

## Supplementary Online Content

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**eFigure.** Diagnostic imaging use among quality control conditions from the emergency department in 4 children's hospitals in Ontario, Canada and 26 children's hospitals in the United States, 2006 to 2016.

**eReferences.**

This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1.** Diagnostic imaging codes from the Ontario Health Insurance Plan (OHIP)<sup>a</sup> and Pediatric Health Information System (PHIS)

<b>Imaging Modality</b>	<b>Location</b>	<b>OHIP (Ontario, Canada)<sup>a</sup></b>	<b>PHIS (United States)</b>
<b>X-ray</b>	<b>Chest</b>	X039, X040, X045, X047, X090, X091, X092, X096, X195, X209, X211, 3GT10VA, 3GY10VA, 3GY18VA, 3SK10VA, 3SL10VA, 3SM10VA, 3SM12VA, 3TB10KM, 3TB10VA, 3YM10VA, 3GY10VV, 3GY10VZ, 3GY10WX, 3GY18VV, 3IM10VC, 3JY10VC	400011, 400911, 422311, 422411, 424211, 427911, 431011, 433011, 433111, 433211, 433311, 433411, 433511, 433611, 433711, 433811, 433911, 441311, 441611
	<b>Abdomen</b>	X036, X037, X060, X100, X101, X103, X104, X108, X109, X110, X111, X113, X117, X122, X123, X129, X130, X134, X135, X137, X139, X140, X191, X197, X231, X232, X233, 3OT10VA, 3OT10VH, 3OT12VA, 3PH10VA, 3PM12VA, 3PS10VA, 3OE10WZ, 3OT10VZ, 3OT10WG, 3OT10WX, 3PM10WN, 3PM10WX, 3PM10WQ, 3PM10XJ, 3PM10XN, 3PQ10XJ, 3PS10VC	400011, 400911, 416011, 422011, 422111, 422311, 422411, 422511, 422611, 422911, 424111, 426511, 431011, 431111, 433011, 433111, 433211, 433311, 433411, 433511, 433611, 433711, 433811, 433911, 441011, 441111, 441211, 441311, 441411, 441511, 441611, 441911, 442211
<b>Ultrasound</b>	<b>Abdomen</b>	J128, J135, J138, J149, J157, J158, J159, J160, J161, J162, J163, J166, J167, J183, J205, J206, J207, J428, J435, J438, J462, J483, J506, 3KE30DD, 3KQ30DC, 3KQ30DD, 3KT30DA, 3OA30DA, 3OA30DC, 3OT30DA, 3OT30DB, 3OT30DC, 3OT30DD, 3PC30DA, 3PC30DC, 3PC30DD, 3PM30DA, 3QG30DA, 3QG30DC, 3QG30DD, 3QZ30DA, 3RZ30DA, 3RZ30LA, 3VA30DA, 5AB03CK, 5AB03JA	400041, 400141, 400941, 425141, 441041, 441042, 441141, 441142, 441241, 441242, 441941, 441942, 443441, 444741, 445141, 445142, 445241, 445341, 445441, 451041, 452041, 454041, 455041, 455141, 455241, 455741, 456241, 457041, 457042, 490041, 495041
<b>CT Scan</b>	<b>Head</b>	X188, X400, X401, X402, X405, X408, 3AN20VA, 3AN20WA, 3AN20WC, 3AN20WE, 3CA20VA, 3CA20WA, 3CA20WC, 3CA20WE, 3DR20WA, 3DR20WC, 3DR20WE, 3EA20VA, 3EA20WA, 3EA20WC, 3EA20WE, 3EL20VA, 3EL20WA, 3EL20WC, 3EL20WE, 3ER20VA, 3ER20WA, 3ER20WC, 3ER20WE, 3EY20VA, 3EY20WA, 3EY20WC, 3EY20WE, 3FX20WA, 3FX20WC, 3FX20WE	400051, 400951, 410051, 410071, 411051, 414051, 415151, 416051, 417051, 421151, 421351, 421751, 441051, 441151, 441251, 471051

**eTable 1. (continued)**

<b>Imaging Modality</b>	<b>Location</b>	<b>OHIP (Ontario, Canada)<sup>a</sup></b>	<b>PHIS (United States)</b>
	<b>Abdomen</b>	X126, X409, X410, 3KE20WC, 3KT20WC, 3KT20WE, 3OT20VA, 3OT20WA, 3OT20WC, 3OT20WE, 3PC20VA, 3PC20WA, 3PC20WC, 3PC20WE, 3PZ20VA, 3PZ20WA, 3WZ20VA, 3WZ20WA, 3ZZ20VA, 3ZZ20WA, 3ZZ20WC, 3ZZ20WE	441051, 441151, 441251, 400951, 495051, 497051, 400051, 401071, 475051, 475151, 477051, 495251, 495951, 422351, 422451, 433051, 473051, 454151, 445151, 452051
<b>MRI</b>	<b>Head</b>	X421, X425, 3AF40WE, 3AN40VA, 3AN40WA, 3AN40WC, 3AN40WE, 3CA40VA, 3CA40WA, 3CA40WC, 3CA40WE, 3DR40WE, 3ER40VA, 3ER40WA, 3ER40WC, 3ER40WE, 3JX40VA, 3JX40WA, 3JX40WC, 3WZ40VA	400052, 400952, 410052, 411052, 411152, 411452, 417052, 422152, 426152, 470052, 471052, 472052

<sup>a</sup> OHIP codes supplemented by intervention codes from the Canadian Institute for Health Information's Canadian Classification of Interventions (<https://www.cihi.ca/en/ci-coding-structure>)

**eTable 2.** International Classification of Diseases 9<sup>th</sup> and 10<sup>th</sup> versions (ICD9 and ICD10) used in the study. Conditions in *italics* were used for quality controls.

<b>Condition</b>	<b>ICD9</b>	<b>ICD-10</b>	<b>References*</b>
<b>Bronchiolitis</b>	4661, 46611, 46619	J210, J211, J218, J219	1-4
<b>Asthma</b>	493	J45	5,6
<b><i>Pneumonia</i></b>	481, 482, 4820, 4821, ,4822, 4823 48230, 48231, 48232, 48239, 4824, 48240, 48241, 48242, 48249, 4828, 48281 48282, 48283, 48284, 48289, 4829, 483, 4830, 4831, 4838, 485, 486	J13, J181, J150, J151, J14, J153, J154, J1520, J15211, J15212, J1529, J158, J155, J156, A481, J158, J159, J157, J160, J168, J180, J189	5
<b>Constipation</b>	5640	K590	7
<b>Abdominal Pain</b>	7890x	R100, R101, R103, R104, R193	7
<b><i>Bowel Obstruction</i></b>	5601, 5602, 56031, 56032, 56039, 56081, 56089, 5601, 5609	K560, K562, K563, K564, K565, K566, K567	
<b><i>Intussusception</i></b>	5600	K561	7
<b><i>Pancreatic or Liver Laceration</i></b>	864,8638	S361, S362	
<b>Concussion</b>	8500	S060X0	6,8
<b>Febrile Convulsion</b>	78031 (Simple), 78032 (Complex),	R600 (Simple, US), R5601 (Complex), R5602 (Simple, CA), R5609 (Simple, CA)	6,9
<b>Seizure</b>	3450, 34500, 34501, 3451, 34510, 34511, 3454, 34540, 34541, 3455, 34550, 34551, 78039	G400, G4000, G4001, G401, G4010, G4011, G402, G4020, G4021, G406, G4060, G4061, G407, G4070, G4071, R5860	
<b>Headache</b>	346, 339, 7840	G43, G44, R51	
<b><i>Acute Stroke</i></b>	36231, 430, 431, 43301, 43311, 43321, 43331, 43381, 43391, 43401, 43411, 43491	H341, I600, I601, I602, I603, I604, I605, I606, I607, I609, I61, I630, I631, I632, I633, I634, I635, I638, I639, I64	

\* we utilized previous studies using administrative data to identify ICD codes for specific conditions when available; otherwise, we queried ICD9 and 10 codebooks to identify condition-specific codes to represent the diagnosis of interest.

**eTable 3.** Rates of imaging and hospital admission within 3 days among discharged children without imaging from the ED in 4 children’s hospitals in Ontario, Canada and 26 children’s hospitals in the United States **limited to 2016**.

	Imaging Rates			Hospital Admission within 3 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95% CI)	Ontario n (%)	US n (%)	Difference (95% CI)
<b>Chest X Ray</b>						
Bronchiolitis	433/2,266 (19.1%)	7,428/36,925 (20.1%)	-1.0% (-2.7%, 0.7%)	59/1,833 (3.2%)	1,078/29,497 (3.7%)	-0.4% (-1.3%, 0.4%)
Asthma	608/3,077 (19.8%)	9,703/57,928 (16.6%)	3.0% (1.6%, 4.4%)	9/2,469 (0.4%)	607/48,225 (1.3%)	-0.9% (-1.2%, -0.6%)
<b>Abdominal X Ray</b>						
Constipation	794/3,064 (25.9%)	25,076/39,722 (63.1%)	-37.2% (-38.8%, -35.6%)	≤5/2,270 (0.1%)	104/14,646 (0.7%)	*
Abdominal Pain	873/6,610 (13.2%)	19,279/52,695 (22.5%)	-23.4% (-24.3%, -22.5%)	63/5,737 (1.1%)	500/33,416 (1.5%)	-0.4% (-0.7%, -0.1%)
<b>Abdominal Ultrasound</b>						
Constipation	187/3,064 (6.1%)	4,103/39,722 (10.3%)	-4.2% (-5.1%, -3.3%)	8/2,877 (0.3%)	360/35,619 (1.0%)	-0.7% (-1.0%, -0.5%)
Abdominal Pain	2,120/6,610 (32.1%)	17,828/52,695 (33.8%)	-1.8% (-3.0%, -0.6%)	23/4,490 (0.5%)	461/34,867 (1.3%)	-0.8% (-1.1%, -0.6%)
<b>Abdominal CT</b>						
Constipation	≤5/3,064 (0.1%)	395/39,722 (1.0%)	*	10/3,061 (0.3%)	411/39,327 (1.0%)	-0.7% (-0.9%, -0.5%)
Abdominal Pain	34/6,610 (0.5%)	2,397/52,695 (4.6%)	-4.0% (-4.3%, -3.8%)	89/6,576 (1.4%)	712/50,298 (1.4%)	-0.1% (-0.4%, 0.2%)

**eTable 3. (continued)**

	Imaging Rates			Hospital Admission within 3 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95%)	Ontario n (%)	US n (%)	Difference (95% CI)
<b>Head CT</b>						
Simple Febrile Convulsion	4/841 (0.5%)	100/7,725 (1.3%)	*	17/837 (2.0%)	202/7,625 (2.6%)	-0.6% (-1.6%, 0.4%)
Complex Febrile Convulsion	≤5//33 (6.1%)	44/502 (8.8%)	*	≤5//31 (3.2%)	17/458 (3.7%)	*
Seizure	13/209 (6.2%)	30/445 (6.7%)	-0.5% (-4.5%, 3.5%)	6/196 (3.1%)	17/415 (4.1%)	-1.0% (-4.1%, 2.0%)
Headache	202/2,384 (8.5%)	4,170/32,429 (12.9%)	-4.4% (-5.6%, -3.2%)	34/2,182 (1.6%)	465/28,259 (1.7%)	-0.1% (-0.6%, 0.5%)
<b>Head MRI</b>						
Concussion	11/2,811 (0.4%)	36/11,611 (0.3%)	0.1% (-0.2%, 0.3%)	≤5//2,800 (0.2%)	31/11,575 (0.3%)	*
Seizure	7/209 (3.3%)	15/445 (3.4%)	0.0% (-3.0%, 2.9%)	≤5//202 (2.0%)	16/430 (3.7%)	*
Headache	116/2,384 (4.9%)	930/32,429 (2.9%)	2.0% (1.1%, 2.9%)	31/2,268 (1.4%)	516/31,499 (1.6%)	-0.3% (-0.8%, 0.2%)

CCC: complex chronic conditions  
 CT: computed tomography  
 MRI: magnetic resonance imaging

**eTable 4.** Admission and ICU/Surgery/Death within **7 days** of ED visit among discharged children **without imaging** by diagnosis in 4 children’s hospitals in Ontario, Canada and 26 children’s hospitals in the United States, 2006 to 2016.

	Hospital Admission within 7-days of ED visit			Hospital Admission within 7-days of ED visit resulting in ICU care, surgery, or death		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
<b>Chest X Ray</b>						
Bronchiolitis	626/14,256 (4.4%)	9235/215,108 (4.3%)	0.1% (-0.2%, 0.4%)	25/14,256 (0.2%)	1119/215,108 (0.5%)	-0.3% (-0.4%, -0.3%)
Asthma	205/29,278 (0.7%)	8380/502,310 (1.7%)	-1.0% (-1.1%, -0.9%)	20/29,278 (0.1%)	752/502,310 (0.1%)	-0.1% (-0.1%, 0.0%)
<b>Abdominal X Ray</b>						
Constipation	158/19,930 (0.8%)	1233/113,166 (1.1%)	-0.3% (-0.4%, -0.2%)	26/19,930 (0.1%)	208/113,166 (0.2%)	-0.1% (-0.1%, 0.0%)
Abdominal Pain	677/41,167 (1.6%)	6009/289,917 (2.1%)	-0.4% (-0.6%, -0.3%)	214/41,167 (0.5%)	1678/289,917 (0.6%)	-0.1% (-0.1%, 0.0%)
<b>Abdominal Ultrasound</b>						
Constipation	351/31,443 (1.1%)	4409/292,974 (1.5%)	-0.4% (-0.5%, -0.3%)	69/31,443 (0.2%)	815/292,974 (0.3%)	-0.1% (-0.1%, 0.0%)
Abdominal Pain	557/38,022 (1.5%)	7866/374,904 (2.1%)	-0.6% (-0.8%, -0.5%)	174/38,022 (0.5%)	2088/374,904 (0.6%)	-0.1% (-0.1%, 0.0%)
<b>Abdominal CT</b>						
Constipation	434/33,345 (1.3%)	4753/310,685 (1.5%)	-0.2% (-0.4%, -0.1%)	92/33,345 (0.3%)	877/310,685 (0.3%)	0.0% (-0.1%, 0.0%)
Abdominal Pain	997/50,888 (2.0%)	9629/452,381 (2.1%)	-0.2% (-0.3%, 0.0%)	300/50,888 (0.6%)	2529/452,381 (0.6%)	0.0% (0.0%, 0.1%)
<b>Head CT</b>						
Concussion	21/15,563 (0.1%)	130/47,760 (0.3%)	-0.1% (-0.2%, -0.1%)	≤5/15,563	24/47,760 (0.1%)	*
Simple Febrile Convulsion	83/5265 (1.6%)	2071/81,916 (2.5%)	-1.0% (-1.3%, -0.6%)	≤5/5265	134/81,916 (0.2%)	*
Complex Febrile Convulsion	≤5/165	109/2513 (4.3%)	*	≤5/165	7/2513 (0.3%)	*
Seizure	74/2109 (3.5%)	3624/70,488 (5.1%)	-1.6% (-2.4%, -0.8%)	≤5/2109	413/70,488 (0.6%)	*
Headache	286/17,891 (1.6%)	5542/205,501 (2.7%)	-1.1% (-1.3%, -0.9%)	47/17,891 (0.3%)	577/205,501 (0.3%)	0.0% (-0.1%, 0.1%)
<b>Head MRI</b>						

**eTable 4. (continued)**

	Hospital Admission within 7-days of ED visit			Hospital Admission within 7-days of ED visit resulting in ICU care, surgery, or death		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
Concussion	37/17,315 (0.2%)	286/71,333 (0.4%)	-0.2% (-0.3%, 0.0%)	≤5/17,315	41/71,333 (0.1%)	*
Seizure	80/2254 (3.5%)	4204/84,343 (5.0%)	-0.1% (-0.2%, -0.1%)	6/2254 (0.3%)	474/84,343 (0.6%)	-0.3% (-0.3%, -0.5%)
Headache	350/19,929 (1.8%)	7100/250,813 (2.8%)	-1.0% (-1.3%, -0.6%)	58/19,929 (0.3%)	964/250,813 (0.4%)	-0.1% (-0.2%, 0.0%)

US: United States

CT: computed tomography

MRI: magnetic resonance imaging

ICU: intensive care unit

\* unable to calculate due to suppressed data as a result of small cell sizes



**eTable 5.** Hospital admission rates and ICU/surgery/death 3-days and 7-days following ED discharge **among all children (with and without imaging)** in 4 children’s hospitals in Ontario, Canada and 26 children’s hospitals in the United States, 2006 to 2016. All data are presented as n (%) unless stated otherwise.

Imaging modality by Condition	Hospital Admission within 3 days of ED visit			Hospital Admission within 7 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
<b>Chest X Ray</b>						
Bronchiolitis	820/18,781 (4.4%)	11,763/311,303 (3.8%)	0.6% (0.3%, 0.9%)	939/18,781 (5.0%)	13,943/311,303 (4.5%)	0.5% (0.2%, 0.8%)
ICU/surgery/death	56/18,781 (0.3%)	1384/311,303 (0.4%)	-0.1% (-0.2%, -0.1%)	59/18,781 (0.3%)	1636/311,303 (0.5%)	-0.2% (-0.3%, -0.1%)
Asthma	306/37,560 (0.8%)	10,085/650,379 (1.6%)	-0.7% (-0.8%, -0.6%)	393/37,560 (1.0%)	12,276/650,379 (1.9%)	-0.8% (-0.9%, -0.7%)
ICU/surgery/death	22/37,560 (0.1%)	852/650,379 (0.1%)	-0.1% (-0.1%, 0.0%)	36/37,560 (0.1%)	1139/650,379 (0.2%)	-0.1% (-0.1%, 0.0%)
<b>Abdominal X Ray</b>						
Constipation	299/33,386 (0.9%)	3268/314,486 (1.0%)	-0.1% (-0.3%, 0.0%)	442/33,386 (1.3%)	4882/314,486 (1.6%)	-0.2% (-0.4%, -0.1%)
ICU/surgery/death	72/33,386 (0.2%)	655/314,486 (0.2%)	0.0% (0.0%, 0.1%)	97/33,386 (0.3%)	908/314,486 (0.3%)	0.0% (-0.1%, 0.1%)
Abdominal Pain	753/51,320 (1.5%)	8031/486,480 (1.7%)	-0.2% (-0.3%, -0.1%)	1,036/51,320 (2.0%)	10,919/486,480 (2.2%)	-0.2% (-0.4%, -0.1%)
ICU/surgery/death	251/51,320 (0.5%)	2199/486,480 (0.5%)	0.0% (0.0%, 0.1%)	311/51,320 (0.6%)	2885/486,480 (0.6%)	0.0% (-0.1%, 0.1%)
<b>Abdominal Ultrasound</b>						
Constipation	299/33,386 (0.9%)	3268/314,486 (1.0%)	-0.1% (-0.3%, 0.0%)	442/33,386 (1.3%)	4882/314,486 (1.6%)	-0.2% (-0.4%, -0.1%)
ICU/surgery/death	72/33,386 (0.2%)	655/314,486 (0.2%)	0.0% (0.0%, 0.1%)	97/33,386 (0.3%)	908/314,486 (0.3%)	0.0% (-0.1%, 0.1%)
Abdominal Pain	753/51,320 (1.5%)	8031/486,480 (1.7%)	0.2% (-0.3%, -0.1%)	1,036/51,320 (2.0%)	10,919/486,480 (2.2%)	-0.2% (-0.4%, -0.1%)
ICU/surgery/death	251/51,320 (0.5%)	2199/486,480 (0.5%)	0.0% (0.0%, 0.1%)	311/51,320 (0.6%)	2885/486,480 (0.6%)	0.0% (-0.1%, 0.1%)

**eTable 5. (continued)**

Imaging modality by Condition	Hospital Admission within 3 days of ED visit			Hospital Admission within 7 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
<b>Abdominal CT</b>						
Constipation	299/33,386 (0.9%)	3268/314,486 (1.0%)	-0.1% (-0.3%, 0.0%)	442/33,386 (1.3%)	4882/314,486 (1.6%)	-0.2% (-0.4%, -0.1%)
ICU/surgery/death	72/33,386 (0.2%)	655/314,486 (0.2%)	0.0% (0.0%, 0.1%)	97/33,386 (0.3%)	908/314,486 (0.3%)	0.0% (-0.1%, 0.1%)
Abdominal Pain	753/51,320 (1.5%)	8031/486,480 (1.7%)	-0.2% (-0.3%, -0.1%)	1,036/51,320 (2.0%)	10,919/486,480 (2.2%)	-0.2% (-0.4%, -0.1%)
ICU/surgery/death	251/51,320 (0.5%)	2199/486,480 (0.5%)	0.0% (0.0%, 0.1%)	311/51,320 (0.6%)	2885/486,480 (0.6%)	0.0% (-0.1%, 0.1%)
<b>Head CT</b>						
Concussion	31/17,363 (0.1%)	199/71,533 (0.3%)	-0.1% (-0.2%, 0.0%)	40/17,363 (0.2%)	288/71,533 (0.4%)	-0.2% (-0.3%, -0.1%)
ICU/surgery/death	≤5/17,363	21/71,533 (0.0%)	*	7/17,363 (0.0%)	41/71,533 (0.1%)	0.0% (-0.1%, 0.0%)
Simplex Febrile Convulsion	81/5309 (1.5%)	1888/84,011 (2.2%)	-0.7% (-1.1%, -0.4%)	90/5309 (1.6%)	2176/84,011 (2.6%)	-0.9% (-1.3%, -0.5%)
ICU/surgery/death	6/5309 (0.1%)	98/84,011 (0.1%)	0.0% (-0.1%, 0.1%)	7/5309 (0.1%)	141/84,011 (0.2%)	0.0% (-0.1%, 0.1%)
Complex Febrile Convulsion	8/173 (4.6%)	115/2830 (4.1%)	0.6% (-2.7%, 3.8%)	8/173 (4.6%)	121/2830 (4.3%)	0.3% (-2.9%, 3.6%)
ICU/surgery/death	≤5/173	6/2830 (0.2%)	*	≤5/173	8/2830 (0.3%)	*
Seizure	61/2291 (2.7%)	3043/85,086 (3.6%)	-0.9% (-1.6%, -0.2%)	86/2291 (3.8%)	4237/85,086 (5.0%)	-1.2% (-2.0%, -0.4%)
ICU/surgery/death	≤5/2291	326/85,086 (0.4%)	*	6/2291 (0.3%)	480/85,086 (0.6%)	-0.3% (-0.5%, -0.1%)
Headache	238/20,520 (1.2%)	4913/256,012 (1.9%)	-0.8% (-0.9%, -0.6%)	392/20,520 (1.9%)	7325/256,012 (2.9%)	-1.0% (-1.1%, -0.8%)
ICU/surgery/death	33/20,520 (0.2%)	637/256,012 (0.2%)	-0.1% (-0.1%, 0.0%)	66/20,520 (0.3%)	1037/256,012 (0.4%)	-0.1% (-0.2%, 0.0%)

**eTable 5. (continued)**

Imaging modality by Condition	Hospital Admission within 3 days of ED visit			Hospital Admission within 7 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
<b>Head MRI</b>						
Concussion	31/17,363 (0.2%)	199/71,533 (0.3%)	-0.1% (-0.2%, 0.0%)	40/17,363 (0.2%)	288/71,533 (0.4%)	-0.2% (-0.3%, -0.1%)
ICU/surgery/death	≤5/17,363	21/71,533 (0.0%)	*	7/17,363 (0.0%)	41/71,533 (0.1%)	0.0% (-0.1%, 0.0%)
Seizure	61/2291 (2.7%)	3043/85,086 (3.6%)	-0.9% (-1.6%, -0.25%)	86/2291 (3.8%)	4237/85,086 (5.0%)	-1.2% (-2.0%, -0.4%)
ICU/surgery/death	≤5/2291	326/85,086 (0.4%)	*	6/2291 (0.3%)	480/85,086 (0.6%)	-0.3% (-0.5%, -0.1%)
Headache	238/20,520 (1.2%)	4913/256,012 (1.9%)	-0.8% (-0.9%, -0.6%)	392/20,520 (1.9%)	7325/256,012 (2.9%)	-1.0% (-1.1%, -0.8%)
ICU/surgery/death	33/20,520 (0.2%)	637/256,012 (0.2%)	-0.1% (-0.1%, 0.0%)	66/20,520 (0.3%)	1037/256,012 (0.4%)	-0.1% (-0.2%, 0.0%)

US: United States

CT: computed tomography

MRI: magnetic resonance imaging

ICU: intensive care unit

\* unable to calculate due to suppressed data as a result of small cell sizes

**eTable 6.** Rates of imaging among all children and limited to those without complex chronic conditions (CCC) who were discharged from the ED in 4 children’s hospitals in Ontario, Canada and 26 children’s hospitals in the United States, 2006 to 2016.

	Imaging Rates					
	All Children			Children without a CCC		
	Ontario n (%)	US n (%)	Difference (95% CI)	Ontario n (%)	US n (%)	Difference (95% CI)
<b>Chest X Ray</b>						
Bronchiolitis	4525/18,781 (24.1%)	96,195/311,303 (30.9%)	-6.8% (-7.4%, -6.2%)	4140/17,435 (23.7%)	89,825/295,977 (30.3%)	-6.6% (-7.3%, -6.0%)
Asthma	8282/37,560 (22.1%)	148,069/650,379 (22.8%)	-0.7% (-1.1%, -0.3%)	7984/36,784 (21.7%)	138,314/624,466 (22.1%)	-0.4% (-0.9%, 0.0%)
<b>Abdominal X Ray</b>						
Constipation	13,456/33,386 (40.3%)	201,320/314,486 (64.0%)	-23.7% (-24.3%, -23.2%)	12,806/32,094 (39.9%)	187,073/295,106 (63.4%)	-23.5% (-24.1%, -22.9%)
Abdominal Pain	10,153/51,320 (19.8%)	196,563/486,480 (40.4%)	-20.6% (-21.0%, -20.3%)	9617/49,685 (19.4%)	182,420/458,400 (39.8%)	-20.4% (-20.8%, -20.1%)
<b>Abdominal Ultrasound</b>						
Constipation	1943/33,386 (9.6%)	21,512/314,486 (6.8%)	-1.0% (-1.3%, -0.8%)	1809/32,094 (5.6%)	21,512/314,486 (6.8%)	-1.2% (-1.5%, -0.9%)
Abdominal Pain	13,298/51,320 (25.9%)	111,576/486,480 (22.9%)	3.0% (2.6%, 3.4%)	12,777/49,685 (25.7%)	105,520/458,400 (23.0%)	2.7% (2.3%, 3.1%)
<b>Abdominal CT</b>						
Constipation	41/33,386 (0.1%)	3801/314,486 (1.2%)	-1.1% (-1.1%, -1.0%)	38/32,094 (0.1%)	3473/295,106 (1.2%)	-1.1% (-1.1%, -1.0%)
Abdominal Pain	432/51,320 (0.8%)	34,099/486,480 (7.0%)	-6.2% (-6.3%, -6.1%)	397/49,685 (0.8%)	32,021/458,400 (7.0%)	-6.2% (-6.3%, -6.1%)
<b>Head CT</b>						
Concussion	1800/17,363 (10.4%)	23,773/71,533 (33.2%)	-22.9% (-23.4%, -22.3%)	1780/17,261 (10.3%)	23,088/69,838 (33.1%)	-22.7% (-23.3%, -22.2%)
Simple Febrile Convulsion	44/5309 (0.8%)	2095/84,011 (2.5%)	-1.7% (-1.9%, -1.4%)	43/5222 (0.8%)	1878/80,708 (2.3%)	-1.5% (-1.8%, -1.2%)
Complex Febrile Convulsion	8/173 (4.6%)	317/2830 (11.2%)	-6.6% (-9.9%, -3.2%)	7/171 (4.1%)	303/2635 (11.5%)	-7.4% (-10.6%, -4.2%)

**eTable 6. (continued)**

	Imaging Rates					
	All Children			Children without a CCC		
	Ontario n (%)	US n (%)	Difference (95% CI)	Ontario n (%)	US n (%)	Difference (95% CI)
Seizure	182/2291 (7.9%)	14,598/85,086 (17.2%)	-9.2% (-10.3%, -8.1%)	169/2041 (8.3%)	11,216/64,870 (17.3%)	-9.0% (-10.2%, -7.8%)
Headache	2,629/20,520 (12.8%)	50,511/256,012 (19.7%)	-6.9% (-7.4%, -6.4%)	2299/19,478 (11.8%)	39,732/230,516 (17.2%)	-5.4% (-5.9%, -5.0%)
<b>Head MRI</b>						
Concussion	48/17,363 (0.3%)	200/71,533 (0.3%)	0.0% (-0.1%, 0.1%)	48/17,261 (0.3%)	176/69,838 (0.3%)	0.0% (-0.1%,0.1%)
Seizure	37/2291 (1.6%)	743/85,086 (0.9%)	0.7% (0.2%, 1.3%)	32/2041 (1.6%)	512/64,870 (0.8%)	0.8% (0.3%, 1.3%)
Headache	591/20,520 (2.9%)	5199/256,012 (2.0%)	0.8% (0.6%, 1.1%)	512/19,478 (2.6%)	5199/230,516 (2.3%)	0.4% (0.1%, 0.6%)

CCC: complex chronic condition  
 CT: computed tomography  
 MRI: magnetic resonance imaging

**eTable 7.** Hospital admission rates and ICU/surgery/death 3-days and 7-days following ED discharge **for discharged children without a complex chronic condition** (with and without imaging) and outcomes in 4 children’s hospitals in Canada and 26 children’s hospitals in the United States, 2006 to 2016. All data are presented as n (%) unless stated otherwise.

Imaging modality by Condition	Hospital Admission within 3 days of ED visit			Hospital Admission within 7 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
<b>Chest X Ray</b>						
Bronchiolitis	731/17,435 (4.2%)	10,664/295,977 (3.6%)	0.6% (0.3%, 0.9%)	828/17,435 (4.7%)	12,528/295,977 (4.2%)	0.4% (0.1%, 0.7%)
ICU/surgery/death	45/17,435 (0.3%)	1181/295,977 (0.4%)	-0.1% (-0.2%, -0.1%)	45/17,435 (0.3%)	1361/295,977 (0.5%)	-0.2% (-0.3%, -0.1%)
Asthma	277/36,784 (0.8%)	8902/624,466 (1.4%)	-0.7% (-0.8%, -0.6%)	353/36,784 (1.0%)	10,683/624,466 (1.7%)	-0.8% (-0.9%, -0.6%)
ICU/surgery/death	20/36,784 (0.1%)	702/624,466 (0.1%)	-0.1% (-0.1%, 0.0%)	34/36,784 (0.1%)	886/624,466 (0.1%)	0.0% (-0.1%, 0.0%)
<b>Abdominal X Ray</b>						
Constipation	236/32,094 (0.7%)	2509/295,106 (0.9%)	-0.1% (-0.2%, 0.0%)	345/32,094 (1.1%)	3688/295,106 (1.2%)	-0.2% (-0.3%, -0.1%)
ICU/surgery/death	60/32,094 (0.2%)	528/295,106 (0.2%)	0.0% (0.0%, 0.1%)	75/32,094 (0.2%)	690/295,106 (0.2%)	0.0% (-0.1%, 0.1%)
Abdominal Pain	681/49,685 (1.4%)	6574/458,400 (1.4%)	-0.1% (-0.2%, 0.0%)	918/49,685 (1.8%)	8737/458,400 (1.9%)	-0.1% (-0.2%, 0.1%)
ICU/surgery/death	237/49,685 (0.5%)	1904/458,400 (0.4%)	0.1% (0.0%, 0.1%)	285/49,685 (0.6%)	2435/458,400 (0.5%)	0.0% (0.0%, 0.1%)
<b>Abdominal Ultrasound</b>						
Constipation	236/32,094 (0.7%)	2509/295,106 (0.9%)	-0.1% (-0.2%, 0.0%)	345/32,094 (1.1%)	3688/295,106 (1.2%)	-0.2% (-0.3%, -0.1%)
ICU/surgery/death	60/32,094 (0.2%)	528/295,106 (0.2%)	0.0% (0.0%, 0.1%)	75/32,094 (0.2%)	690/295,106 (0.2%)	0.0% (-0.1%, 0.1%)
Abdominal Pain	681/49,685 (1.4%)	6574/458,400 (1.4%)	-0.1% (-0.2%, 0.0%)	918/49,685 (1.8%)	8737/458,400 (1.9%)	-0.1% (-0.2%, 0.1%)
ICU/surgery/death	237/49,685 (0.5%)	1904/458,400 (0.4%)	0.1% (0.0%, 0.1%)	285/49,685 (0.6%)	2435/458,400 (0.5%)	0.0% (0.0%, 0.1%)

eTable 7. (continued)

Imaging modality by Condition	Hospital Admission within 3 days of ED visit			Hospital Admission within 7 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
<b>Abdominal CT</b>						
Constipation	236/32,094 (0.7%)	2509/295,106 (0.9%)	-0.1% (-0.2%, 0.0%)	345/32,094 (1.1%)	3688/295,106 (1.2%)	-0.2% (-0.3%, -0.1%)
ICU/surgery/death	60/32,094 (0.2%)	528/295,106 (0.2%)	0.0% (0.0%, 0.1%)	75/32,094 (0.2%)	690/295,106 (0.2%)	0.0% (-0.1%, 0.1%)
Abdominal Pain	681/49,685 (1.4%)	6574/458,400 (1.4%)	-0.1% (-0.2%, 0.0%)	918/49,685 (1.8%)	8737/458,400 (1.9%)	-0.1% (-0.2%, 0.1%)
ICU/surgery/death	237/49,685 (0.5%)	1904/458,400 (0.4%)	0.1% (0.0%, 0.1%)	285/49,685 (0.6%)	2435/458,400 (0.5%)	0.0% (0.0%, 0.1%)
<b>Head CT</b>						
Concussion	31/17,261 (0.2%)	177/69,838 (0.3%)	-0.1% (-0.1%, 0.0%)	40/17,261 (0.2%)	253/69,838 (0.4%)	-0.1% (-0.2%, 0.0%)
ICU/surgery/death	≤5/17,261	18/69,838 (0.0%)	*	7/17,261 (0.0%)	35/69,838 (0.1%)	0.0% (0.0%, 0.0%)
Simplex Febrile Convulsion	78/5222 (1.5%)	1710/80,708 (2.1%)	-0.6% (-1.0%, -0.3%)	85/5222 (1.6%)	1955/80,708 (2.4%)	-0.8% (-1.2%, -0.4%)
ICU/surgery/death	6/5222 (0.1%)	74/80,708 (0.1%)	0.0% (-0.1%, 0.1%)	7/5222 (0.1%)	108/80,708 (0.1%)	0.0% (-0.1%, y=0.1%)
Complex Febrile Convulsion	7/171 (4.1%)	95/2635 (3.6%)	0.5% (-2.6%, 3.5%)	7/171 (4.1%)	98/2635 (3.7%)	0.4% (-2.7%, 3.4%)
ICU/surgery/death	≤5/171	5/2635 (0.2%)	*	≤5/171	5/2635 (0.2%)	*
Seizure	42/2041 (2.1%)	2062/64,870 (3.2%)	-1.1% (-1.8%, -0.5%)	63/2041 (3.1%)	2735/64,870 (4.2%)	-1.1% (-1.9%, -0.4%)
ICU/surgery/death	≤5/2041	167/64,870 (0.3%)	*	≤5/2041	217/64,870 (0.3%)	*
Headache	195/19,478 (1.0%)	3733/230,516 (1.6%)	-0.6% (-0.8%, -0.5%)	310/19,478 (1.6%)	5450/230,516 (2.4%)	-0.1% (-0.3%, 0.1%)
ICU/surgery/death	26/19,478 (0.1%)	290/230,516 (0.1%)	0.0% (0.0%, 0.1%)	46/19,478 (0.2%)	455/230,516 (0.2%)	-1.1% (-1.3%, -0.9%)

**eTable 7. (continued)**

Imaging modality by Condition	Hospital Admission within 3 days of ED visit			Hospital Admission within 7 days of ED visit		
	Ontario n (%)	US n (%)	Difference (95%CI)	Ontario n (%)	US n (%)	Difference (95%CI)
<b>Head MRI</b>						
Concussion	31/17,261 (0.2%)	177/69,838 (0.3%)	-0.1% (-0.1%, 0.0%)	40/17,261 (0.2%)	253/69,838 (0.4%)	0.0% (0.0%, 0.1%)
ICU/surgery/death	≤5/17,261	18/69,838 (0.0%)	*	7 /17,261 (0.0%)	35/69,838 (0.1%)	0.0% (0.0%, 0.0%)
Seizure	42/2041 (2.1%)	2062/64,870 (3.2%)	-1.1% (-1.8%, -0.5%)	63/2041 (3.1%)	2735/64,870 (4.2%)	-1.1% (-1.9%, -0.4%)
ICU/surgery/death	≤5/2041	167/64,870 (0.3%)	*	≤5/2041	217/64,870 (0.3%)	*
Headache	195/19,478 (1.0%)	3733/230,516 (1.6%)	-1.5% (-1.6%, -1.4%)	310/19,478 (1.6%)	5450/230,516 (2.4%)	-0.8% (-1.0%, -0.6%)
ICU/surgery/death	26/19,478 (0.1%)	290/230,516 (0.1%)	0.0% (0.0%, 0.1%)	46/19,478 (0.2%)	455/230,516 (0.2%)	0.0% (0.0%, 0.1%)

US: United States

CCC: complex chronic condition

CT: computed tomography

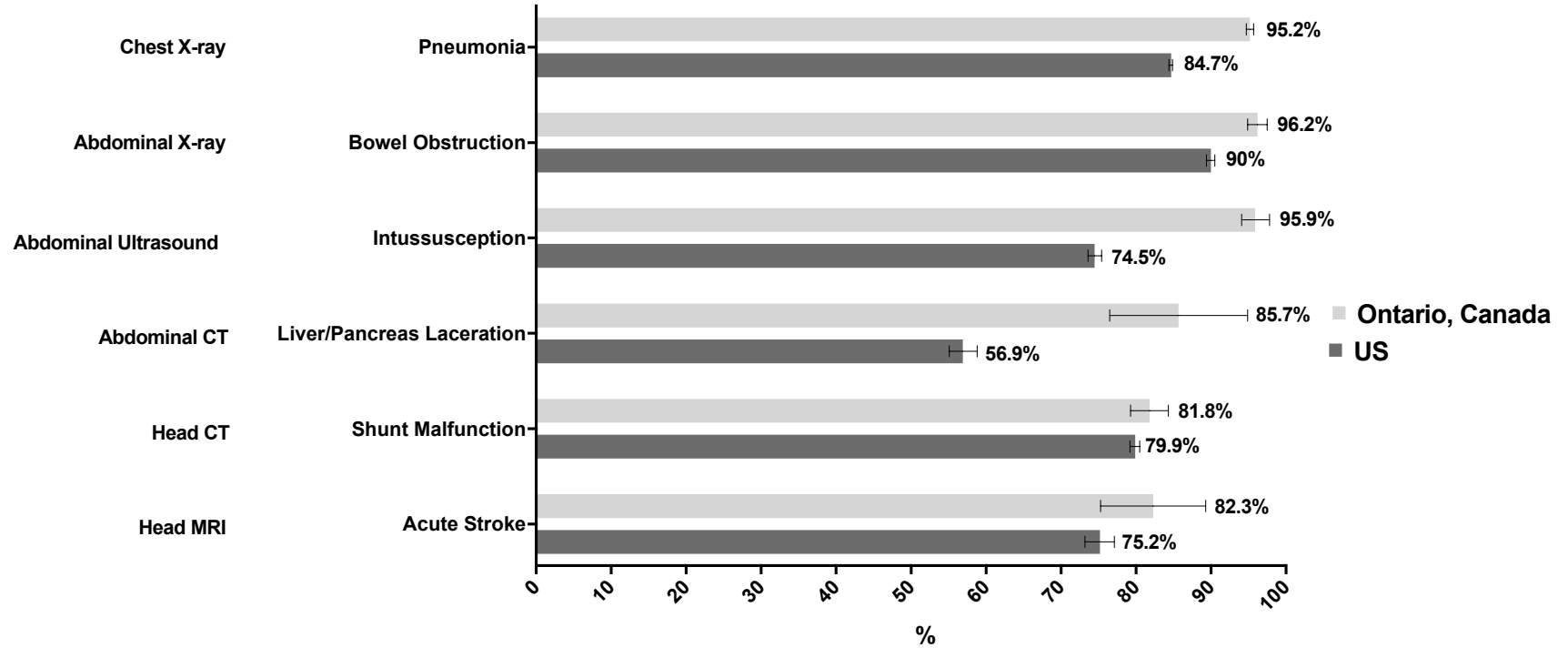
MRI: magnetic resonance imaging

ICU: intensive care unit

\* unable to calculate due to suppressed data as a result of small cell size.



**eFigure.** Diagnostic imaging use among quality control conditions from the emergency department in 4 children’s hospitals in Ontario, Canada and 26 children’s hospitals in the United States (US), 2006 to 2016.



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