An Analysis of the Relationship between Unemployment and Health in California

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Literature

- There are two strands of research traditions that consider the relationship between unemployment and health:
    - (i)   Aggregate-level studies using measures of unemployment at the local level
    - (ii)   Individual-level studies linking own experience of unemployment to own health
- Divergent findings
    - Studies in (i) typically show that health improves during periods of increased unemployment; furthermore mortality has been shown to be procyclical.
    - Studies in (ii) find that individual who lose their jobs during recessions experience negative health consequences.

Relationship between Unemployment and Health

- The channels through which unemployment can affect health are elucidated in detail in the literature.
  - Certain aspects of high unemployment periods and experience of job loss could be health-neutral or health-improving (e.g., less air pollution, decrease in harmful behaviors due to reduced income)
  - Other aspects could be be health-damaging (e.g., stress, worsening diet, e.g.)
- Thus, the net effect can go in either direction

Empirical Analysis

- Data drawn from the Behavioral Risk Factor Surveillance System (BRFSS).
  - BRFSS designed by the CDC is an on-going health survey system tracking the health conditions and risk behaviors in the United States since 1984.
  - A telephone survey that currently provides coverage of all 50 states and the District of Columbia.
  - Repeated cross-sections

Analysis Sample

- Individuals of prime working age who are between ages 25-54 between 2000 and 2012.

- ~35,000 observations from California residents
  - County identifiers are available, so analyses are conducted both for all California and four SCAQMD counties, including Los Angeles, Orange, Riverside, and San Bernardino

Measures of Unemployment

- County unemployment rate at the monthly level drawn from the Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS).
  - We take a three month moving average to smooth short-term fluctuations.
- Individual measures of unemployment drawn from responses in BRFSS.
  - Short-term unemployed (St_Unemp): A binary indicator variable for whether the respondent reported to have been out of work for less than a year
  - Long-term unemployed (Lt_Unemp): A binary indicator for whether the respondent to have been out of work for more than a year

Measures of Health and Health Behaviors

- Indicators for being in
  - Good or excellent health
  - Excellent health
  - Poor health
- Indicators for having poor mental health for
  - >10 days in the past month
  - >20 days in the past month
- Indicators for being a smoker, binge drinking, physical exercise, being obese, being overweight

Mortality Analysis

- Mortality rate drawn from the U.S. Vital Statistics provided by the National Center for Health Statistics (NCHS) for the period between 2000-2010.

Empirical Model

$$H_{icmy} = \alpha_0 + \alpha_1 Unemp_{cmy} + \alpha_2 St\_Unemp_{icmy} + \alpha_3 Lt\_Unemp_{icmy} + \mathbf{X}_{icmy}\, \alpha_4 + county + month + year + \varepsilon_{icmy}$$

Right hand side: County UR; St_Unemp & Lt_Unemp

X: Vector of control variables

County: County indicators

Month: Month indicators

Year: Year indicators

Empirical Model

- It is important to note that the estimate of the impact of own unemployment on health is likely to be biased upward to the extent that unemployed and employed individuals differ from each other in many respects, which may be associated with health. Some of these differences are accounted for by our analysis. However, one always risk the possibility of remaining omitted characteristics in an analysis with observational data.

Table 1: Variable Definitions

Unemployment Variables

Unemp	: County unemployment rate (3 month moving average)
St_Unemp	: 1 if the respondent has been out of a job for less than a year, 0 otherwise
Lt_Unemp[a]	: 1 if the respondent has been out of a job for more than a year, 0 otherwise

Outcome variables

Smoker[b]	: 1 if the respondent is a current smoker, 0 otherwise
Daily smoker	: 1 if the respondent reports smoking every day, 0 otherwise
Binge	: 1 if the respondent drank more than 5 servings of alcohol in one sitting during the previous month, 0 otherwise.
Chronic Drinker	: 1 if the respondent had 60 or more any alcoholic beverage in the past 30 days, 0 otherwise
Physical	: 1 If the respondent reported any physical activity in the past 30 days other than that which he or she does while working, 0 otherwise
Overweight	: 1 if the respondent's body mass index (BMI) $\geq$ 25, 0 otherwise
Obese	: 1 if the respondent's BMI $\geq$ 30, otherwise
General Health	: 1 if the respondent reports good or excellent general health at the time of interview, 0 otherwise
Excellent Health	: 1 if the respondent reports excellent health at the time of the interview, 0 otherwise
Poor Health	: 1 if the respondent reports poor health at the time of the interview, 0 otherwise
Mental$\geq$10[c]	: 1 if the respondent reports to having mental health problems $\geq$10 days past month , 0 otherwise
Mental$\geq$20	: 1 if the respondent reports to having mental health problems $\geq$20 days past month , 0 otherwise

Notes: Sample includes BRFSS individuals who are between ages 25-54 and in the labor force excluding self-employer. The sample covers years 2000-2012. Note that county identifiers are not publicly available starting 2013.

[a] Omitted category includes individuals who are employed.

[b] Includes individuals who smoke every day or some days.

[c] The variable is based on the question "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"

Table 2A: Descriptive Statistics – All California

Variable	Observations	Mean	Standard Deviation
Smoker	36,543	0.164	0.371
Daily Smoker	36,042	0.104	0.306
Binge	34,806	0.189	0.392
Chronic Drinker	34,073	0.067	0.251
Physical	36,008	0.779	0.415
Overweight	35,509	0.640	0.480
Obese	35,509	0.246	0.431
General Health	36,530	0.868	0.339
Excellent Health	36,530	0.245	0.430
Poor Health	36,530	0.015	0.122
Mental$\geq$10	36,389	0.129	0.335
Mental$\geq$20	36,389	0.061	0.239
Unemp	36,543	0.077	0.035
St_Unemp	36,543	0.051	0.219
Lt_Unemp	36,543	0.068	0.251

Table 2B: Descriptive Statistics – Non-SCAQMD Counties

Variable	Observations	Mean	Standard Deviation
Smoker	22,227	0.164	0.370
Daily Smoker	21,897	0.107	0.309
Binge	21,305	0.193	0.395
Chronic Drinker	20,915	0.071	0.256
Physical	21,942	0.798	0.402
Overweight	21,573	0.633	0.482
Obese	21,573	0.240	0.427
General Health	22,223	0.885	0.319
Excellent Health	22,223	0.262	0.440
Poor Health	22,223	0.015	0.120
Mental$\geq$10	22,136	0.125	0.331
Mental$\geq$20	22,136	0.058	0.234
Unemp	22,227	0.080	0.038
St_Unemp	22,227	0.048	0.213
Lt_Unemp	22,227	0.070	0.254

Table 2C: Descriptive Statistics – San Bernardino County

Variable	Observations	Mean	Standard Deviation
Smoker	2,109	0.185	0.389
Daily Smoker	2,083	0.140	0.347
Binge	2,015	0.198	0.398
Chronic Drinker	1,972	0.077	0.267
Physical	2,079	0.745	0.436
Overweight	2,067	0.714	0.452
Obese	2,067	0.325	0.468
General Health	2,108	0.857	0.350
Excellent Health	2,108	0.224	0.417
Poor Health	2,108	0.020	0.139
Mental$\geq$10	2,101	0.144	0.351
Mental$\geq$20	2,101	0.063	0.244
Unemp	2,109	0.079	0.036
St_Unemp	2,109	0.075	0.263
Lt_Unemp	2,109	0.070	0.255

Table 2D: Descriptive Statistics – Riverside County

Variable	Observations	Mean	Standard Deviation
Smoker	2,068	0.162	0.369
Daily Smoker	2,043	0.104	0.306
Binge	1,991	0.188	0.391
Chronic Drinker	1,946	0.067	0.251
Physical	2,040	0.762	0.426
Overweight	2,015	0.683	0.466
Obese	2,015	0.298	0.457
General Health	2,063	0.861	0.346
Excellent Health	2,063	0.235	0.424
Poor Health	2,063	0.015	0.120
Mental$\geq$10	2,057	0.150	0.357
Mental$\geq$20	2,057	0.079	0.270
Unemp	2,068	0.085	0.036
St_Unemp	2,068	0.056	0.230
Lt_Unemp	2,068	0.069	0.253

Table 2E: Descriptive Statistics - Orange County

Variable	Observations	Mean	Standard Deviation
Smoker	3,119	0.138	0.345
Daily Smoker	3,069	0.082	0.274
Binge	2,942	0.173	0.378
Chronic Drinker	2,880	0.052	0.222
Physical	3,068	0.808	0.394
Overweight	3,027	0.603	0.489
Obese	3,027	0.203	0.403
General Health	3,118	0.868	0.338
Excellent Health	3,118	0.259	0.438
Poor Health	3,118	0.008	0.091
Mental$\geq$10	3,098	0.122	0.328
Mental$\geq$20	3,098	0.057	0.232
Unemp	3,119	0.054	0.022
St_Unemp	3,119	0.037	0.190
Lt_Unemp	3,119	0.061	0.239

Table 2F: Descriptive Statistics - Los Angeles County

Variable	Observations	Mean	Standard Deviation
Smoker	7,020	0.169	0.375
Daily Smoker	6,950	0.099	0.298
Binge	6,553	0.185	0.388
Chronic Drinker	6,360	0.063	0.244
Physical	6,879	0.744	0.436
Overweight	6,827	0.638	0.481
Obese	6,827	0.243	0.429
General Health	7,018	0.838	0.369
Excellent Health	7,018	0.214	0.410
Poor Health	7,018	0.018	0.131
Mental$\geq$10	6,997	0.132	0.338
Mental$\geq$20	6,997	0.063	0.243
Unemp	7,020	0.077	0.028
St_Unemp	7,020	0.055	0.227
Lt_Unemp	7,020	0.066	0.247

Table 3A: Estimates for All California (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.183	0.149	-0.163	0.041	0.402	0.329	0.616*	-0.117	0.558**	-0.047	0.088	0.220
	(0.289)	(0.223)	(0.291)	(0.205)	(0.306)	(0.325)	(0.342)	(0.265)	(0.277)	(0.085)	(0.243)	(0.170)
Panel B												
Unemp	0.129	0.108	-0.137	0.036	0.387	0.342	0.606*	-0.059	0.595**	-0.070	0.010	0.169
	(0.289)	(0.223)	(0.292)	(0.204)	(0.307)	(0.326)	(0.343)	(0.263)	(0.277)	(0.085)	(0.243)	(0.171)
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.018*	-0.024*	0.023**	-0.111***	-0.068***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.011	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Panel C												
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.019*	-0.024*	0.023**	-0.111***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.012	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 3B: Estimates for All California (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.232	-0.048	-0.182	0.158	0.440	0.349	0.515	-0.374	0.487	-0.070	0.313	0.203
	(0.331)	(0.283)	(0.357)	(0.221)	(0.398)	(0.373)	(0.392)	(0.339)	(0.334)	(0.115)	(0.278)	(0.211)
Panel B												
Unemp	-0.290	-0.093	-0.161	0.153	0.424	0.364	0.504	-0.312	0.526	-0.094	0.229	0.148
	(0.331)	(0.282)	(0.358)	(0.221)	(0.399)	(0.374)	(0.392)	(0.338)	(0.334)	(0.115)	(0.280)	(0.213)
St_Unemp	0.085***	0.060***	-0.045***	0.007	0.018*	-0.025**	0.023**	-0.110***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.002	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Panel C												
St_Unemp	0.085***	0.060***	-0.045***	0.007	0.019*	-0.025**	0.023**	-0.110***	-0.067***	0.043***	0.118***	0.077***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.003	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 4A: Estimates for SCAQMD Counties (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.510	0.213	-0.444	-0.013	0.948*	0.012	-0.317	0.340	0.570	0.002	0.414	-0.155
	(0.419)	(0.354)	(0.601)	(0.441)	(0.528)	(0.619)	(0.658)	(0.589)	(0.440)	(0.147)	(0.579)	(0.376)
Panel B												
Unemp	0.504	0.218	-0.439	-0.014	0.957*	0.014	-0.326	0.364	0.591	-0.005	0.412	-0.155
	(0.418)	(0.349)	(0.599)	(0.441)	(0.528)	(0.623)	(0.658)	(0.586)	(0.436)	(0.147)	(0.587)	(0.384)
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.017)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.028*	-0.015	-0.001	-0.014	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Panel C												
St_Unemp	0.085***	0.055***	-0.026*	0.013	0.005	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.017)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.053***	-0.007	0.008	0.028*	-0.015	-0.001	-0.014	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Observations	14,236	14,069	13,424	13,096	13,994	13,863	13,863	14,228	14,228	14,228	14,173	14,173

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 4B: Estimates for SCAQMD Counties (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.158	0.195	-0.735	-0.213	0.613	0.312	-0.638	-0.410	0.142	0.079	0.714	-0.551
	(0.623)	(0.529)	(0.871)	(0.534)	(0.743)	(0.797)	(0.930)	(0.894)	(0.650)	(0.199)	(0.772)	(0.508)
Panel B												
Unemp	0.141	0.193	-0.730	-0.215	0.624	0.317	-0.654	-0.369	0.175	0.066	0.696	-0.562
	(0.630)	(0.528)	(0.868)	(0.536)	(0.744)	(0.804)	(0.929)	(0.891)	(0.641)	(0.200)	(0.781)	(0.518)
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.109***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.016)	(0.016)	(0.014)	(0.008)	(0.019)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.012*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Panel C												
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.016)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Observations	14,236	14,069	13,424	13,096	13,994	13,863	13,863	14,228	14,228	14,228	14,173	14,173

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 4C: Estimates for SCAQMD Counties (With Trends + Air Pollution Controls)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.110	0.154	-0.742	-0.216	0.637	0.275	-0.642	-0.410	0.130	0.069	0.726	-0.550
	(0.616)	(0.525)	(0.872)	(0.536)	(0.740)	(0.802)	(0.926)	(0.895)	(0.649)	(0.201)	(0.766)	(0.507)
Panel B												
Unemp	0.093	0.151	-0.737	-0.218	0.648	0.280	-0.658	-0.370	0.163	0.056	0.707	-0.561
	(0.623)	(0.524)	(0.868)	(0.537)	(0.742)	(0.809)	(0.925)	(0.891)	(0.639)	(0.203)	(0.776)	(0.517)
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.109***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.017)	(0.016)	(0.014)	(0.008)	(0.019)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.012*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Panel C												
St_Unemp	0.085***	0.055***	-0.025*	0.013	0.004	-0.026	0.037**	-0.110***	-0.076***	0.042***	0.110***	0.077***
	(0.017)	(0.017)	(0.015)	(0.009)	(0.014)	(0.017)	(0.016)	(0.016)	(0.014)	(0.008)	(0.020)	(0.014)
Lt_Unemp	0.047**	0.054***	-0.007	0.008	0.029*	-0.015	-0.001	-0.015	0.001	0.011*	0.089***	0.069***
	(0.020)	(0.016)	(0.018)	(0.011)	(0.017)	(0.015)	(0.024)	(0.017)	(0.020)	(0.006)	(0.016)	(0.014)
Observations	14,236	14,069	13,424	13,096	13,994	13,863	13,863	14,228	14,228	14,228	14,173	14,173

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 5A: Estimates with SCAQMD Counties Interaction (No Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	0.230	0.292	-0.164	0.070	0.095	0.101	0.620*	-0.340	0.621**	-0.017	0.256	0.334*
	(0.307)	(0.251)	(0.316)	(0.207)	(0.348)	(0.344)	(0.355)	(0.278)	(0.294)	(0.098)	(0.245)	(0.173)
Unemp*SCAQMD	-0.075	-0.231	0.002	-0.043	0.495***	0.365	-0.007	0.361**	-0.102	-0.049	-0.273**	-0.186*
	(0.186)	(0.156)	(0.182)	(0.145)	(0.189)	(0.235)	(0.202)	(0.148)	(0.179)	(0.056)	(0.138)	(0.101)
Panel B												
Unemp	0.187	0.258	-0.146	0.065	0.083	0.112	0.613*	-0.296	0.650**	-0.035	0.193	0.293*
	(0.307)	(0.250)	(0.316)	(0.207)	(0.348)	(0.345)	(0.356)	(0.276)	(0.295)	(0.098)	(0.246)	(0.174)
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.018*	-0.025**	0.023**	-0.111***	-0.067***	0.043***	0.118***	0.077***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.011	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	-0.093	-0.242	0.013	-0.045	0.492***	0.370	-0.012	0.384***	-0.088	-0.058	-0.298**	-0.202**
	(0.185)	(0.156)	(0.182)	(0.144)	(0.189)	(0.235)	(0.201)	(0.148)	(0.179)	(0.056)	(0.138)	(0.101)
Panel C												
St_Unemp	0.085***	0.060***	-0.046***	0.007	0.018*	-0.025**	0.023**	-0.111***	-0.067***	0.043***	0.118***	0.077***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.057***	0.058***	-0.011	0.010	0.021*	-0.016	0.002	-0.024**	-0.021*	0.011***	0.087***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	0.094	0.015	-0.133	0.021	0.575*	0.482	0.602*	0.088	0.561*	-0.093	-0.104	0.092
	(0.301)	(0.228)	(0.298)	(0.219)	(0.304)	(0.348)	(0.356)	(0.264)	(0.288)	(0.084)	(0.255)	(0.177)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 5B: Estimates with SCAQMD Counties Interaction (With Trends)

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Panel A												
Unemp	-0.105	0.023	-0.205	0.139	0.268	0.190	0.362	-0.441	0.613*	-0.077	0.344	0.193
	(0.357)	(0.305)	(0.367)	(0.232)	(0.412)	(0.405)	(0.403)	(0.338)	(0.345)	(0.120)	(0.275)	(0.209)
Unemp*SCAQMD	-0.331	-0.186	0.060	0.052	0.446	0.413	0.395	0.174	-0.329	0.020	-0.080	0.025
	(0.292)	(0.234)	(0.319)	(0.173)	(0.314)	(0.338)	(0.306)	(0.290)	(0.316)	(0.097)	(0.246)	(0.184)
Panel B												
Unemp	-0.152	-0.015	-0.190	0.134	0.255	0.201	0.354	-0.394	0.642*	-0.096	0.276	0.149
	(0.356)	(0.304)	(0.367)	(0.232)	(0.413)	(0.406)	(0.404)	(0.335)	(0.346)	(0.120)	(0.276)	(0.209)
St_Unemp	0.086***	0.060***	-0.045***	0.007	0.018*	-0.025**	0.023*	-0.110***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.002	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	-0.361	-0.206	0.076	0.050	0.441	0.422	0.387	0.215	-0.305	0.004	-0.123	-0.003
	(0.290)	(0.232)	(0.319)	(0.173)	(0.313)	(0.337)	(0.306)	(0.291)	(0.315)	(0.098)	(0.248)	(0.185)
Panel C												
St_Unemp	0.086***	0.060***	-0.045***	0.007	0.018*	-0.025**	0.023*	-0.110***	-0.067***	0.043***	0.118***	0.076***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.010)	(0.012)	(0.012)	(0.011)	(0.009)	(0.006)	(0.013)	(0.010)
Lt_Unemp	0.056***	0.058***	-0.011	0.010	0.022**	-0.016	0.002	-0.024**	-0.021*	0.012***	0.088***	0.058***
	(0.013)	(0.011)	(0.011)	(0.007)	(0.011)	(0.012)	(0.014)	(0.010)	(0.012)	(0.004)	(0.010)	(0.008)
Unemp*SCAQMD	-0.513	-0.221	-0.114	0.184	0.696	0.623	0.741*	-0.179	0.337	-0.092	0.153	0.146
	(0.370)	(0.307)	(0.425)	(0.245)	(0.452)	(0.415)	(0.445)	(0.409)	(0.400)	(0.131)	(0.347)	(0.262)
Observations	36,299	35,819	34,571	33,885	35,789	35,290	35,290	36,288	36,288	36,288	36,149	36,149

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 6: Estimated of Unemployment on Health for Individual SCAQMD Counties

	Smoker	Daily Smoker	Binge	Chronic Drinker	Physical	Overweight	Obese	General Health	Excellent	Poor	Mental≥10	Mental≥20
Los Angeles												
stunemp	0.065**	0.036*	-0.010	0.015	0.005	-0.038*	0.063**	-0.091***	-0.081***	0.038***	0.122***	0.084***
	(0.023)	(0.019)	(0.019)	(0.011)	(0.019)	(0.021)	(0.022)	(0.023)	(0.017)	(0.011)	(0.027)	(0.018)
ltunemp	0.015	0.027	-0.014	0.002	0.037	-0.005	0.046	-0.020	-0.015	0.008	0.068***	0.069***
	(0.025)	(0.021)	(0.025)	(0.016)	(0.025)	(0.020)	(0.034)	(0.026)	(0.030)	(0.009)	(0.020)	(0.021)
Observations	6,980	6,912	6,516	6,328	6,844	6,789	6,789	6,978	6,978	6,978	6,957	6,957
Orange												
stunemp	0.066**	0.022	-0.050**	0.005	-0.037	-0.057	-0.025	-0.087*	-0.023	0.016	0.089	0.099*
	(0.026)	(0.026)	(0.022)	(0.019)	(0.049)	(0.056)	(0.050)	(0.041)	(0.044)	(0.012)	(0.060)	(0.045)
ltunemp	0.036	0.033	0.033	0.050	0.000	-0.011	-0.110**	-0.046*	0.039	0.014	0.101**	0.081**
	(0.039)	(0.031)	(0.054)	(0.030)	(0.040)	(0.031)	(0.046)	(0.024)	(0.029)	(0.011)	(0.036)	(0.033)
Observations	3,097	3,048	2,920	2,862	3,047	3,009	3,009	3,096	3,096	3,096	3,076	3,076
Riverside												
stunemp	0.111*	0.058	-0.038	0.011	0.022	0.059	0.039	-0.175***	-0.085*	0.060**	0.113*	0.055
	(0.054)	(0.039)	(0.063)	(0.025)	(0.035)	(0.043)	(0.045)	(0.019)	(0.040)	(0.026)	(0.058)	(0.038)
ltunemp	0.113**	0.110**	-0.019	-0.006	0.009	-0.001	0.006	0.047	-0.032	0.010	0.095*	0.029
	(0.040)	(0.037)	(0.035)	(0.029)	(0.040)	(0.042)	(0.053)	(0.041)	(0.035)	(0.017)	(0.049)	(0.038)
Observations	2,059	2,034	1,982	1,941	2,032	2,006	2,006	2,055	2,055	2,055	2,048	2,048
San Bernardino												
stunemp	0.139***	0.132**	-0.065*	0.007	0.029	-0.017	0.027	-0.130***	-0.091**	0.059**	0.080*	0.046
	(0.029)	(0.051)	(0.035)	(0.026)	(0.032)	(0.038)	(0.025)	(0.039)	(0.039)	(0.021)	(0.042)	(0.038)
ltunemp	0.125*	0.128**	-0.019	-0.011	0.045	-0.071	-0.047	-0.033	0.010	0.029	0.170***	0.099***
	(0.060)	(0.044)	(0.044)	(0.022)	(0.035)	(0.047)	(0.031)	(0.033)	(0.061)	(0.018)	(0.043)	(0.025)
Observations	2,100	2,075	2,006	1,965	2,071	2,059	2,059	2,099	2,099	2,099	2,092	2,092

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 7: Estimates of the Effect of County Unemployment on Mortality Rates

	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate
Unemp	-79.656***	-73.013***	-57.623***	-61.971***	-58.909***	-55.708***
	(8.572)	(8.027)	(7.515)	(8.259)	(8.075)	(8.102)
San Bernardino*Unemp			-27.451***			-20.280**
			(7.900)			(9.746)
Riverside*Unemp			-72.173***			-50.163***
			(8.993)			(11.796)
Orange*Unemp			34.755***			3.497
			(11.129)			(10.095)
Los Angeles *Unemp			-1.345			2.688
			(7.197)			(8.002)
SCAQMD*Unemp		-14.478**			-8.381	
		(6.496)			(6.728)	
County Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Month Fixed Effects	Y	Y	Y	Y	Y	Y
County Specific Trends	N	N	N	Y	Y	Y
R-squared	0.850	0.851	0.854	0.861	0.861	0.862
Observations	6,240	6,240	6,240	6,240	6,240	6,240

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 8: Estimates of the Effect of County Unemployment on Mortality Rates (SCAQMD Counties)

	Mortality Rate	Mortality Rate	Mortality Rate	Mortality Rate
Unemp	-155.007***	-81.745***	-98.000***	-74.845**
	(24.803)	(28.580)	(25.878)	(28.830)
San Bernardino*Unemp		-22.008*		-19.340
		(11.850)		(12.782)
Riverside*Unemp		-65.044***		-50.107***
		(11.982)		(13.881)
Orange*Unemp		29.882*		-4.775
		(15.014)		(14.509)
County fixed effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Month Fixed Effects	Y	Y	Y	y
County Specific Trends	N	N	y	y
R-squared	0.852	0.863	0.864	0.867
Observations	528	528	528	528

Notes: Standard errors clustered at the month*year are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Conclusions

- County unemployment rate itself appears to have no impact on health.

- Unemployed individuals have worse health than those who are employed regardless of the county unemployment rate.

- Unemployment rate appears to be negatively associated with the county mortality rate, i.e., number deaths decrease as unemployment increases.

- Fluctuations in the local unemployment rate are not unlikely to be associated with health and health behaviors in any meaningful manner, at least for the state of California.