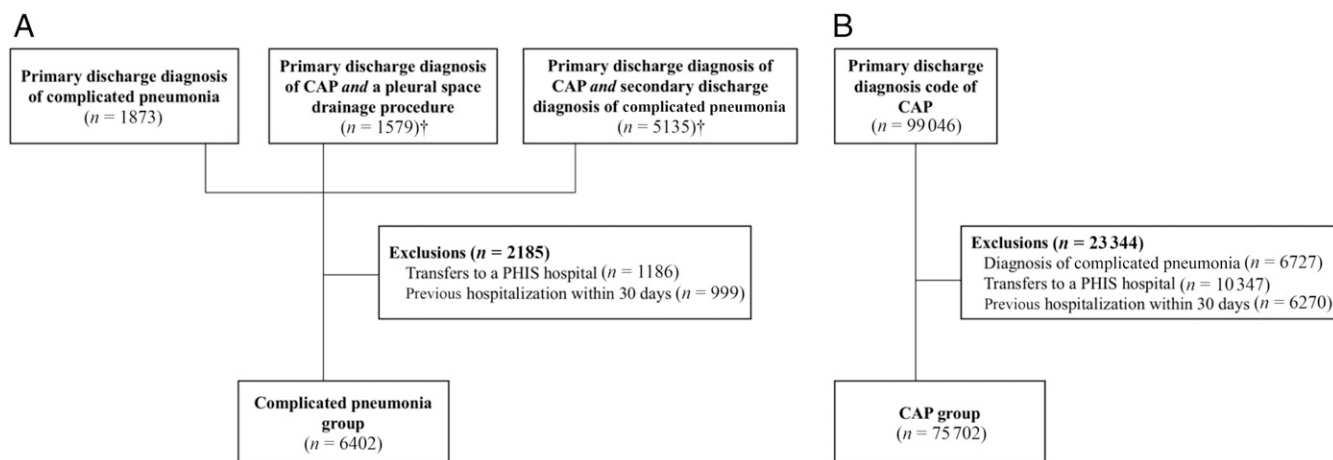
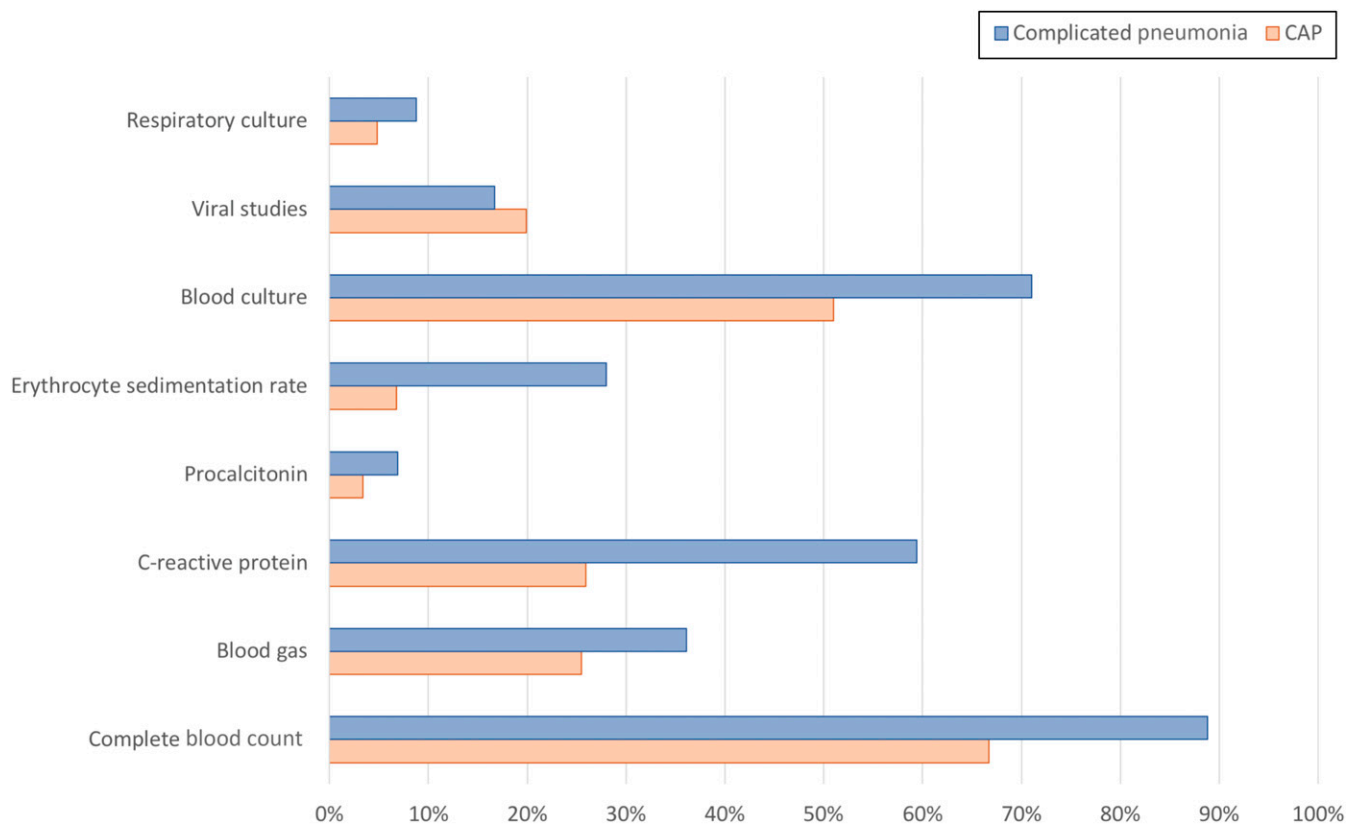


Supplemental Information



SUPPLEMENTAL FIGURE 3 Flowchart of study identification, inclusion, and exclusion criteria for (A) the complicated pneumonia group and (B) the CAP comparator group. ^a A total of 1479 patients met criteria for both (1) a primary discharge diagnosis of CAP and pleural space drainage procedure and (2) a primary discharge diagnosis of CAP and secondary discharge diagnosis of complicated pneumonia. These patients are listed under the CAP plus pleural space drainage procedure group because of the order in which the analysis was completed.



SUPPLEMENTAL FIGURE 4 Laboratory evaluation conducted in children with complicated pneumonia and CAP. $P < .001$ for all comparisons for complicated pneumonia and CAP.

SUPPLEMENTAL TABLE 4 ICD-9 and ICD-10 Codes Included in the Definitions of Complicated Pneumonia and CAP

ICD-9 Code		Description	ICD-10 Code		Description
CAP					
480.0	Pneumonia due to adenovirus		J11.00	Influenza due to unidentified influenza virus with pneumonia	
480.1	Pneumonia due to respiratory syncytial virus		J12.0	Adenoviral pneumonia	
480.2	Pneumonia due to parainfluenza virus		J12.1	Respiratory syncytial virus pneumonia	
480.8	Pneumonia due to other virus not elsewhere classified		J12.2	Parainfluenza virus pneumonia	
480.9	Viral pneumonia, unspecified		J12.89	Other viral pneumonia	
481	<i>S pneumoniae</i> pneumonia		J12.9	Viral pneumonia, unspecified	
482.0	Pneumonia due to <i>Klebsiella pneumoniae</i>		J13	Pneumonia due to <i>S pneumoniae</i>	
482.30	Pneumonia due to <i>Streptococcus</i> , unspecified		J15.0	Pneumonia due to <i>K pneumoniae</i>	
482.31	Pneumonia due to <i>Streptococcus</i> , group A		J15.211	Pneumonia due to Methicillin susceptible <i>S aureus</i>	
482.32	Pneumonia due to <i>Streptococcus</i> , group B		J15.212	Pneumonia due to Methicillin-resistant <i>S aureus</i>	
482.41	Methicillin susceptible pneumonia due to <i>S aureus</i>		J15.3	Pneumonia due to <i>Streptococcus</i> , group B	
482.42	Methicillin-resistant pneumonia due to <i>S aureus</i>		J15.4	Pneumonia due to other streptococci	
482.83	Pneumonia due to other Gram-negative bacteria		J15.6	Pneumonia due to other Gram-negative bacteria	
482.89	Pneumonia due to other specified bacteria		J15.8	Pneumonia due to other specified bacteria	
482.90	Bacterial pneumonia, unspecified		J15.9	Unspecified bacterial pneumonia	
483.8	Pneumonia due to other specified organism		J16.8	Pneumonia due to other specified infectious organisms	
484.3	Pneumonia in whooping cough		J18.0	Bronchopneumonia, unspecified organism	
485	Bronchopneumonia, organism unspecified		J18.1	Lobar pneumonia, unspecified organism	
486	Pneumonia, organism unspecified		J18.9	Pneumonia, unspecified organism	
487.0	Influenza with pneumonia		A37.91	Whooping cough, unspecified species with pneumonia	
Complicated pneumonia					
510.0	Empyema with fistula		J85.0	Gangrene and necrosis of lung	
510.9	Empyema without mention of fistula		J85.1	Abscess of lung with pneumonia	
511.0	Pleurisy without mention of effusion or current tuberculosis		J85.2	Abscess of lung without pneumonia	
511.1	Pleurisy with effusion, with mention of a bacterial cause other than tuberculosis		J86.0	Pyothorax with fistula	
511.9	Unspecified pleural effusion		J86.9	Pyothorax without fistula	
513	Abscess of lung		J90	Pleural effusion, not elsewhere classified	
—	—		J91.8	Pleural effusion in other conditions classified elsewhere	
—	—		J94.1	Fibrothorax	
—	—		J94.8	Other specified pleural conditions	
—	—		J94.9	Pleural condition, unspecified	
—	—		R09.1	Pleurisy	

SUPPLEMENTAL TABLE 4 Continued

Pleural drainage procedure		ICD-9 Code	Description	ICD-10 Code	Description
34.02	Exploratory thoracotomy			0B9N00Z	Drainage of right pleura with drainage device, open approach
34.04	Insertion of intercostal catheter for drainage			0B9N0ZZ	Drainage of right pleura, open approach
34.09	Other incision of pleura			0B9N30Z	Drainage of right pleura with drainage device, percutaneous approach
34.21	Transpleural thoracoscopy			0B9N3ZZ	Drainage of right pleura, percutaneous approach
34.91	Thoracentesis			0B9N40Z	Drainage of right pleura with drainage device, percutaneous endoscopic approach
—	—			0B9N80Z	Drainage of right pleura with drainage device, via natural or artificial opening endoscopic
—	—			0B9N8ZZ	Drainage of right pleura, via natural or artificial opening endoscopic
—	—			0B9P00Z	Drainage of left pleura with drainage device, open approach
—	—			0B9P0ZZ	Drainage of left pleura, open approach
—	—			0B9P30Z	Drainage of left pleura with drainage device, percutaneous approach
—	—			0B9P3ZZ	Drainage of left pleura, percutaneous approach
—	—			0B9P40Z	Drainage of left pleura with drainage device, percutaneous endoscopic approach
—	—			0B9P80Z	Drainage of left pleura with drainage device, via natural or artificial opening endoscopic
—	—			0B9P8ZZ	Drainage of left pleura, via natural or artificial opening endoscopic
—	—			0BCN0ZZ	Extirpation of matter from right pleura, open approach
—	—			0BCN3ZZ	Extirpation of matter from right pleura, percutaneous approach
—	—			0BCN4ZZ	Extirpation of matter from right pleura, percutaneous endoscopic approach
—	—			0BCP0ZZ	Extirpation of matter from left pleura, open approach
—	—			0BCP3ZZ	Extirpation of matter from left pleura, percutaneous approach
—	—			0BCP4ZZ	Extirpation of matter from left pleura, percutaneous endoscopic approach
—	—			0BHQ0YZ	Insertion of other device into pleura, open approach
—	—			0BHQ3YZ	Insertion of other device into pleura, percutaneous approach
—	—			0BHQ4YZ	Insertion of other device into pleura, percutaneous endoscopic approach
—	—			0BHQ7YZ	Insertion of other device into pleura, via natural or artificial opening
—	—			0BHQ8YZ	Insertion of other device into pleura, via natural or artificial opening endoscopic
—	—			0BJ04ZZ	Inspection of tracheobronchial tree, percutaneous endoscopic approach
—	—			0BJK4ZZ	Inspection of right lung, percutaneous endoscopic approach
—	—			0BJL4ZZ	Inspection of left lung, percutaneous endoscopic approach

SUPPLEMENTAL TABLE 4 Continued

ICD-9 Code	Description	ICD-10 Code	Description
-	-	0BJQ0ZZ	Inspection of pleura, open approach
-	-	0BJQ3ZZ	Inspection of pleura, percutaneous approach
-	-	0BJQ4ZZ	Inspection of pleura, percutaneous endoscopic approach
-	-	0BJQ7ZZ	Inspection of pleura, via natural or artificial opening
-	-	0BJQ8ZZ	Inspection of pleura, via natural or artificial opening endoscopic
-	-	0BJQXZZ	Inspection of pleura, external approach
-	-	0W9900Z	Drainage of right pleural cavity with drainage device, open approach
-	-	0W990ZZ	Drainage of right pleural cavity, open approach
-	-	0W9930Z	Drainage of right pleural cavity with drainage device, percutaneous approach
-	-	0W993ZZ	Drainage of right pleural cavity, percutaneous approach
-	-	0W9940Z	Drainage of right pleural cavity with drainage device, percutaneous endoscopic approach
-	-	0W994ZZ	Drainage of right pleural cavity, percutaneous endoscopic approach
-	-	0W9B00Z	Drainage of left pleural cavity with drainage device, open approach
-	-	0W9B0ZZ	Drainage of left pleural cavity, open approach
-	-	0W9B30Z	Drainage of left pleural cavity with drainage device, percutaneous approach
-	-	0W9B3ZZ	Drainage of left pleural cavity, percutaneous approach
-	-	0W9B40Z	Drainage of left pleural cavity with drainage Device, percutaneous endoscopic approach
-	-	0W9B4ZZ	Drainage of left pleural cavity, percutaneous endoscopic approach
-	-	0WC90ZZ	Exirtipation of matter from right pleural cavity, open approach
-	-	0WC93ZZ	Exirtipation of matter from right pleural cavity, percutaneous approach
-	-	0WC94ZZ	Exirtipation of matter from right pleural cavity, percutaneous endoscopic approach
-	-	0WCB0ZZ	Exirtipation of matter from left pleural cavity, open approach
-	-	0WCB3ZZ	Exirtipation of matter from left pleural cavity, percutaneous approach
-	-	0WCB4ZZ	Exirtipation of matter from left pleural cavity, percutaneous endoscopic approach
-	-	0WCQ0ZZ	Exirtipation of matter from respiratory tract, open approach
-	-	0WJ90ZZ	Inspection of right pleural cavity, open approach
-	-	0WJ94ZZ	Inspection of right pleural cavity, percutaneous endoscopic approach
-	-	0WJB0ZZ	Inspection of left pleural cavity, open approach
-	-	0WJB4ZZ	Inspection of left pleural cavity, percutaneous endoscopic approach
-	-	0WJC0ZZ	Inspection of mediastinum, open approach
-	-	0WJC3ZZ	Inspection of mediastinum, percutaneous approach

SUPPLEMENTAL TABLE 4 Continued

ICD-9 Code	Description	ICD-10 Code	Description
—	—	0WJC4ZZ	Inspection of mediastinum, percutaneous endoscopic approach
—	—	0WJQ0ZZ	Inspection of respiratory tract, open approach
—	—	0WJQ4ZZ	Inspection of respiratory tract, percutaneous endoscopic approach
—	—	0WJQ7ZZ	Inspection of respiratory tract, via natural or artificial opening approach

Complicated pneumonia: either (1) a primary discharge diagnosis of complicated pneumonia, (2) a primary discharge diagnosis of CAP in a patient who underwent a pleural drainage procedure during the hospitalization, or (3) a primary discharge diagnosis of CAP with a secondary diagnosis of complicated pneumonia. CAP: a primary diagnosis code of CAP, excluding patients with complicated pneumonia. —, not applicable.

SUPPLEMENTAL TABLE 5 Total Cases of Complicated Pneumonia and CAP by Year

Academic Year ^a	Complicated Pneumonia Cases	CAP Cases	Total Cases	Cases of Complicated Pneumonia, %
2011–2012	825	10 118	10 943	7.5
2012–2013	721	10 375	11 096	6.5
2013–2014	690	9231	9921	7.0
2014–2015	796	10 610	11 406	7.0
2015–2016	864	9572	10 436	8.3
2016–2017	900	8922	9822	9.2
2017–2018	805	8531	9336	8.6
2018–2019	801	8343	9144	8.8

^a Academic year refers to July 1 through June 30.

SUPPLEMENTAL TABLE 6 Hospitalization Characteristics of Children Admitted With Complicated Pneumonia and CAP, Stratified by Age Group (0–4 Years of Age and 5–18 Years of Age)

Characteristic	Complicated Pneumonia (<i>n</i> = 6402)	CAP (<i>n</i> = 75 702)	<i>P</i>
Ages 0–4, <i>n</i>	2602	49 018	
Hospital length of stay, <i>n</i> (%)			<.001
1–2 d	662 (25.4)	30 936 (63.1)	–
3–7 d	930 (35.7)	15 573 (31.8)	–
>7 d	1010 (38.8)	2509 (5.1)	–
Median length of stay (IQR), d	6 (2–10)	2 (1–3)	<.001
ICU care received, <i>n</i> (%)	733 (28.2)	5652 (11.5)	<.001
ECMO, <i>n</i> (%)	8 (0.3)	16 (0.03)	<.001
Mechanical ventilation, <i>n</i> (%)	375 (14.4)	2300 (4.7)	<.001
Death, <i>n</i> (%)	12 (0.5)	51 (0.1)	<.001
Readmission within 30 d, <i>n</i> (%)			
For any reason	215 (8.3)	3052 (6.2)	<.001
For CAP and/or complicated pneumonia	143 (5.5)	1215 (2.5)	<.001
For complicated pneumonia	141 (5.4)	104 (0.2)	<.001
Median hospitalization cost (IQR), \$	17 931.69 (7516.64–36 732.58)	6519.22 (4182.75–10 974.88)	<.001
Age 5–18, <i>n</i>	3800	26 684	
Hospital length of stay, <i>n</i> (%)			<.001
1–2 d	1297 (34.1)	16 507 (61.9)	–
3–7 d	1488 (39.2)	7908 (29.6)	–
>7 d	1015 (26.7)	2269 (8.5)	–
Median length of stay (IQR), d	4 (2–8)	2 (1–3)	<.001
ICU care received, <i>n</i> (%)	775 (20.4)	3485 (13.1)	<.001
ECMO, <i>n</i> (%)	8 (0.2)	6 (0.02)	<.001
Mechanical ventilation, <i>n</i> (%)	395 (10.4)	1881 (7.1)	<.001
Death, <i>n</i> (%)	26 (0.7)	62 (0.2)	<.001
Readmission within 30 d, <i>n</i> (%)			
For any reason	310 (8.2)	1784 (6.7)	<.001
For CAP and/or complicated pneumonia	212 (5.6)	793 (3)	<.001
For complicated pneumonia	212 (5.6)	134 (0.5)	<.001
Median hospitalization cost (IQR), \$	12 645.61 (6385.57–29 181.87)	7145.14 (4427.41–13 219.05)	<.001

–, not applicable.

SUPPLEMENTAL TABLE 7 Hospitalization Characteristics of Children Hospitalized With Simple Parapneumonic Effusion Versus Other Complicated Pneumonia Diagnoses

Characteristic	Simple Parapneumonic Effusion (<i>n</i> = 2434)	Other Complicated Pneumonia Diagnoses (<i>n</i> = 3968)	<i>P</i>
Hospital length of stay, <i>n</i> (%)			<.001
1–2 d	966 (39.7)	993 (25)	–
3–7 d	983 (40.4)	1435 (36.2)	–
>7 d	485 (19.9)	1540 (38.8)	–
Median length of stay (IQR), d	3 (2–6)	6 (2–10)	<.001
ICU care received, <i>n</i> (%)	408 (16.8)	1100 (27.7)	<.001
ECMO, <i>n</i> (%)	4 (0.16)	12 (0.3)	.283
Mechanical ventilation, <i>n</i> (%)	164 (6.7)	606 (15.3)	<.001
Death, <i>n</i> (%)	14 (0.58)	24 (0.6)	.881
Readmission within 30 d, <i>n</i> (%)			
For any reason	233 (9.6)	292 (7.4)	.002
For CAP and/or complicated pneumonia	154 (6.3)	201 (5.1)	.032
For complicated pneumonia	154 (6.3)	199 (5)	.026
Median hospitalization cost (IQR), \$	10 388.07 (5609.90–21 960.69)	19 047.96 (8009.43–38 258.27)	<.001

–, not applicable.