Supplementary Tables and Figures

Supplementary Table S1. Summary of Results for each PCW Compared with Control (Average of 4 Surgeon General's Warnings) Among All Participants

		Session 1 (n = 9,760)							Session 2 (n = 4,913)	Session 3 (n=3,360)	
		New information (OR)	Thinking about risks (OR)	Self-reported learning (B)	Attention (B)	Perceived inform-ativeness (B)	Perceived under-standability (B)	Perceived factualness (OR)	Health beliefs Session 2 vs. Session 1 (DID or interaction term)	Health beliefs Session 3 vs. Session 1 (DID or interaction term)	Recall[e] (OR)
1	Addictive[b]	0.61[a]	1.11	−0.44[a]	0.36[a]	−0.05	0.39[a]	1.07	−1.03[a]	−0.39	5.63[a]
2	Harm children[b]	1.37[a]	2.38[a]	0.31[a]	0.68[a]	0.54[a]	0.52[a]	0.94	0.32	−0.21	7.64[a]
3	Kill you[b]	1.04	1.70[a]	−0.30[a]	0.67[a]	0.17	0.42[a]	0.99	0.09	−0.26	9.42[a]
4	Fatal lung disease in nonsmokers[b]	1.55[a]	1.94[a]	0.64[a]	0.51[a]	0.69[a]	0.41[a]	0.70[a]	0.50[a]	0.59[a]	5.20[a]
5	Quit now[b]	0.95	1.18	−0.44[a]	0.33[a]	−0.33[a]	0.12	1.01	0.29	−0.06	5.15[a]
6	Head and neck cancer	8.09[a]	2.70[a]	1.96[a]	0.66[a]	0.78[a]	0.44[a]	0.53[a]	0.50[a]	0.25[a]	4.89[a]
7	Bladder cancer	14.63[a]	2.14[a]	2.37[a]	0.61[a]	0.95[a]	0.46[a]	0.43[a]	0.60[a]	0.36[a]	5.39[a]
8	Stunt fetal growth[b]	1.73[a]	2.00[a]	0.74[a]	0.67[a]	0.91[a]	0.58[a]	0.93	1.02[a]	−0.02	6.13[a]
9	Clogged arteries	2.64[a]	2.05[a]	1.20[a]	0.52[a]	0.88[a]	0.55[a]	1.14	0.18[a]	−0.01	2.99[a]
10	COPD 1[c]	1.48[a]	2.25[a]	0.70[a]	0.51[a]	0.76[a]	0.47[a]	1.23	0.12[a]	−0.08	4.14[a]
11	COPD 2[d]	1.48[a]	2.13[a]	0.78[a]	0.57[a]	0.77[a]	0.53[a]	1.26	0.01	−0.10	4.23[a]
12	Erectile dysfunction	7.65[a]	1.56[a]	2.21[a]	0.47[a]	0.95[a]	0.47[a]	0.53[a]	0.41[a]	0.10	4.69[a]
13	Amputation	7.26[a]	3.52[a]	2.28[a]	0.83[a]	1.13[a]	0.60[a]	0.66[a]	0.56[a]	0.37[a]	8.73[a]
14	Diabetes	10.64[a]	2.11[a]	2.43 [a]	0.61[a]	0.90[a]	0.54[a]	0.44[a]	0.74[a]	0.25[a]	4.90[a]

| 15 | Macular degeneration | 11.81[a] | 2.64[a] | 2.58[a] | 0.71[a] | 1.12[a] | 0.44[a] | 0.59[a] | 0.58[a] | 0.26[a] | 4.87[a] |
| 16 | Cataracts | 14.45[a] | 1.71[a] | 2.37[a] | 0.56[a] | 0.86[a] | 0.47[a] | 0.38[a] | 0.66[a] | 0.33[a] | 3.44[a] |

[a]Significant after adjustment for multiple comparisons. [b]Relevant health belief items are not scaled so the reported result is the interaction term from the ordinal regression rather than the DID. [c]Image of diseased lungs. [d]Image of man with oxygen. [e]Sample size for recall analyses is 3,163; 197 cases missing due to technical error with the survey platform for the item assessing recall.

Note: B = regression coefficient. COPD = chronic obstructive pulmonary disease. DID = difference in difference score. OR = odds ratio. All results control for age group and smoking status. DID scores for linear analyses represent: (follow-up session mean for PCW – Session 1 mean for PCW) - (follow-up session mean for Control – Session 1 mean for Control) where follow-up is either Session 2 or Session 3. Significant interaction terms from ordinal regression models for non-scaled health beliefs (i.e., the PCW with a superscript "b") indicate that there was a greater pre-post change in agreement with health beliefs for treatment versus control, either in the direction of greater agreement with health beliefs in the treatment condition (positive coefficients) or greater agreement with health beliefs in the control condition (negative coefficients).

Supplementary Table S2. Linear Regressions of Difference in Difference Health Belief Scores between Session 2 and Session 1 and between Session 3 and Session 1, by Condition

Condition	Session 1 to Session 2 (n = 4,913)			Session 1 to Session 3 (n = 3,360)		
	Mean (SD) Health Belief Score			Mean (SD) Health Belief Score		
	Session 1	Session 2	DID (95% CI)	Session 1	Session 3	DID (95% CI)
Head and neck cancer	3.40 (3.04)	3.97 (2.94)	0.50 (0.37, 0.63)[a]	3.22 (2.96)	3.64 (2.85)	0.25 (0.11, 0.40)[a]
Control	3.35 (1.48)	3.42 (1.46)		3.36 (1.50)	3.52 (1.45)	
Bladder cancer	3.27 (3.14)	3.96 (2.98)	0.60 (0.47, 0.74)[a]	3.25 (3.04)	3.66 (2.87)	0.36 (0.19, 0.52)[a]
Control	3.25 (1.47)	3.34 (1.50)		3.26 (1.42)	3.31 (1.49)	
Clogged arteries	4.00 (2.67)	4.20 (2.52)	0.18 (0.07, 0.29)[a]	3.94 (2.44)	3.99 (2.42)	−0.01 (−0.13, 0.12)
Control	3.94 (1.32)	3.96 (1.29)		3.95 (1.29)	4.01 (1.31)	
COPD 1[b]	4.35 (2.27)	4.49 (2.17)	0.12 (0.04, 0.21)[a]	4.35 (2.33)	4.34 (2.26)	−0.08 (−0.19, 0.04)
Control	4.36 (1.08)	4.38 (1.09)		4.38 (1.05)	4.45 (1.05)	
COPD 2[c]	4.44 (2.36)	4.47 (2.52)	0.01 (−0.09, 0.11)	4.46 (2.18)	4.43 (2.03)	−0.10 (−0.20, 0.00)
Control	4.37 (1.08)	4.38 (1.08)		4.39 (1.05)	4.46 (1.05)	
Erectile dysfunction	3.67 (2.74)	4.16 (2.76)	0.41 (0.28, 0.53)[a]	3.65 (2.81)	3.87 (2.48)	0.10 (−0.05, 0.24)
Control	3.59 (1.31)	3.67 (1.30)		3.61 (1.31)	3.74 (1.35)	

Amputation	3.55 (2.96)	4.20 (2.54)		3.46 (2.80)	3.97 (2.56)	
			0.56 (0.43, 0.69)[a]			0.37 (0.23, 0.51)[a]
Control	3.52 (1.46)	3.61 (1.43)		3.55 (1.44)	3.69 (1.46)	
Diabetes	2.97 (3.12)	3.89 (3.22)		2.90 (2.86)	3.35 (3.04)	
			0.74 (0.59, 0.89)[a]			0.25 (0.08, 0.42)[a]
Control	2.90 (1.52)	3.07 (1.51)		2.89 (1.50)	3.09 (1.53)	
Macular degeneration	3.32 (2.61)	4.01 (2.89)		3.22 (2.54)	3.60 (2.75)	
			0.58 (0.46, 0.70)[a]			0.26 (0.13, 0.40)[a]
Control	3.21 (1.39)	3.32 (1.43)		3.22 (1.40)	3.35 (1.42)	
Cataracts	3.14 (3.01)	3.92 (3.06)		3.02 (2.69)	3.55 (2.62)	
			0.66 (0.52, 0.80)[a]			0.33 (0.18, 0.49)[a]
Control	3.09 (1.45)	3.22 (1.45)		3.08 (1.44)	3.27 (1.51)	

Note: Control = average of the 4 Surgeon General warnings for the relevant health belief. Regressions control for age group and smoking status. CI = confidence interval. COPD = chronic obstructive pulmonary disease. DID = difference in difference. PCW = pictorial cigarette warning. SD = standard deviation. DID scores represent: (follow-up session mean for PCW – Session 1 mean for PCW) - (follow-up session mean for Control – Session 1 mean for Control) where follow-up is either Session 2 or Session 3.

[a] Significant after adjustment for multiple comparisons. [b] Image of diseased lungs. [c] Image of man with oxygen.

Supplementary Table S3. Ordinal Regression of Difference in Difference Health Belief Scores between Session 2 and Session 1, by Condition

Warning	Ordinal Response Options for Corresponding Health Belief Item	Condition	Proportion Selecting Response		DID (95% CI)	B (95% CI)
			Session 1	Session 2		
Addictive	1 "Strongly disagree"	PCW	0.01	0.01	0.01 (0.00, 0.01)	
		Control	0.02	0.01		
	2 "Disagree"	PCW	0.00	0.01	0.00 (0.00, 0.01)	
		Control	0.01	0.01		
	3 "Neither agree nor disagree"	PCW	0.02	0.03	0.02 (0.01, 0.03)	−1.03[a] (−1.64, −0.41)
		Control	0.04	0.03		
	4 "Agree"	PCW	0.13	0.19	0.06 (0.03, 0.10)	
		Control	0.19	0.19		
	5 "Strongly agree"	PCW	0.84	0.76	−0.09 (−0.15, −0.04)	
		Control	0.75	0.76		
Harm children	1 "Strongly disagree"	PCW	0.01	0.01	0.00 (0.00, 0.00)	
		Control	0.01	0.01		
	2 "Disagree"	PCW	0.02	0.02	0.00 (−0.01, 0.00)	
		Control	0.02	0.02		
	3 "Neither agree nor disagree"	PCW	0.07	0.06	−0.01 (−0.03, 0.00)	0.32 (−0.15, 0.79)
		Control	0.07	0.08		
	4 "Agree"	PCW	0.31	0.29	−0.02 (−0.05, 0.01)	
		Control	0.31	0.32		
	5 "Strongly agree"	PCW	0.60	0.62	0.04 (−0.02, 0.09)	
		Control	0.59	0.58		

Kill you	1 "Strongly disagree"	PCW	0.01	0.01	0.00 (0.00, 0.00)	
		Control	0.01	0.01		
	2 "Disagree"	PCW	0.01	0.01	0.00 (0.00, 0.00)	
		Control	0.01	0.01		
	3 "Neither agree nor disagree"	PCW	0.07	0.06	0.00 (-0.02, 0.01)	0.09 (−0.42, 0.61)
		Control	0.07	0.07		
	4 "Agree"	PCW	0.29	0.28	-0.01 (-0.04, 0.03)	
		Control	0.30	0.29		
	5 "Strongly agree"	PCW	0.62	0.64	0.01 (-0.05, 0.07)	
		Control	0.61	0.62		
Fatal lung disease in nonsmokers	1 "Strongly disagree"	PCW	0.03	0.02	−0.01 (−0.02, 0.00)	
		Control	0.03	0.02		
	2 "Disagree"	PCW	0.09	0.06	−0.02 (−0.04, 0.00)	
		Control	0.09	0.08		
	3 "Neither agree nor disagree"	PCW	0.24	0.19	−0.03 (−0.06, −0.01)	0.50[a] (0.08, 0.92)
		Control	0.23	0.22		
	4 "Agree"	PCW	0.37	0.38	0.00 (−0.01, 0.01)	
		Control	0.38	0.38		
	5 "Strongly agree"	PCW	0.26	0.35	0.06 (0.01, 0.11)	
		Control	0.28	0.30		
Quit now	1 "Strongly disagree"	PCW	0.02	0.01	0.00 (−0.01, 0.00)	
		Control	0.02	0.02		
	2 "Disagree"	PCW	0.02	0.02	0.00 (−0.01, 0.00)	0.29 (−0.13, 0.72)
		Control	0.02	0.02		
	3 "Neither agree nor disagree"	PCW	0.08	0.06	−0.01 (−0.03, 0.01)	
		Control	0.08	0.07		

	4 "Agree"	PCW	0.38	0.34	−0.02 (−0.06, 0.01)	
		Control	0.37	0.35		
	5 "Strongly agree"	PCW	0.49	0.57	0.04 (−0.02, 0.11)	
		Control	0.50	0.55		
Stunt fetal growth	1 "Strongly disagree"	PCW	0.01	0.01	−0.01 (−0.01, 0.00)	
		Control	0.01	0.01		
	2 "Disagree"	PCW	0.02	0.01	−0.01 (−0.02, −0.01)	
		Control	0.02	0.02		
	3 "Neither agree nor disagree"	PCW	0.15	0.10	−0.06 (−0.08, −0.03)	1.02[a] (0.54, 1.49)
		Control	0.15	0.16		
	4 "Agree"	PCW	0.37	0.32	−0.05 (−0.08, −0.03)	
		Control	0.37	0.37		
	5 "Strongly agree"	PCW	0.44	0.56	0.13 (0.07, 0.19)	
		Control	0.44	0.43		

Note: Control = average of the 4 Surgeon General warnings for the relevant health belief. Regressions control for age group and smoking status. CI = confidence interval. DID = difference in difference. PCW = pictorial cigarette warning. DID scores represent: (Proportion endorsing response at Session 2 for PCW – Proportion endorsing response at Session 1 for PCW) - (Proportion endorsing response at Session 2 for Control – Proportion endorsing response at Session 1 for Control).

[a] Significant after adjustment for multiple comparisons.

Supplementary Table S4. Ordinal Regression of Difference in Difference Health Belief Scores between Session 3 and Session 1, by Condition

Warning	Ordinal Response Options for Corresponding Health Belief Item	Condition	Proportion Selecting Response		DID (95% CI)	B (95% CI)
			Session 1	Session 3		
Addictive	1 "Strongly disagree"	PCW	0.02	0.02	0.01 (0.00, 0.02)	
		Control	0.02	0.02		
	2 "Disagree"	PCW	0.01	0.01	0.00 (0.00, 0.01)	
		Control	0.01	0.01		
	3 "Neither agree nor disagree"	PCW	0.03	0.03	0.01 (−0.01, 0.02)	−0.39 (−1.08, 0.30)
		Control	0.03	0.03		
	4 "Agree"	PCW	0.15	0.16	0.03 (−0.02, 0.07)	
		Control	0.17	0.16		
	5 "Strongly agree"	PCW	0.80	0.78	−0.04 (−0.11, 0.03)	
		Control	0.77	0.78		
Harm children	1 "Strongly disagree"	PCW	0.01	0.01	0.00 (0.00, 0.01)	
		Control	0.01	0.01		
	2 "Disagree"	PCW	0.02	0.02	0.00 (0.00, 0.01)	
		Control	0.02	0.02		
	3 "Neither agree nor disagree"	PCW	0.08	0.08	0.01 (−0.01, 0.03)	−0.21 (−0.79, 0.37)
		Control	0.08	0.07		
	4 "Agree"	PCW	0.32	0.32	0.01 (−0.02, 0.05)	
		Control	0.32	0.31		
	5 "Strongly agree"	PCW	0.58	0.57	−0.02 (−0.09, 0.04)	
		Control	0.58	0.59		

Kill you	1 "Strongly disagree"	PCW	0.01	0.01	0.00 (0.00, 0.00)	
		Control	0.01	0.01		
	2 "Disagree"	PCW	0.01	0.01	0.00 (0.00, 0.01)	
		Control	0.01	0.01		
	3 "Neither agree nor disagree"	PCW	0.07	0.06	0.01 (−0.01, 0.03)	−0.26 (−0.82, 0.30)
		Control	0.07	0.06		
	4 "Agree"	PCW	0.29	0.27	0.02 (−0.02, 0.05)	
		Control	0.29	0.26		
	5 "Strongly agree"	PCW	0.62	0.65	−0.03 (−0.09, 0.03)	
		Control	0.62	0.67		
Fatal lung disease in nonsmokers	1 "Strongly disagree"	PCW	0.03	0.02	−0.01 (−0.02, 0.00)	
		Control	0.02	0.02		
	2 "Disagree"	PCW	0.10	0.06	−0.02 (−0.05, 0.00)	
		Control	0.08	0.07		
	3 "Neither agree nor disagree"	PCW	0.25	0.19	−0.04 (−0.07, −0.01)	0.59[a] (0.10, 1.08)
		Control	0.23	0.21		
	4 "Agree"	PCW	0.38	0.39	0.00 (−0.01, 0.02)	
		Control	0.39	0.39		
	5 "Strongly agree"	PCW	0.24	0.34	0.07 (0.01, 0.12)	
		Control	0.28	0.31		
Quit now	1 "Strongly disagree"	PCW	0.02	0.01	0.00 (−0.01, 0.01)	
		Control	0.02	0.01		
	2 "Disagree"	PCW	0.02	0.01	0.00 (−0.01, 0.01)	−0.06 (−0.54, 0.42)
		Control	0.02	0.01		
	3 "Neither agree nor disagree"	PCW	0.08	0.06	0.00 (−0.02, 0.02)	
		Control	0.08	0.06		

	4 "Agree"	PCW	0.39	0.34	0.01 (−0.04, 0.05)	
		Control	0.39	0.34		
	5 "Strongly agree"	PCW	0.49	0.57	−0.01 (−0.08, 0.06)	
		Control	0.49	0.58		
Stunt fetal growth	1 "Strongly disagree"	PCW	0.01	0.01	0.00 (0.00, 0.00)	
		Control	0.01	0.01		
	2 "Disagree"	PCW	0.03	0.03	0.00 (−0.01, 0.01)	
		Control	0.03	0.03		
	3 "Neither agree nor disagree"	PCW	0.14	0.13	0.00 (−0.03, 0.03)	−0.02 (−0.58, 0.54)
		Control	0.15	0.13		
	4 "Agree"	PCW	0.36	0.36	0.00 (−0.02, 0.03)	
		Control	0.36	0.36		
	5 "Strongly agree"	PCW	0.45	0.47	0.00 (−0.07, 0.07)	
		Control	0.45	0.47		

Note: Control = average of the 4 Surgeon General warnings for the relevant health belief. Regressions control for age group and smoking status. CI = confidence interval. DID = difference in difference. PCW = pictorial cigarette warning. DID scores represent: (Proportion endorsing response at Session 3 for PCW – Proportion endorsing response at Session 1 for PCW) - (Proportion endorsing response at Session 3 for Control – Proportion endorsing response at Session 1 for Control).

[a] Significant after adjustment for multiple comparisons.

Supplementary Figure S1. Sample Cigarette Package Stimuli (Six Sides Shown Combined into a 3-D, Rotatable Model) with a Surgeon General Warning (control condition)

Supplementary Figure S2. Sample Cigarette Advertisement Stimuli with a Surgeon General Warning (control condition)

Supplementary Figure S3. Sample Cigarette Package Stimuli (Six Sides Shown Combined into a 3-D, Rotatable Model) with 1 of 16 Pictorial Cigarette Warning
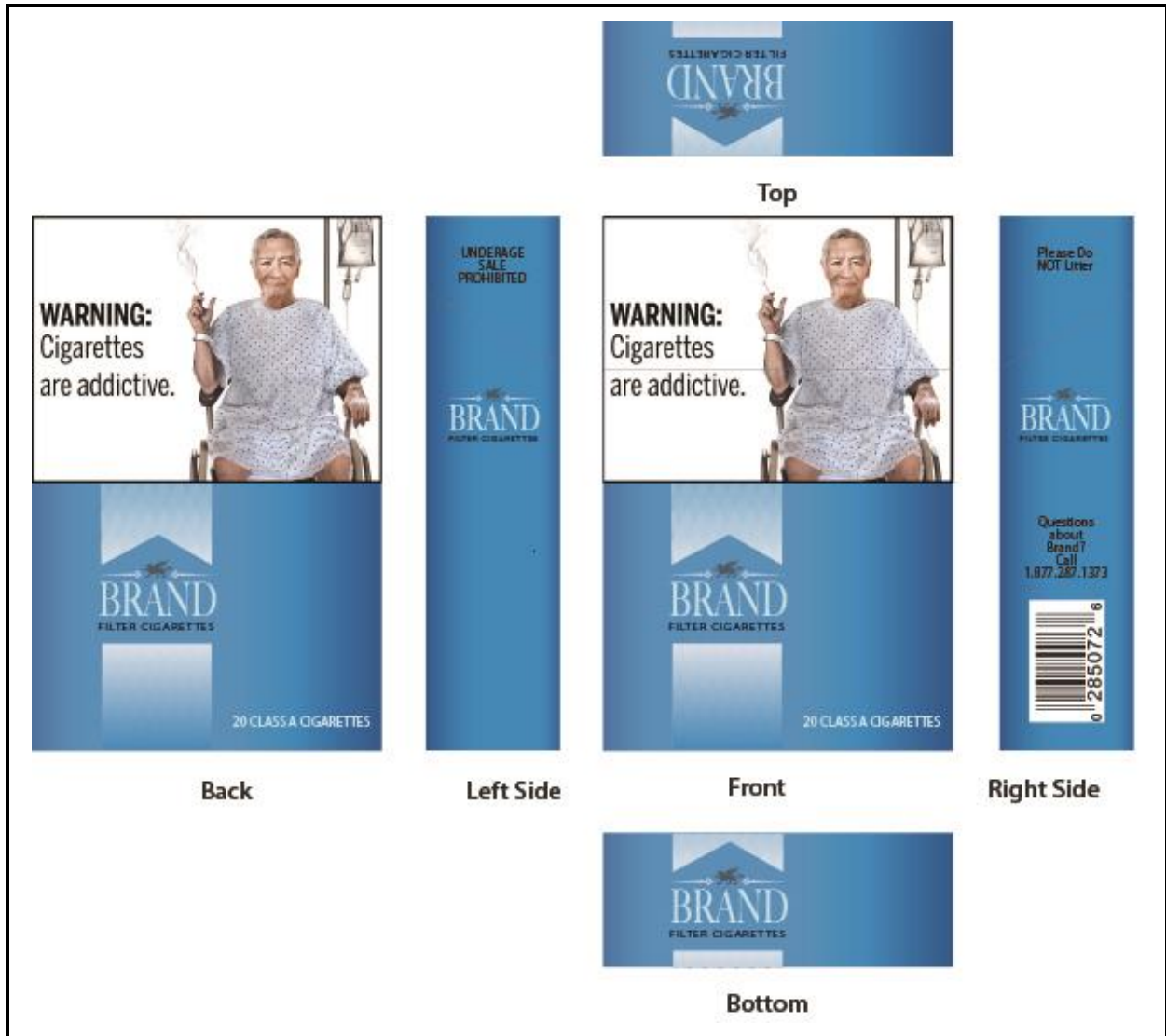
Supplementary Figure S4. Sample Cigarette Advertisement Stimuli with a Pictorial Cigarette Warning (experimental condition)

Supplementary Figure S5. Study Conditions with Thumbnail Images of Warnings from Side (for Surgeon General's Warnings) or Front (for Pictorial Cigarette Warnings) of 3-D Rotatable Image of Cigarette Package

Condition Number	Abbreviated Term for Warning (Used in this Manuscript)	Warning Exposure as Part of 3-D Rotatable Package
0	Control	Random exposure to 1 of 4 SG warnings:

SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy.

SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

SURGEON GENERAL'S WARNING: Smoking by Pregnant Women May Result in Fetal Injury, Premature Birth, and Low Birth Weight.

SURGEON GENERAL'S WARNING: Cigarette Smoke Contains Carbon Monoxide.

| 1 | Addictive | |

WARNING: Cigarettes are addictive.

2　　　　Harm children

3　　　　Kill you

4　　　　Fatal lung disease in nonsmokers
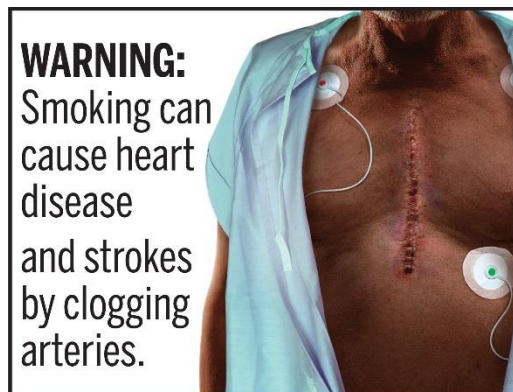

5　　　　Quit now
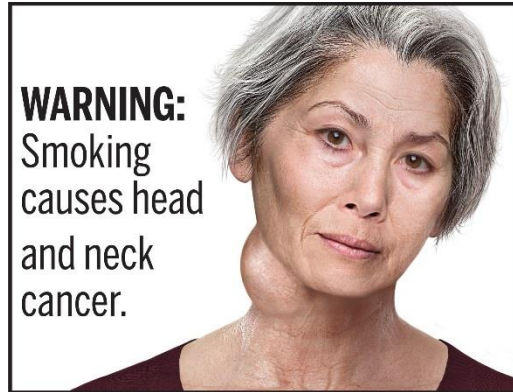
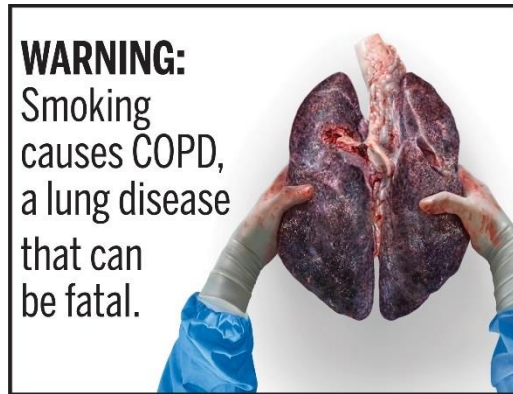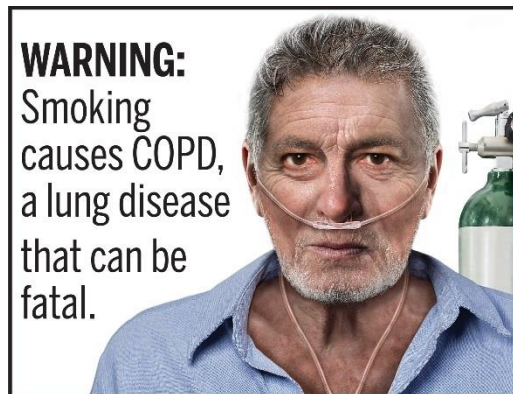| 6 | Head and neck cancer | |
7	Bladder cancer	
8	Stunt fetal growth	
9	Clogged arteries	

10   COPD 1[a]

11   COPD 2[a]

12   Erectile dysfunction
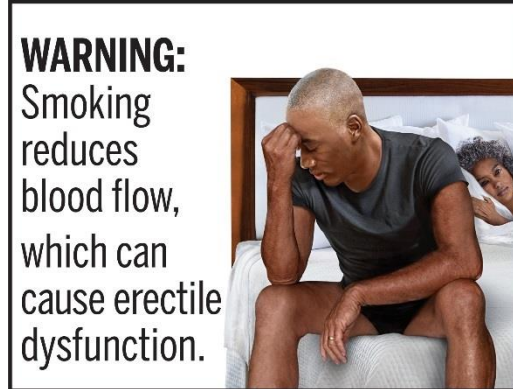
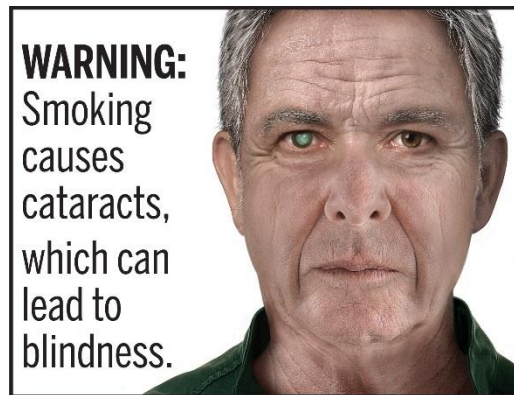13   Amputation
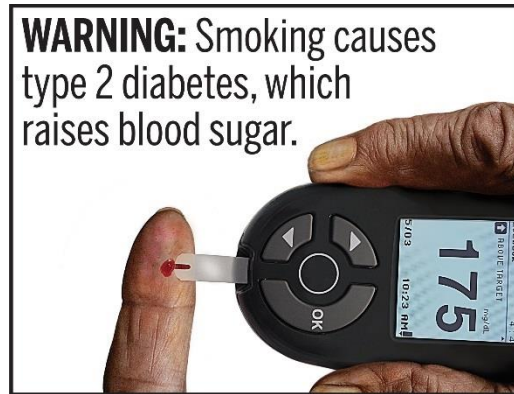
14	Diabetes	
15	Macular degeneration	
16	Cataracts	

[a]Conditions 10 and 11 used the same statement ("Smoking causes COPD, a lung disease that can be fatal.") but with different images; because the images differed, conditions 10 and 11 were treated as distinct pictorial cigarette warnings.