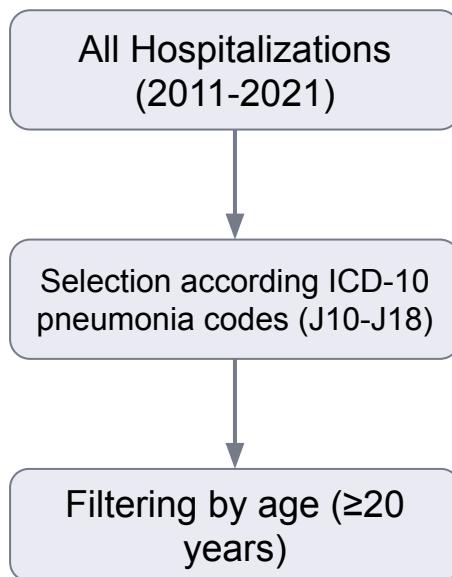# Community-acquired pneumonia in Brazil

IND2620 - Healthcare Operations Management
Authors: Matheus Meirim, Rachel Ventriglia

Community-acquired pneumonia in Brazil

Selection of community-acquired pneumonia cases

All Hospitalizations
(2011-2021)

↓

Selection according ICD-10
pneumonia codes (J10-J18)

↓

Filtering by age (≥20
years)

Community-acquired pneumonia in Brazil

Informations by Age group

Data Information	2011	2012	2013	2014	2015	2016	2017	2018	2019	%Δ*	AAPC [95% CI]	2020	2021	%Δ*	AAPC [95% CI]
Admissions	362,159	344,545	359,744	344,402	339,809	338,561	351,769	349,995	353,591	-2.37	-0.19 [-0.23 ; -0.15]	259,030	222,710	-37.01	-21.12 [-21.33 ; -20.91]
20-49	100,828	95,221	95,835	85,023	73,548	73,140	66,012	67,761	67,083	-33.47	-5.83 [-5.92 ; -5.75]	56,986	47,359	-29.40	-15.92 [-16.41 ; -15.43]
50-59	47,338	46,156	47,186	43,368	41,594	43,961	40,668	41,428	40,372	-14.72	-2.06 [-2.18 ; -1.95]	32,642	28,037	-30.55	-16.82 [-17.45 ; -16.18]
60-69	57,121	54,489	57,829	55,113	55,622	57,857	60,350	59,306	59,710	4.53	0.95 [0.84 ; 1.06]	44,692	38,132	-36.14	-20.47 [-20.98 ; -19.96]
70+	156,872	148,679	158,894	160,898	169,045	163,603	184,739	181,500	186,426	18.84	2.73 [2.67 ; 2.79]	124,710	109,182	-41.43	-24.36 [-24.65 ; -24.08]
Age-adjusted Admissions rate [a]	286	265	268	249	238	230	231	223	218	-23.78	-3.26 [-3.31 ; -3.21]	157	131	-39.91	-23.13 [-23.4 ; -22.87]
20-49	112	105	104	92	79	78	69	71	69	-38.39	-6.72 [-6.85 ; -6.6]	58	48	-30.43	-16.67 [-17.41 ; -15.93]
50-59	247	233	232	207	194	200	180	180	172	-30.36	-4.54 [-4.91 ; -4.18]	137	116	-32.56	-18.17 [-20.13 ; -16.16]
60-69	482	441	450	411	399	400	402	381	370	-23.24	-2.86 [-3.26 ; -2.47]	268	221	-40.27	-23.15 [-25.04 ; -21.21]
70+	1,561	1,426	1,467	1,428	1,441	1,343	1,453	1,371	1,350	-13.52	-1.28 [-1.55 ; -1.01]	871	730	-45.93	-27.32 [-28.54 ; -26.07]
Deaths	43,615	45,225	49,196	49,246	52,225	55,595	55,836	57,379	59,337	36.05	3.9 [3.78 ; 4.01]	52,464	48,017	-19.08	-10.1 [-10.64 ; -9.55]
20-49	4,614	4,623	4,847	4,301	4,217	4,698	4,004	4,301	4,217	-8.60	-1.44 [-1.81 ; -1.06]	4,320	4,042	-4.15	-2.07 [-4.14 ; 0.05]
50-59	4,126	4,265	4,547	4,356	4,343	4,990	4,282	4,684	4,683	13.50	1.35 [0.96 ; 1.73]	4,558	4,395	-6.15	-3.12 [-5.09 ; -1.11]
60-69	6,383	6,545	7,335	7,130	7,572	8,320	8,136	8,504	8,871	38.98	4.15 [3.85 ; 4.46]	8,844	7,830	-11.73	-5.93 [-7.34 ; -4.51]
70+	28,492	29,792	32,467	33,459	36,093	37,587	39,414	39,890	41,566	45.89	4.86 [4.72 ; 5.01]	34,742	31,750	-23.62	-12.78 [-13.41 ; -12.13]
Age-adjusted In-hospital Mortality rate [a]	35	35	37	35	36	37	36	36	35	0.00	0.18 [0.04 ; 0.32]	31	27	-22.86	-12.65 [-13.35 ; -11.95]
20-49	6	6	6	5	5	5	5	5	5	-16.67	-2.55 [-3.11 ; -1.99]	5	5	0.00	-3.18 [-6.3 ; 0.04]
50-59	22	22	23	21	21	23	19	21	20	-9.09	-1.24 [-2.42 ; -0.04]	19	19	-5.00	-4.7 [-10.74 ; 1.74]
60-69	54	54	58	54	55	58	55	55	56	3.70	0.21 [-0.91 ; 1.34]	53	46	-17.86	-9.14 [-14.27 ; -3.7]
70+	277	279	293	289	299	300	301	293	293	5.78	0.7 [0.09 ; 1.32]	238	208	-29.01	-15.89 [-18.66 ; -13.03]

AAPC - Annual Average Percent Change (estimated from Poisson regression model)
[a] Rates per 100,000 population, adjusted to the WHO standard population
*Percentage change between 2011-2019 and 2019-2021, respectively

Community-acquired pneumonia in Brazil

ICU vs non ICU by Age group

Data Information	2011	2012	2013	2014	2015	2016	2017	2018	2019	%Δ*	AAPC [95% CI]	2020	2021	%Δ*	AAPC [95% CI]
Admissions	362,159	344,545	359,744	344,402	339,809	338,561	351,769	349,995	353,591	-2.37	-0.19 [-0.23 ; -0.15]	259,030	222,710	-37.01	-21.12 [-21.33 ; -20.91]
ICU Admissions	15,258	16,976	19,243	19,504	18,948	20,236	20,303	20,800	22,602	48.13	3.85 [3.66 ; 4.04]	24,930	21,894	-3.13	-1.52 [-2.41 ; -0.62]
Non ICU Admissions	346,901	327,569	340,501	324,898	320,861	318,325	331,466	329,195	330,989	-4.59	-0.42 [-0.46 ; -0.38]	234,100	200,816	-39.33	-22.72 [-22.94 ; -22.51]
20-49	100,828	95,221	95,835	85,023	73,548	73,140	66,012	67,761	67,083	-33.47	-5.83 [-5.92 ; -5.75]	56,986	47,359	-29.40	-15.92 [-16.41 ; -15.43]
ICU Admissions	3,160	3,480	3,726	3,463	3,272	3,837	3,329	3,602	3,960	25.32	1.49 [1.06 ; 1.93]	4,757	4,259	7.55	3.52 [1.36 ; 5.72]
Non ICU Admissions	97,668	91,741	92,109	81,560	70,276	69,303	62,683	64,159	63,123	-35.37	-6.16 [-6.25 ; -6.08]	52,229	43,100	-31.72	-17.36 [-17.86 ; -16.86]
50-59	47,338	46,156	47,186	43,368	41,594	43,961	40,668	41,428	40,372	-14.72	-2.06 [-2.18 ; -1.95]	32,642	28,037	-30.55	-16.82 [-17.45 ; -16.18]
ICU Admissions	2,053	2,311	2,653	2,581	2,330	2,842	2,515	2,875	2,895	41.01	3.34 [2.83 ; 3.86]	3,487	3,245	12.09	5.61 [3.05 ; 8.23]
Non ICU Admissions	45,285	43,845	44,533	40,787	39,264	41,119	38,153	38,553	37,477	-17.24	-2.39 [-2.51 ; -2.27]	29,155	24,792	-33.85	-18.91 [-19.56 ; -18.26]
60-69	57,121	54,489	57,829	55,113	55,622	57,857	60,350	59,306	59,710	4.53	0.95 [0.84 ; 1.06]	44,692	38,132	-36.14	-20.47 [-20.98 ; -19.96]
ICU Admissions	2,788	3,048	3,461	3,527	3,507	3,859	3,983	4,204	4,596	64.85	5.67 [5.23 ; 6.12]	5,208	4,520	-1.65	-0.79 [-2.76 ; 1.22]
Non ICU Admissions	54,333	51,441	54,368	51,586	52,115	53,998	56,367	55,102	55,114	1.44	0.64 [0.53 ; 0.75]	39,484	33,612	-39.01	-22.45 [-22.98 ; -21.92]
70+	156,872	148,679	158,894	160,898	169,045	163,603	184,739	181,500	186,426	18.84	2.73 [2.67 ; 2.79]	124,710	109,182	-41.43	-24.36 [-24.65 ; -24.08]
ICU Admissions	7,257	8,137	9,403	9,933	9,839	9,698	10,476	10,119	11,151	53.66	4.18 [3.91 ; 4.45]	11,478	9,870	-11.49	-5.74 [-6.99 ; -4.48]
Non ICU Admissions	149,615	140,542	149,491	150,965	159,206	153,905	174,263	171,381	175,275	17.15	2.64 [2.58 ; 2.71]	113,232	99,312	-43.34	-25.78 [-26.07 ; -25.49]
Age-adjusted Admissions rate [a]	286	265	268	249	238	230	231	223	218	-23.78	-3.26 [-3.31 ; -3.21]	157	131	-39.91	-23.13 [-23.4 ; -22.87]
ICU Admissions	13 (4.55%)	14 (5.28%)	15 (5.6%)	15 (6.02%)	14 (5.88%)	14 (6.09%)	14 (6.06%)	14 (6.28%)	15 (6.88%)	15.38	0.71 [0.48 ; 0.94]	16 (10.19%)	13 (9.92%)	-13.33	-4.02 [-5.14 ; -2.89]
20-49	112	105	104	92	79	78	69	71	69	-38.39	-6.72 [-6.85 ; -6.6]	58	48	-30.43	-16.67 [-17.41 ; -15.93]
ICU Admissions	4 (3.57%)	4 (3.81%)	5 (4.81%)	4 (4.35%)	4 (5.06%)	5 (6.41%)	4 (5.8%)	4 (5.63%)	5 (7.25%)	25.00	0.45 [-0.2 ; 1.1]	5 (8.62%)	5 (10.42%)	0.00	2.37 [-0.87 ; 5.72]
50-59	247	233	232	207	194	200	180	180	172	-30.36	-4.54 [-4.91 ; -4.18]	137	116	-32.56	-18.17 [-20.13 ; -16.16]
ICU Admissions	11 (4.45%)	12 (5.15%)	14 (6.03%)	13 (6.28%)	11 (5.67%)	13 (6.5%)	12 (6.67%)	13 (7.22%)	13 (7.56%)	18.18	0.73 [-0.86 ; 2.35]	15 (10.95%)	14 (12.07%)	7.69	3.84 [-3.94 ; 12.24]
60-69	482	441	450	411	399	400	402	381	370	-23.24	-2.86 [-3.26 ; -2.47]	268	221	-40.27	-23.15 [-25.04 ; -21.21]
ICU Admissions	24 (4.98%)	25 (5.67%)	27 (6%)	27 (6.57%)	26 (6.52%)	27 (6.75%)	27 (6.72%)	27 (7.09%)	29 (7.84%)	20.83	1.66 [0.02 ; 3.32]	32 (11.94%)	27 (12.22%)	-6.90	-4.05 [-11.21 ; 3.68]
70+	1,561	1,426	1,467	1,428	1,441	1,343	1,453	1,371	1,350	-13.52	-1.28 [-1.55 ; -1.01]	871	730	-45.93	-27.32 [-28.54 ; -26.07]
ICU Admissions	73 (4.68%)	79 (5.54%)	88 (6%)	89 (6.23%)	85 (5.9%)	81 (6.03%)	84 (5.78%)	78 (5.69%)	83 (6.15%)	13.70	0.33 [-0.82 ; 1.5]	82 (9.41%)	68 (9.32%)	-18.07	-9.35 [-14.58 ; -3.81]

AAPC - Annual Average Percent Change (estimated from Poisson regression model)
[a] Rates per 100,000 population, adjusted to the WHO standard population
*Percentage change between 2011-2019 and 2019-2021, respectively

Community-acquired pneumonia in Brazil

Lethality by Age group

Data Information	2011	2012	2013	2014	2015	2016	2017	2018	2019	%Δ*	AAPC [95% CI]	2020	2021	%Δ*	AAPC [95% CI]
Age-adjusted In-hospital Lethality rate	6.59%	7.02%	7.31%	7.39%	7.98%	8.66%	8.19%	8.58%	8.66%	31.54	3.48 [3.29 ; 3.68]	10.77%	11.64%	34.36	16.12 [14.96 ; 17.3]
20-49	4.28%	4.49%	4.70%	4.66%	5.31%	5.83%	5.64%	5.83%	5.78%	35.05	4.4 [3.78 ; 5.02]	6,95%	7,64%	32.27	15.09 [11.24 ; 19.08]
50-59	8.67%	9.15%	9.56%	9.92%	10.33%	11.17%	10.39%	11.17%	11.48%	32.36	3.38 [2.14 ; 4.63]	13,77%	15,49%	34.98	16.19 [8.84 ; 24.04]
60-69	11.08%	11.87%	12.54%	12.82%	13.49%	14.26%	13.39%	14.21%	14.68%	32.45	3.14 [1.99 ; 4.31]	19,64%	20,31%	38.35	17.96 [11.33 ; 24.98]
70+	16.07%	17.78%	18.08%	18.37%	18.72%	20.23%	18.65%	19.33%	19.64%	22.20	1.94 [1.31 ; 2.58]	25,49%	26,50%	34.94	16.65 [12.86 ; 20.57]
Age-adjusted Non ICU Lethality rate	5.12%	5.33%	5.47%	5.42%	5.96%	6.43%	6.12%	6.39%	6.54%	27.74	3.23 [3 ; 3.46]	7.84%	8.61%	31.71	14.94 [13.54 ; 16.36]
20-49	3.10%	3.18%	3.32%	3.19%	3.70%	4.01%	3.90%	4.04%	4.07%	31.03	3.99 [3.23 ; 4.75]	4,55%	5,19%	27.67	12.99 [8.23 ; 17.95]
50-59	6.88%	6.96%	7.00%	7.17%	7.71%	8.32%	7.88%	8.23%	8.70%	26.50	3.12 [1.65 ; 4.61]	10,13%	11,34%	30.42	14.14 [5.4 ; 23.62]
60-69	8.80%	9.34%	9.67%	9.74%	10.45%	11.02%	10.43%	11.13%	11.39%	29.48	3.06 [1.71 ; 4.43]	15,20%	15,81%	38.82	18.28 [10.38 ; 26.74]
70+	13.82%	14.99%	15.04%	15.12%	15.68%	17.11%	15.69%	16.44%	16.77%	21.33	2.07 [1.35 ; 2.79]	21,54%	22,62%	34.90	16.67 [12.41 ; 21.1]
Age-adjusted ICU Lethality rate	45.36%	44.94%	45.46%	45.88%	46.62%	45.59%	44.22%	44.20%	39.87%	-12.10	-1.12 [-1.45 ; -0.78]	39.90%	39.59%	-0.69	-0.34 [-2.14 ; 1.49]
20-49	41.16%	39.72%	39.57%	39.81%	40.62%	39.25%	39.05%	38.73%	33.42%	-18.79	-1.57 [-2.58 ; -0.55]	34,34%	33,03%	-1.19	-0.65 [-6.1 ; 5.13]
50-59	48.27%	50.80%	52.44%	53.63%	54.78%	52.63%	48.80%	50.58%	47.52%	-1.56	-0.57 [-2.77 ; 1.68]	44,33%	47,30%	-0.46	-0.05 [-11.05 ; 12.31]
60-69	55.47%	54.88%	57.82%	57.63%	58.48%	59.56%	55.13%	54.51%	53.97%	-2.70	-0.46 [-2.59 ; 1.72]	53,43%	53,86%	-0.20	-0.08 [-10.33 ; 11.34]
70+	61.82%	64.54%	65.48%	66.59%	65.90%	67.07%	64.55%	64.40%	60.93%	-1.43	-0.29 [-1.71 ; 1.15]	60,52%	61,37%	0.71	0.29 [-7.02 ; 8.18]

AAPC - Annual Average Percent Change (estimated from Poisson regression model)
*Percentage change between 2011-2019 and 2019-2021, respectively

Community-acquired pneumonia in Brazil

ICU mean LOS by Age group

Data Information	2011	2012	2013	2014	2015	2016	2017	2018	2019	%Δ*	AAPC [95% CI]	2020	2021	%Δ*	AAPC [95% CI]
Mean ICU LOS (days)	7.76	7.92	8.07	8.17	8.07	8.29	8.15	8.18	7.97	2.73	0.4 [-8.16 ; 9.75]	7.48	8.01	0.49	0.25 [-38.93 ; 64.57]
20-49	7.67	7.66	7.87	7.81	8.23	8.08	7.83	8.22	7.89	2.76	0.57 [-8.08 ; 10.04]	7.30	7.77	-1.51	-0.78 [-39.88 ; 63.77]
50-59	8.24	8.26	8.45	8.31	8.52	8.52	8.52	8.60	8.02	-2.75	0.09 [-8.28 ; 9.24]	7.60	8.71	8.69	4.39 [-35.85 ; 69.87]
60-69	8.06	8.25	8.43	8.58	8.13	8.52	8.44	8.74	8.32	3.26	0.49 [-7.92 ; 9.67]	8.00	8.49	1.97	1 [-37.63 ; 63.53]
70+	7.54	7.81	7.91	8.12	7.89	8.22	8.06	7.82	7.84	3.99	0.34 [-8.29 ; 9.78]	7.28	7.66	-2.28	-1.17 [-40.24 ; 63.44]

AAPC - Annual Average Percent Change (estimated from Poisson regression model)
*Percentage change between 2011-2019 and 2019-2021, respectively

Community-acquired pneumonia in Brazil

ICD-10 TOP 10 Ranking

2011		%
J189	Pneumonia, unspecified organisms	40,68%
J180	Bronchopneumonia, unspecified organism	12,41%
J188	Other pneumonia, unspecified organism	11,15%
J158	Pneumonia due to other specified bacteria	8,98%
J159	Unspecified bacterial pneumonia	6,50%
J128	Other viral pneumonia	6,26%
J168	Pneumonia due to other specified infectious organisms	4,46%
J110	Influenza due to unidentified influenza virus with pneumonia	2,35%
J181	Lobar pneumonia, unspecified organism	1,85%
J100	Influenza due to other identified influenza virus with pneumonia	1,58%

2019		%
J189	Pneumonia, unspecified organisms	42,69%
J159	Unspecified bacterial pneumonia	17,51%
J180	Bronchopneumonia, unspecified organism	12,76%
J158	Pneumonia due to other specified bacteria	8,29%
J188	Other pneumonia, unspecified organism	6,12%
J128	Other viral pneumonia	3,01%
J168	Pneumonia due to other specified infectious organisms	2,07%
J110	Influenza due to unidentified influenza virus with pneumonia	2,00%
J129	Viral pneumonia, unspecified	1,62%
J181	Lobar pneumonia, unspecified organism	0,74%

2021		%
J189	Pneumonia, unspecified organisms	42,44%
J159	Unspecified bacterial pneumonia	14,62%
J180	Bronchopneumonia, unspecified organism	11,27%
J158	Pneumonia due to other specified bacteria	6,56%
J129	Viral pneumonia, unspecified	4,95%
J188	Other pneumonia, unspecified organism	4,77%
J128	Other viral pneumonia	3,72%
J110	Influenza due to unidentified influenza virus with pneumonia	3,65%
J168	Pneumonia due to other specified infectious organisms	1,52%
J100	Influenza due to other identified influenza virus with pneumonia	0,92%

(11) (11)

(12) (11)

Obrigado!

Dúvidas?