life years (QALYs), and incremental cost-effectiveness ratios. Sensitivity analyses (SAs) were conducted to test the robustness of results.

Results. In the confirmed treatment setting, C/T had a higher cure rate (5.0 percentage points, the same below), lower short-term mortality (−5.1%), cost more ($2,728), and yielded higher lifetime QALYs (0.61) than meropenem ($4,472/QALY gained). In the initial treatment setting, C/T sustained a better clinical performance (9.5% more cure, −6.8% mortality, 1.16 more QALYs), yet cost less than meropenem (−$5,662) due to better susceptibility. The response and mortality rates from ASPECT-NP had the greatest impact on results. SAs showed that the result of C/T being cost-effective over meropenem was generally robust.

Conclusion. The results indicate that, compared with meropenem, C/T could be a cost-effective option for patients with vHABP/VABP in the US setting.

Disclosures. **All authors:** No reported disclosures.

2201. Cost of Antimicrobial Use Against Upper Respiratory Infection in Japan

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Session: 244. Bacterial Respiratory Infections
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Background. Antibiotics are often inappropriately prescribed for treating upper respiratory infection (URI) patients in ambulatory care settings. In Japan, a previous study estimated physicians prescribed antibiotics in about 30% of URI cases. However, trends of prescription behavior and additional costs of inappropriate antibiotic use in URI cases are still not clear in Japan. The present study's main objective was to clarify the amount of additional cost owing to inappropriate antibiotic prescription for URI, and the recent trend.

Methods. We conducted a retrospective observational survey using longitudinal claims data spanning 2013–2016, obtained from the Japan Medical Data Center Co., Ltd. (JMDC) Claims Database, which contains anonymous claim data on 5.1 million (for 2013–2016) corporate employees covered by the employees' health insurance plan (Social insurance), and their family members <65 years old. Six physicians specialized in infectious disease assessed the appropriateness of antibiotic prescription based on the ICD-10 code in the database. The total additional cost of antibiotic prescription for URI at the national level was estimated by weighting corresponds to the age-structured population data, from the healthcare payer perspective. Costs of treatment for adverse events and of antimicrobial resistance caused by inappropriate antibiotic prescription were not taken into consideration.

Results. The total annual cost of antibiotic prescription for URI was estimated at US$423.6 (95% confidence interval: 416.8–430.5) million in 2013, $340.9 (335.7–346.2) million in 2014, $349.9 (344.5–355.3) million in 2015, and $297.1 (292.4–301.9) million in 2016.

Conclusion. Although a decreasing trend was observed, the annual cost of antibiotic prescription for URI potentially imposes a substantial economic burden in Japan.

Year	2013	2014	2015	2016
0-4	300045 (5.73)	349827 (6.71)	364043 (7.27)	378095 (7.62)
5-9	186265 (3.47)	199763 (3.76)	190513 (3.58)	183465 (3.46)
10-14	178937 (3.09)	195988 (3.43)	185914 (3.31)	178224 (3.23)
15-19	181308 (3.0)	232657 (3.87)	229207 (3.79)	229102 (3.79)
20-24	206669 (3.33)	301604 (4.86)	310845 (5.10)	319438 (5.19)
25-29	234889 (3.42)	301904 (4.52)	301886 (4.62)	303908 (4.75)
30-34	254486 (3.34)	304273 (4.08)	298905 (4.04)	297681 (4.10)
35-39	279942 (3.09)	319855 (3.69)	309508 (3.68)	302943 (3.73)
40-44	266656 (2.76)	299446 (3.06)	288814 (2.93)	281933 (2.90)
45-49	219357 (2.61)	242943 (2.82)	233439 (2.66)	227467 (2.45)
50-54	174821 (2.26)	198847 (2.55)	190321 (2.37)	184999 (2.34)
55-59	129055 (1.67)	172490 (2.25)	164890 (2.17)	159649 (2.12)
60-64	107417 (1.11)	146718 (1.63)	142367 (1.66)	138287 (1.70)
Total	2719847 (2.85)	3266315 (3.47)	3210652 (3.44)	3185191 (3.45)

Table 1. Number of enrollees in each age group*

*Numbers in brackets represent the proportion of enrollees in total number of Japanese populations in each age group

Year	2013	2014	2015	2016
0-4	22.45 (22.37-22.52)	21.59 (21.52-21.66)	20.14 (20.07-20.21)	18.87 (18.80-18.94)
5-9	30.92 (30.79-31.05)	30.37 (30.25-30.50)	28.32 (28.20-28.44)	26.75 (26.63-26.87)
10-14	36.88 (36.69-37.08)	35.95 (35.76-36.13)	34.56 (34.39-34.74)	33.04 (32.86-33.22)
15-19	43.29 (43.0-43.58)	42.02 (41.75-42.30)	41.71 (41.45-41.97)	37.87 (37.63-38.12)
20-24	44.05 (43.74-44.36)	42.72 (42.42-43.01)	43.61 (43.32-43.91)	40.49 (40.21-40.78)
25-29	42.51 (42.24-42.78)	41.68 (41.42-41.94)	42.09 (41.84-42.35)	39.99 (39.73-40.24)
30-34	42.74 (42.51-42.96)	42.01 (41.79-42.23)	41.52 (41.30-41.74)	39.80 (39.58-40.02)
35-39	42.82 (42.61-43.04)	42.09 (41.88-42.30)	41.45 (41.24-41.66)	39.98 (39.77-40.19)
40-44	41.6 (41.37-41.82)	40.95 (40.74-41.17)	40.46 (40.26-40.67)	39.04 (38.83-39.25)
45-49	39.10 (38.85-39.35)	38.16 (37.93-38.40)	38.40 (38.17-38.62)	36.87 (36.65-37.10)
50-54	36.75 (36.49-37.01)	36.31 (36.06-36.56)	36.09 (35.85-36.33)	34.79 (34.55-35.02)
55-59	35.45 (35.16-35.74)	34.88 (34.60-35.15)	35.04 (34.78-35.30)	33.45 (33.20-33.71)
60-64	33.62 (33.30-33.94)	33.06 (32.74-33.38)	33.27 (32.96-33.58)	31.71 (31.40-32.02)
Total	32.35 (32.30-32.40)	31.62 (31.57-31.67)	30.96 (30.91-31.01)	29.33 (29.28-29.37)

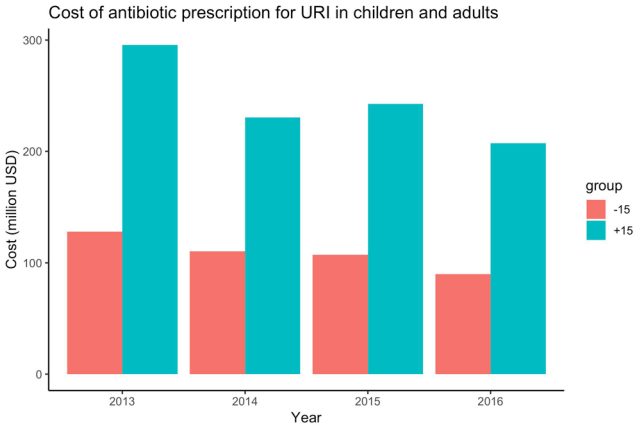
Table 2. Estimated proportion of antibiotic prescription against URI in ambulatory care*

*Numbers are represented by percentage. Numbers in brackets represent 95% confidence interval.

Year	2013	2014	2015	2016
0-4	40.3 (39.9-40.7)	32.7 (32.4-33.0)	27.2 (26.9-27.5)	22.1 (21.8-22.3)
5-9	56.6 (55.9-57.3)	50.1 (49.5-50.7)	51.1 (50.5-51.8)	43.4 (42.8-43.9)
10-14	31.2 (30.7-31.7)	27.7 (27.3-28.1)	29.0 (28.6-29.4)	24.4 (24.0-24.7)
15-19	19.5 (19.1-19.8)	14.6 (14.4-14.8)	16.1 (15.8-16.4)	14.0 (13.8-14.3)
20-24	17.2 (16.9-17.5)	11.4 (11.2-11.6)	11.1 (11.0-11.3)	9.5 (9.3-9.6)
25-29	22.4 (22.0-22.7)	16.1 (15.8-16.4)	15.5 (15.3-15.8)	12.6 (12.4-12.8)
30-34	31.2 (30.8-31.7)	23.9 (23.6-24.2)	23.9 (23.5-24.2)	19.8 (19.5-20.1)
35-39	38.0 (37.4-38.5)	29.9 (29.5-30.3)	29.6 (29.2-30.0)	23.7 (23.4-24.1)
40-44	39.7 (39.1-40.2)	34.9 (34.4-35.4)	37.6 (37.1-38.1)	30.5 (30.1-30.9)
45-49	31.9 (31.3-32.4)	28.4 (28.0-28.9)	31.8 (31.3-32.3)	30.3 (29.8-30.8)
50-54	29.4 (28.8-29.9)	26.2 (25.7-26.7)	30.0 (29.5-30.6)	26.2 (25.7-26.7)
55-59	31.1 (30.4-31.8)	23.0 (22.5-23.4)	25.3 (24.8-25.8)	23.0 (22.6-23.5)
60-64	35.4 (34.5-36.3)	22.0 (21.5-22.6)	21.7 (21.2-22.2)	17.7 (17.3-18.2)
Total	423.6 (416.8-430.5)	340.9 (335.7-346.2)	349.9 (344.5-355.3)	297.1 (292.4-301.9)

Table 3. Estimated additional cost of antibiotic use against URI in ambulatory care (unit = million USD)*

*Numbers in brackets represent 95% confidence interval.



Disclosures. **All authors:** No reported disclosures.

2202. Validation of a Rabbit Model of *Pseudomonas aeruginosa* Acute Pneumonia

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Background. Severity and antimicrobial resistance of *P. aeruginosa* (PA) hospital-acquired pneumonia led the FDA to encourage the development of animal models for preclinical evaluation of new therapeutic strategies. We present here the validation of a rabbit model of PA acute pneumonia.

Methods. Rabbits were infected by endotracheal instillation of 1.8 mL of a standardized inoculum containing 9×10^7 CFU of PA clinical strain 6206 (predetermined 100% lethal dose). The natural history of the disease was described by the following parameters evaluated at 3, 4, 5, 6, 10 hours post-infection (hpi) and at the time of spontaneous death (6 rabbits/group): lung-to-body weight ratio (LW/BW), pulmonary, splenic and renal bacterial counts, pulmonary histology and blood markers (blood cell counts, blood gas and IL-8). Three groups of 12 rabbits were then treated with saline (controls), tobramycin or meropenem at doses determined by PK/PD analysis to confirm the efficacy of a human-equivalent dosing regimen.

Results. PA strain 6,206 caused fatal pneumonia in 13–23 hours by acute respiratory distress syndrome (pulmonary edema and necrosis with LW/BW > 10, pO_2 <40 mmHg) and/or sepsis (hyperlactatemia, hypoglycemia, cytopenias). LW/BW and pulmonary bacterial counts increased significantly over time. The splenic and renal bacterial spread was constant after 6 hpi. Hypoxemia <60 mmHg appeared at 5 hpi for 4/6 rabbits, associated with elevated plasma IL-8 concentration, massive neutrophilic influx into the airspace, lung necrosis, hemorrhage, and pulmonary edema formation. Consequently, 5 hpi appeared as the most appropriate time to trigger a therapeutic intervention. Meropenem (80 mg/kg/q2h) or tobramycin (1 injection of 2.5 mg/kg, then saline/q2h) showed superiority over saline, with a mortality rate of 33% and 17% *vs.* 100%, and an LW/BW ratio of 8.53 and 8.54 *vs.* 13.9, respectively. Tobramycin was less effective than meropenem in clearing bacteria, with, respectively, 1 and 9 out of 12 rabbits having sterile samples.

Conclusion. This rabbit model of PA acute pneumonia is a reliable evaluation tool for new therapeutic strategies. Our study also provides guidance for the

development of animal models by describing the natural history of disease and therapeutic validation.

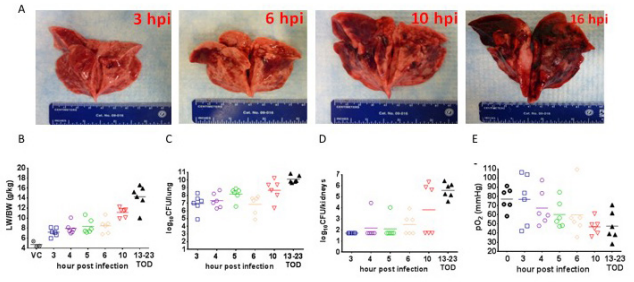

Fig. 1 – Natural history of *P. aeruginosa* acute pneumonia : lung morphology (A), lung/body weight ratio (B), lung (C) and kidney (D) bacterial loads, and hypoxemia (E)

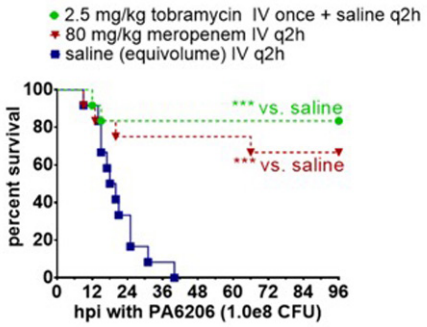

Fig. 2 – Therapeutic validation comparing mortality rate of rabbits treated by saline, tobramycin and meropenem

Disclosures. **All authors:** No reported disclosures.

2203. Patient-Specific Risk Stratification to Identify Patients at High and Low Risk for *P. aeruginosa* in Community-Acquired Pneumonia

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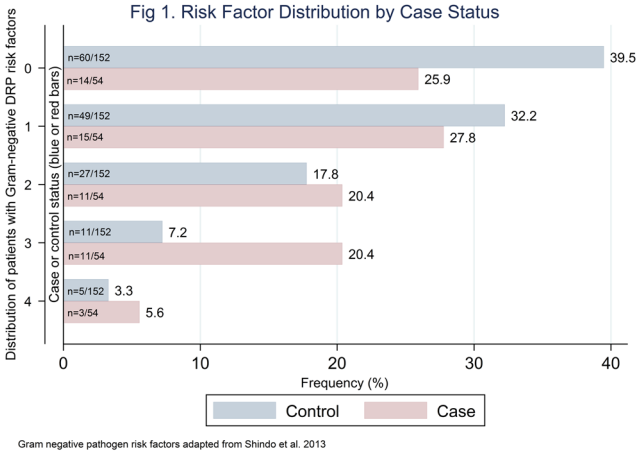
Background. *Pseudomonas aeruginosa* (PsA) is an infrequent pathogen associated with poor outcomes in community-acquired pneumonia (CAP). Identifying patients at high and low-risk for PsA in CAP is necessary to reduce inappropriate and overly broad-spectrum antibiotic use. We evaluated the distribution of risk-factors in hospitalized CAP patients with and without PsA infection.

Methods. Design: retrospective, single-center, case–control study. Inclusion: hospitalized CAP patients admitted to the general medicine wards between January 1, 2014 and May 29, 2018. Exclusion: cystic fibrosis, ≥ 3 admissions within 30 days, CAP requiring ICU admission, and death within 48 hours of admission. Case patients had PsA in respiratory or blood cultures during the index CAP admission. Controls were randomly selected targeting a 3:1 ratio. Comorbidities, pneumonia severity index, and m-APACHE II were assessed. Gram-negative risk factors defined by Shindo et al. 2013 (PMID: 23855620) and validated by Kobayashi et al. (2018; PMID: 30349327) were scored for each patient. Stepwise logistic regression was used to identify covariates that distinguished cases from controls at a $P < 0.2$; these were then used to generate propensity weights (i.e., inverse-probability conditioned on covariates). Unadjusted and adjusted odds ratios for case status were estimated using logistic regression according to: the total number of risk factors present and threshold values, respectively. All analyses were conducted using IC Stata (v.14.2).

Results. 54 cases and 152 controls were included. The distribution of the patient-specific sum of risk factors for PsA is shown in Figure 1. The univariate OR for case status was 4.29 (95% CI:1.55–11.9) at $n = 3$ risk factors, which was similar after propensity weight adjustment [aOR = 4.64 (95% CI: 1.32–16.3)]. The univariate OR of case status was 2.98 among patients with ≥ 3 risk factors (95% CI: 1.34–6.62), which was similar after propensity weight adjustment [aOR = 2.8 (95% CI: 1.02–7.72)], and correct classification was 73.8%.

Conclusion. At a threshold of ≥ 3 PsA risk factors, cases and controls were well classified, even after adjusting for propensity weights. The impact of patient-specific PsA risk-stratification on CAP outcomes and appropriate antibiotic use should be evaluated.



Gram negative pathogen risk factors adapted from Shindo et al. 2013

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2204. Microbiology of Pneumonia Due to Co-Infection in the ICU: Impact of Host Immune Status

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Background. Pneumonia epidemiology is increasingly showing the presence of co-infection due to the utilization of emerging diagnostic testing modalities such as multiplex polymerase chain reaction (PCR) panels. However, the prevalence and clinical significance of co-infection with respect to host immune status remain unclear.

Methods. A single-center retrospective analysis of mechanically ventilated adult patients treated in critical care units from January to October 2018 was performed on those with positive microbiological analysis of a bronchoalveolar lavage (BAL) sample. Host immune status and microbiological analyses were obtained including PCR and culture testing. Categorical variables and co-infection or immunocompetent status were assessed using Chi-Square, Fisher exact tests, or t-tests. REDCap was utilized for data abstraction and SAS software version 9.4 was used to perform all analysis.

Results. Of the 139 BAL samples that met inclusion criteria, 107 and 32 were obtained from immunocompetent and immunocompromised hosts, respectively. There was no statistical difference found between the frequency of co-infection detected by BAL culture with respect to host immune status. Immunocompetent patients had a higher proportion of positive bacterial cultures compared with immunocompromised (76.7% vs. 43.8% respectively, $P = 0.0004$). There was no significant difference seen with frequency of fungal or acid fast bacilli cultures between the two groups. Analysis of the microbiologic data obtained (figures) revealed different pathogens according to host immune status.

Conclusion. Pneumonia due to co-infection in critically ill, mechanically ventilated immunocompromised hosts occurs at a similar frequency regardless of host immune status, however different microbiological patterns emerge. Interestingly, patients who were not immunocompromised had a higher proportion of positive bacterial cultures compared with those who were immunocompromised. Comparative analysis of the other pathogen types may also reveal differences in detection rates if sample size is increased. Clinically, this may help guide efficient use of microbiological testing among patients based on immune status.