18234.87245	657822	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
date	1	18234.87245	18234.87245	657822	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
date	0.0004750861	5.8575791E-7	811.06	<.0001


Fit Plot for log_total_death
log_total_death
11.25
11.00
10.75
10.50
10.25
Sep 2019
Jan 2020
May
Sep
Jan 2021
May
Sep
Jan 2022
May
Sep
Jan 2023
May
date
Fit
95% Confidence Limits
95% Prediction Limits