Appendix Table 1. Codes used to define cohort and outcomes.

Codes used to define cohort and outcomes	
ED visits	Current Procedural Terminology (CPT): 99281, 99282, 99283, 99284, 99285 Healthcare Common Procedure Coding System: G0380, G0381, G0382, G0383, G0384, B0001 Revenue Center Codes: 0450, 0451, 0452, 0456, 0459, 0981
UTUS	International Classification of Diseases, Ninth Edition (ICD-9-CM) codes: 274.11, 592.0, 592.1, 592.2
CT scan of the pelvis and/or abdomen	ICD-9-CM: 72192, 72193, 72194, 74150, 74160, 74170, 74176, 74177, 74178
RUS	CPT: 76700, 76705, 76770, 76775
AXR	CPT: 74000, 74020

Appendix 1.

We performed risk-standardization using a previously described methodology:

Risk-standardized rate = (Quarterly observed rate/Expected rate) * Reference rate[16]

Creating a separate model for children and adults, we calculated the expected number of CT scans per quarter through a multivariable logistic regression model adjusting for those factors which could impact whether a CT was performed (U.S. census division, race, sex, and quarter). The observed number of CTs per quarter was divided by this calculated expected number, which

was then multiplied by the CT scan rate for all children and adults in this cohort for the entire

analysis period, respectively, to determine the risk-standardized rate of CT utilization per quarter

for children and adults.

Appendix Table 2. Outcome of the logistic regression used to calculate expected rates for

children and adults.

Children - Logistic

	Estimate	StdErr	Odds Ratio	95% Confidence Limits		P-Value
Intercept	-2.69	0.08	--	--	--	
Age Diagnosis	0.17	0.00	1.19	1.18	1.20	<.0001
Female	0.22	0.03	1.24	1.16	1.33	<.0001
Race						
Black	-0.09	0.07	0.91	0.80	1.04	
Hispanic	-0.28	0.06	0.75	0.67	0.85	<.0001
Asian	-0.40	0.14	0.67	0.51	0.87	
White			Ref			
Division						
East South Central	0.40	0.08	1.49	1.29	1.74	
Middle Atlantic	-0.47	0.08	0.62	0.53	0.73	
Mountain	0.31	0.07	1.37	1.19	1.58	
New England	-0.48	0.10	0.62	0.51	0.76	
Pacific	-0.41	0.09	0.67	0.56	0.79	<.0001
South Atlantic	0.29	0.05	1.33	1.21	1.47	
West North Central	0.33	0.07	1.39	1.23	1.58	
West South Central	0.26	0.06	1.30	1.17	1.45	
East North Central			Ref			
Elixhauser	-0.11	0.02	0.90	0.87	0.94	<.0001
Quarter	0.00	0.00	1.00	1.00	1.00	0.0765

Adults - Logistic

	Estimate	StdErr	Odds Ratio	95% Confidence Limits		P-Value
Intercept	0.76	0.01	--	--	--	
Age Diagnosis	-0.01	0.00	0.99	0.99	0.99	<.0001
Female	0.04	0.00	1.04	1.03	1.05	<.0001

Race						
Black	0.02	0.01	1.02	1.01	1.03	
Hispanic	-0.10	0.01	0.91	0.90	0.92	<.0001
Asian	-0.26	0.01	0.77	0.75	0.79	
White			Ref			
Division						
East South Central	0.08	0.01	1.08	1.06	1.10	
Middle Atlantic	-0.52	0.01	0.60	0.59	0.60	
Mountain	-0.07	0.01	0.93	0.92	0.94	
New England	-0.37	0.01	0.69	0.68	0.70	
Pacific	-0.48	0.01	0.62	0.61	0.63	<.0001
South Atlantic	-0.19	0.01	0.83	0.82	0.84	
West North Central	0.12	0.01	1.12	1.11	1.14	
West South Central	-0.09	0.01	0.92	0.91	0.93	
East North Central			Ref			
Elixhauser	0.04	0.00	1.04	1.04	1.04	<.0001
Quarter	0.01	0.00	1.01	1.01	1.01	<.0001

Appendix 2.

The standard multiple group interrupted time series analysis regression model used in this analysis is given below:[18,19]

$$Y_t = \beta_0 + \beta_1 T_t + \beta_2 X_t + \beta_3 X_t T_t + \beta_4 Z + \beta_5 Z T_t + \beta_6 Z X_t + \beta_7 Z X_t T_t + \epsilon_t \quad (1)$$

Y_t is the aggregated outcome variable measured at each quarter t, T_t is the time since the start of the Image Gently Campaign for children, X_t is the indicator variable of the intervention (the campaign), Z is the dummy variable for the study cohort treatment (children) or control (adults).

X_tT_t is the interaction term for adults. The interaction terms for the children are ZT_t, ZX_t, & ZX_tT_t. The random error term is ϵ_t.

β_0 represents the intercept or starting value of the outcome for control, β_1 is the pre-intervention trend of the control, β_2 provides the change in the level of outcome for control group that occurs at the quarter immediately after the initiation of the Image Gently Campaign, β_4 represents the difference in the starting value of the outcome between children and adults, β_5 represents the difference in the trend between children and adults in the pre-intervention period, β_6 is the difference in the level between children and adults in the post intervention period (immediately following the launch of the campaign); β_7 represents difference between adults and children in the slope after initiation of the campaign compared with pre-campaign.

Appendix Table 3. Examples of the sensitivity analysis truncating the data at various time points including a) 8/1/2004-7/31/2015 (truncating the beginning time point), b) 8/1/2002-7/31/2014 (truncating the ending time point), and c) 8/1/2004-7/31/2013 (truncating the beginning and ending time point).

a)

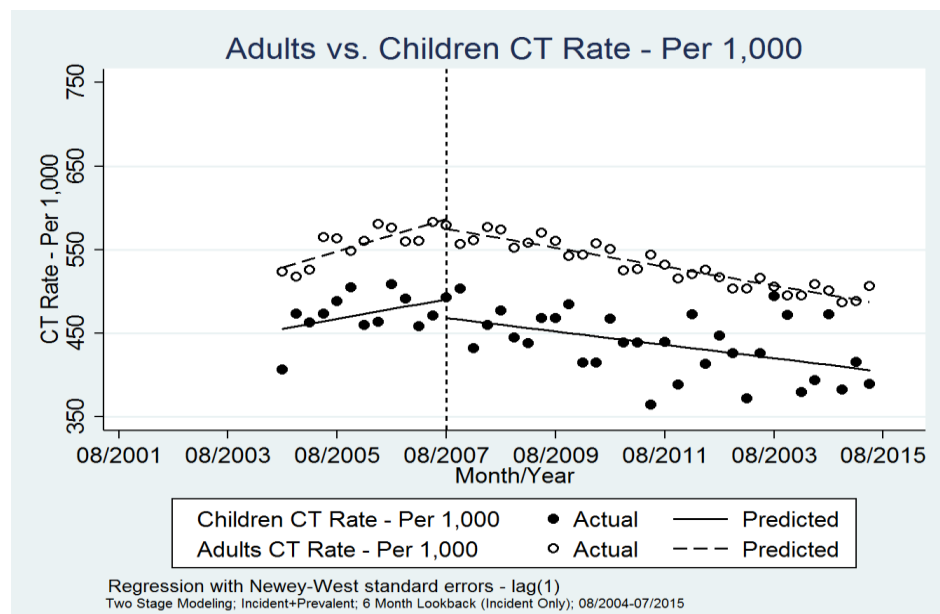| CT-Rate	Pre-intervention Slope	Post-Intervention Slope	Intervention Differences	Lower Bound 95% CI	Upper Bound 95% CI	p-value
Children	2.928	-2.009	-4.937	-9.692	-0.183	0.042
Adult	4.838	-2.816	-7.654	-10.072	-5.236	<0.001
Difference	-1.910	0.806	2.717	-2.618	8.051	0.317

b)

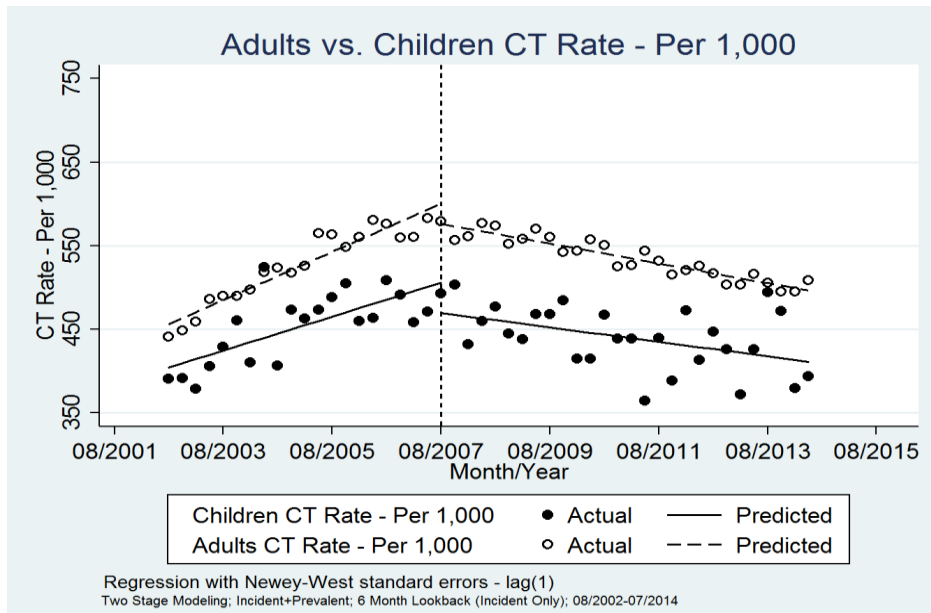| UTUS CT-Rate	Pre-intervention Slope	Post-Intervention Slope	Intervention Differences	Lower Bound 95% CI	Upper Bound 95% CI	p-value
Children	5.069	-2.162	-7.232	-10.109	-4.354	<0.001
Adult	7.219	-2.961	-10.179	-11.711	-8.648	<0.001
Difference	-2.149	0.798	2.948	-0.312	6.207	0.076

c)

UTUS CT-Rate	Pre-intervention Slope	Post-Intervention Slope	Intervention Differences	Lower Bound 95% CI	Upper Bound 95% CI	p-value
Children	2.928	-2.983	-5.911	-10.786	-1.037	0.018
Adult	4.838	-2.994	-7.832	-10.323	-5.341	<0.001
Difference	-1.910	0.010	1.921	-3.553	7.394	0.486

Appendix Figure 1. Examples of the sensitivity analysis truncating the data at various time points including a) 8/1/2004-7/31/2015 (truncating the beginning time point), b) 8/1/2002-7/31/2014 (truncating the ending time point), and c) 8/1/2004-7/31/2013 (truncating the beginning and ending time point).
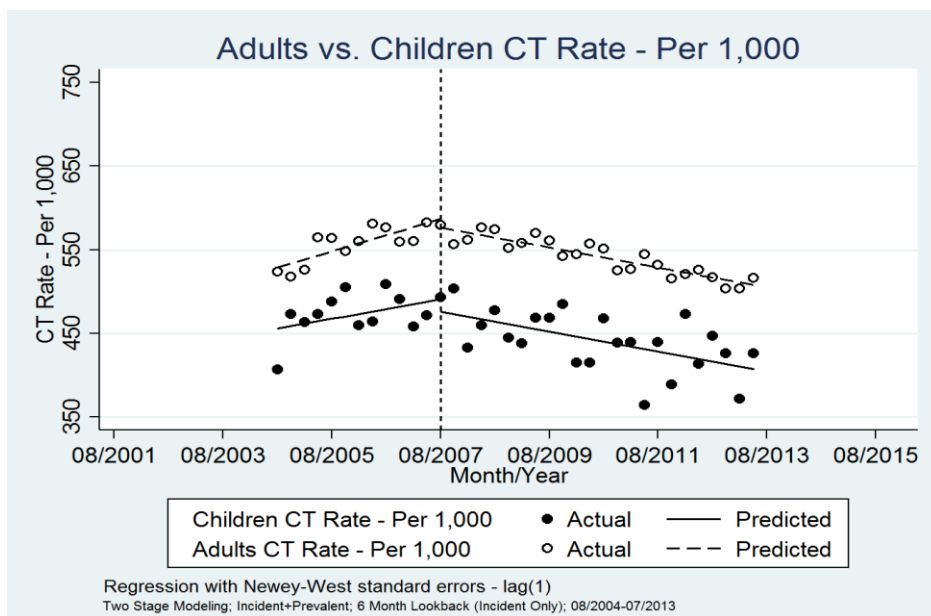
a)

b)

Adults vs. Children CT Rate - Per 1,000

Children CT Rate - Per 1,000 ● Actual —— Predicted
Adults CT Rate - Per 1,000 ○ Actual --- Predicted

Regression with Newey-West standard errors - lag(1)
Two Stage Modeling; Incident+Prevalent; 6 Month Lookback (Incident Only); 08/2002-07/2014

c)

Adults vs. Children CT Rate - Per 1,000

Children CT Rate - Per 1,000 ● Actual —— Predicted
Adults CT Rate - Per 1,000 ○ Actual --- Predicted

Regression with Newey-West standard errors - lag(1)
Two Stage Modeling; Incident+Prevalent; 6 Month Lookback (Incident Only); 08/2004-07/2013

Appendix Table 4. Combination of imaging modalities used during each stone episode (unadjusted).

Date Range	Children				Adults		
	Other[a] or No Imaging	*CT Only*	*CT + Other Imaging*		*Other or No Imaging*	*CT Only*	*CT + Other Imaging*
08/2007-07/2008	44.3%	28.2%	27.5%		33.5%	39.3%	27.1%

08/2008-07/2009	45.1%	28.3%	26.7%		32.4%	40.6%	26.9%
08/2009-07/2010	44.4%	31.1%	24.5%		32.0%	40.8%	27.2%
08/2010-07/2011	46.9%	27.2%	25.8%		32.3%	41.0%	26.7%
08/2011-07/2012	48.1%	27.0%	24.9%		32.9%	41.1%	26.0%
08/2012-07/2013	46.0%	26.2%	27.8%		34.2%	41.1%	24.7%
08/2013-07/2014	45.0%	28.7%	26.3%		34.3%	41.1%	24.6%
08/2014-07/2015	48.8%	26.2%	25.0%		34.2%	41.6%	24.2%

a. Other imaging includes RUS or AXR.