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Supplementary Material

Intensivists' Perceptions and Attitudes towards Infectious Diseases Management in the ICU: An International Survey (PRACT-INF-ICU)

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eAppendix 1: Survey Questions

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PRACT-INF-ICU

Introduction

Infection affects half of the ICU patients while antimicrobials are prescribed to about 70% of them. It is recommended to start antimicrobial early and appropriately to improve outcome. However, overuse is leading to a widespread resistance.

To tackle the problem, stewardship programs are increasingly implemented but the heterogeneity managing infectious diseases in the ICU remains a main obstacle. Many specialties are sharing in the decision-making with poorly defined roles and responsibilities and wide variability even in the same country.

The aim of this survey is to understand the current infectious disease practice in the ICU in order to improve infectious disease management including training and role allocation.

The questionnaire will take about 15 minutes. The participants' data will be kept anonymous; and the collected data will be analysed for presentation or publication.

Endorsed by the European Society of Intensive Care Medicine and its infectious diseases section.

Thank you for participating.

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PRACT-INF-ICU

Tell me about yourself

* 1. Which country are you currently practicing intensive care medicine (ICM) in?

* 2. How can you describe your training?

- ◯ Critical care as sole specialty
- ◯ Dual Anaesthesia and critical care
- ◯ Dual critical care and medicine (or any medical subspecialty)
- ◯ Other (please specify)

* 3. Are you currently member of the ESICM infectious diseases section?

- ◯ Voting member
- ◯ Non-voting member
- ◯ Member of ESICM but not of the infectious diseases section
- ◯ Not a member of ESICM

* 4. How many years had you practiced ICM including ICU training*?

*If dual training please just add the period you spent in ICU

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About your ICU work

* 5. How can you describe your hospital?

- ◯ University/teaching hospital
- ◯ Public non-teaching hospital
- ◯ Private hospital
- ◯ Other (please specify)

* 6. What is the capacity of your hospital?

- ◯ Less than 200 beds
- ◯ 200-499 beds
- ◯ 500-999 beds
- ◯ More than 1000 beds

* 7. What is the total number of critical care beds in your hospital?

- ◯ Less than 10 beds
- ◯ 11-15 beds
- ◯ 16-20 beds
- ◯ 21-24 beds
- ◯ More than 24 beds
- ◯ Other (please specify)

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* 8. How you describe your ICU?

- ◯ Medical ICU
- ◯ Surgical ICU
- ◯ Neuro-ICU
- ◯ Cardiac/Cardiothoracic ICU
- ◯ Paediatric ICU
- ◯ Mixed ICU (any 2 or more of the above including if you are working in different units)

* 9. How you describe your clinical and teaching/Continuous Professional development (CPD) ICM time?

- ◯ Full-time (36 hours or more per week)
- ◯ Part-time (less than 36 hours per week)

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PRACT-INF-ICU

Management of infections in your ICU

* 10. On a scale of 5, how you describe your knowledge about the microbiological diagnostic capabilities in your hospital?

(This includes the range of microbiologic tests available)

1= Poor 5= Very good

0 5

* 11. When deciding upon initial antimicrobial treatment for ICU patients; Which of the following specialties are involved (can select more than one): (Multiple answers allowed)

- [ ] Infectious diseases doctors
- [ ] Microbiologists
- [ ] Pharmacists
- [ ] Intensivists
- [ ] Other (please specify)

* 12. The initial antimicrobial decision in your ICU, is most likely based on:

- ( ) National/International guidelines
- ( ) Local protocols
- ( ) Software application (not guidelines based)
- ( ) Expert opinion by non-ICU specialties (Infectious diseases, pharmacists, Microbiologists)
- ( ) Senior ICU opinion (Consultant)
- ( ) Junior ICU opinion (Specialist or junior trainees)

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* 13. In your unit, is an expert antimicrobial opinion available within 1 hour?

- ◯ Yes, by senior ICU doctors
- ◯ Yes, by non-ICU expert (Infectious disease, microbiologist or pharmacist)
- ◯ No (or based on protocols/guidelines)

* 14. On the initiation of antimicrobial treatment, how frequently non-ICU opinion is sought: (Single answer)

- ◯ More than 90% of cases.
- ◯ In most cases (50 - 90 % of cases)
- ◯ In 25-50% of cases
- ◯ Rarely or in selected cases (<25%)
- ◯ Never (0%)

* 15. How frequently do you have infectious diseases/Microbiologists round per week?

- ◯ None or only on request
- ◯ Once per week
- ◯ 2-3 times per week
- ◯ 4-5 times per week
- ◯ 7 days a week

* 16. An expert non-ICU opinion is most likely required in which of the following patients' groups? (Can select one or more) (Multiple answers allowed)

- ☐ Immunocompromised patients/Neutropenic sepsis.
- ☐ Septic shock patients
- ☐ Burn patients
- ☐ Other (please specify)
- ☐ All equal
- ☐ Never required

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* 17. An expert non-ICU opinion is most likely required in which of the following patient groups? (Can select one or more) (Multiple answers allowed)

- [ ] Respiratory tract infection
- [ ] Urosepsis
- [ ] Abdominal sepsis (excluding urosepsis)
- [ ] Post-operative or surgical site infection
- [ ] Blood stream infection
- [ ] Non- surgical Soft tissue infection including necrotizing fasciitis
- [ ] Central nervous system infection
- [ ] Other (please specify)

* 18. Based on micro-organisms and/or resistance pattern, is there a specific group your ICU team is less confident to manage and more likely to ask for non-ICU expert opinion? (Can select one or more)

* MDR was defined as acquired nonsusceptibility to at least one agent in three or more antimicrobial categories, XDR was defined as nonsusceptibility to at least one agent in all but two or fewer antimicrobial categories (i.e. bacterial isolates remain susceptible to only one or two categories) PDR was defined as non-susceptibility to all agents in all antimicrobial categories (Magiorakos AP, Srinivasan A, Carey RB et al. Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance. Clin Microbiol Infect Dis, 18: 268-281)

- [ ] All equal
- [ ] Any multidrug resistant (MDR)
- [ ] Extended resistant organism (XDR)
- [ ] Pan-resistant organisms (PDR)
- [ ] Fungal infection
- [ ] Viral infection
- [ ] None
- [ ] Other (please specify)

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* 19. At which point you feel you need most of the non-ICU expertise: (Can select one or more)

- [ ] Initiation of Antibiotics
- [ ] 48/72 hours review
- [ ] To adjust according to culture results
- [ ] Shifting from intravenous to oral
- [ ] On discontinuation
- [ ] Never required

* 20. Do you have an antimicrobial Stewardship policy in place in your ICU?

*Please note that If you implement Selective decontamination of the digestive tract (SDD) program, the answer should be yes

- ( ) Yes
- ( ) No
- ( ) I do not know

* 21. Do you think the current level of knowledge and training in intensive care infectious diseases in the country you are practicing is adequate?

Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
( )	( )	( )	( )	( )

* 22. Do you think there is a need to improve the training in infectious diseases for Intensive Care doctors?

Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
( )	( )	( )	( )	( )

23. If you selected "strongly agree" or "agree" in question 22: How do you think more training will impact the service in your unit? (Can select one or more)

- [ ] Improve patients' outcome.
- [ ] Decrease cost.
- [ ] Decrease antimicrobial resistance.
- [ ] Save effort and/or time
- [ ] Sole responsibility will improve communication with patients and relatives
- [ ] Other (please specify)

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* 24. Do you think medicolegal issues and defensive medicine are impacting antimicrobial prescription?

Strongly agree	Agree	Neither	Disagree	Strongly Disagree
○	○	○	○	○

25. If you answered "strongly agree" or "agree" in question 24. In your opinion, by which mean medicolegal issues and defensive medicine are affecting antimicrobial prescription? (Can select more than one)

- [ ] Lower threshold to prescribe antibiotics.
- [ ] More antibiotic combinations.
- [ ] Longer course.
- [ ] Less frequent de-escalation.
- [ ] Seeking non-ICU expertise.
- [ ] Other (please specify)

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Additional comment

26. Please add any additional comment or information you feel will be of benefit about the subject. (Free text)

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eAppendix 2: Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

Checklist Item	Explanation	Page Number
Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	4 & 5
IRB approval	Mention whether the study has been approved by an IRB.	5
Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	5
Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	5
Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	5
Open survey versus closed survey	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	4
Contact mode	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	4
Advertising the survey	How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists - If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	5
Web/E-mail	State the type of e-survey (e.g., one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses?	5
Context	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	5
Mandatory/voluntary	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?	5
Incentives	Were any incentives offered (e.g., monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	5
Time/Date	In what timeframe were the data collected?	5

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Checklist Item	Explanation	Page Number
Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	NR
Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	5
Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	5
Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	5
Completeness check	It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if "yes", how (usually JavaScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as "not applicable" or "rather not say", and selection of one response option should be enforced.	5
Review step	State whether respondents were able to review and change their answers (e.g., through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	5
Unique site visitor	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	NR
View rate (Ratio of unique survey visitors/unique site visitors)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary.	NR
Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called "recruitment" rate.	6
Completion rate (Ratio of users who finished the survey/users who agreed to participate)	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate "informed consent" page or if the survey goes over several pages. This is a measure for attrition. Note that "completion" can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word "completeness rate".)	6
Cookies used	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate	5

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Checklist Item	Explanation	Page Number
	database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	
IP check	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	5
Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	5
Registration	In “closed” (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (e.g., the first entry or the most recent)?	NA
Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	6
Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	NA
Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	NA

NR, not reported; NA, not applicable.

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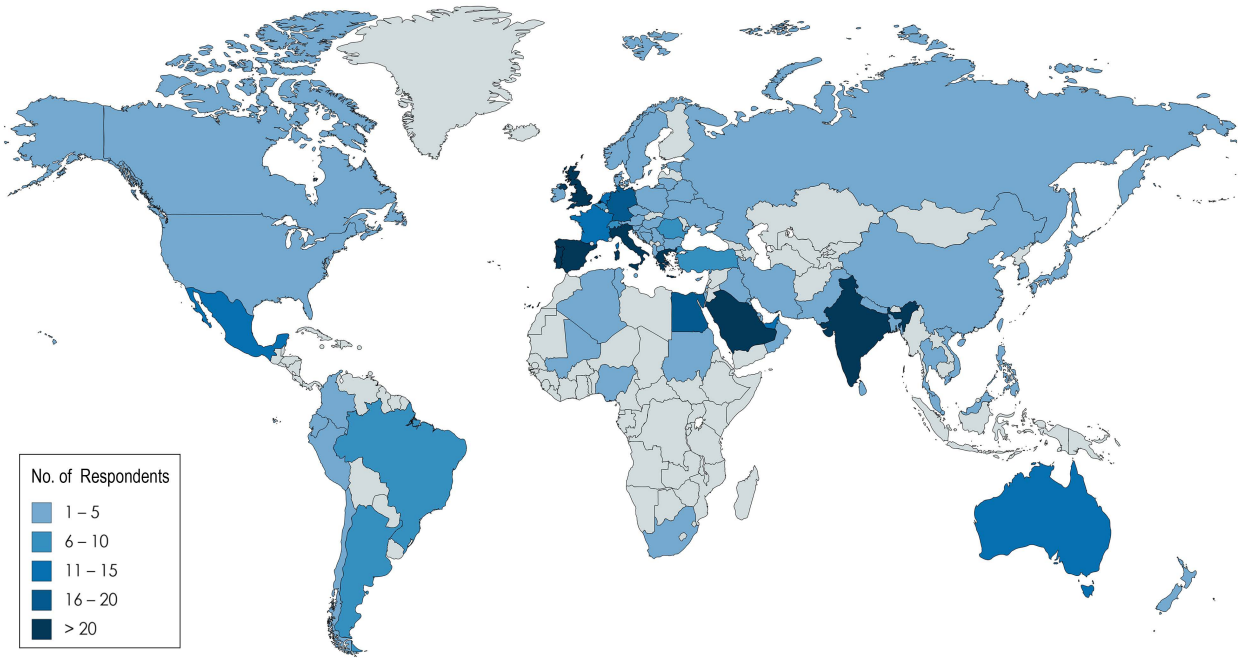
Figures:



eFig. 1 World map showing the countries and territories of the survey respondents.

(Map created at: www.mapchart.net)

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Tables:

eTable 1 Characteristics of Respondents who did and did Not Complete the Survey

Characteristic	Completed Survey *(N=466)*	Did Not Complete Survey *(N=91)**	*P*
Continent, *n (%)*			
Africa	28 (6)	11 (12.1)	
Asia	107 (23)	35 (38.5)	
Europe	274 (58.8)	37 (40.7)	***0.004***
North America	16 (3.4)	3 (3.3)	
Oceania	16 (3.4)	1 (1.1)	
South America	25 (5.4)	4 (4.4)	
Income Class, *n (%)*			
HICs	306 (65.7)	48 (52.7)	***0.023***
LMICs	160 (34.3)	43 (47.3)	
Years of practice, *median (IQR)*	10 (5 - 19)	7 (4 - 12)	***0.001***
ESICM membership, *n (%)*			
Member of ESICM	309 (66.3)	42 (46.2)	
Member of infection section	181 (38.8)	21 (23.1)	***0.003***
Not a member of infection section	128 (27.5)	21 (23.1)	
Not a member of ESICM	157 (33.7)	49 (53.8)	
Background Training, *n (%)*			
Critical Care as sole specialty	141 (30.3)	30 (33)	
Anaesthesia & Critical Care	166 (35.6)	40 (44)	0.170
Medicine & Critical Care	142 (30.5)	20 (22)	
Other	17 (3.6)	1 (1.1)	
ICU time, *n (%)*			
Full time	356 (76.4)	59 (84.3)	0.168
Part time	110 (23.6)	11 (15.7)	

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Characteristic	Completed Survey *(N=466)*	Did Not Complete Survey *(N=91)**	*P*
Hospital type, *n (%)*			
University/teaching hospital	295 (63.3)	41 (58.6)	0.712
Public non-teaching hospital	92 (19.7)	14 (20)	
Private hospital	77 (16.5)	15 (21.4)	
Other	2 (0.4)	0 (0)	
Hospital beds, *n (%)*			
< 200	64 (13.7)	15 (21.4)	0.195
200-499	187 (40.1)	31 (44.3)	
500-999	136 (29.2)	16 (22.9)	
> 1000	79 (17)	8 (11.4)	
ICU beds, *n (%)*			
≤ 10 beds	91 (19.5)	18 (25.7)	0.233
11-15	65 (13.9)	8 (11.4)	
16-20	67 (14.4)	6 (8.6)	
21-24	49 (10.5)	12 (17.1)	
>24	194 (41.6)	26 (37.1)	
ICU specialty, *n (%)*			
Medical ICU	55 (11.8)	10 (14.3)	0.827
Surgical ICU	27 (5.8)	3 (4.3)	
Neuro-ICU	6 (1.3)	2 (2.8)	
Cardiac/Cardiothoracic ICU	13 (2.8)	3 (4.3)	
Paediatric ICU	8 (1.7)	1 (1.4)	
Mixed ICU	357 (76.6)	51 (72.9)	

(*) 70 respondents completed pages 1& 2 (questions 1-9) and 21 respondents completed page 1 (questions 1-4) only.

HICs, High-Income Countries; LMICs, Low- and Middle-Income Countries; IQR, Interquartile Range; ESICM, European Society of Intensive Care Medicine; ICU, Intensive Care Unit.

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eTable 2 Knowledge about hospitals' microbiological diagnostic capabilities

	All (N=466)	Income Class			Background Training				Practice Years		
		HICs (N=306)	LMICs (N=160)	*P*	Critical Care Only (N=141)	Anesthesia & Critical Care (N=166)	Medicine & Critical Care (N=142)	*P*	≤10 years (N=246)	>10 years (N=220)	*P*
On a scale of 5, how you describe your knowledge about the microbiological diagnostic capabilities of your hospital?											
1 (Poor)	4 (0.9)	1 (0.3)	3 (1.9)		0 (0)	3 (1.8)	1 (0.7)		3 (1.2)	1 (0.5)	
2	31 (6.7)	9 (2.9)	22 (13.8)		10 (7.1)	15 (9)	4 (2.8)		22 (8.9)	9 (4.1)	
3	123 (26.4)	47 (24.2)	49 (30.6)	***< 0.001***	45 (31.9)	43 (25.9)	31 (21.8)	***0.026***	81 (32.9)	42 (19.1)	***< 0.001***
4	187 (40.1)	126 (41.2)	61 (38.1)		47 (33.3)	73 (44)	62 (43.7)		94 (38.2)	93 (42.3)	
5 (Very Good)	121 (26)	96 (31.4)	25 (15.6)		39 (27.7)	32 (19.3)	44 (31)		46 (18.7)	75 (34.1)	

HICs, High-Income Countries; LMICs, Low- and Middle-Income Countries.

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eTable 3 Initial antimicrobial therapy (AMT) decision

	All (N=466)	Income Class			Background Training				Practice Years		
		HICs (N=306)	LMICs (N=160)	*P*	Critical Care Only (N=141)	Anesthesia & Critical Care (N=166)	Medicine & Critical Care (N=142)	*P*	≤10 years (N=246)	>10 years (N=220)	*P*
The initial AMT decision is most likely based on											
National/International guidelines	178 (38.2)	123 (40.2)	55 (34.4)		47 (33.3)	71 (42.8)	53 (37.3)		95 (38.6)	83 (37.7)	
Local protocols	142 (30.5)	86 (28.1)	56 (35)		40 (28.4)	51 (20.7)	45 (31.7)		78 (31.7)	64 (29.1)	
Expert non-ICU opinion	20 (4.3)	11 (3.6)	9 (5.6)	0.316	13 (9.2)	2 (1.2)	4 (2.8)	***0.040***	11 (4.5)	9 (4.1)	0.333
Senior ICU opinion	109 (23.4)	76 (24.8)	33 (20.6)		34 (24.1)	38 (22.9)	35 (24.6)		50 (20.3)	59 (26.8)	
Junior ICU opinion	17 (3.6)	10 (3.3)	7 (4.4)		7 (5)	4 (2.4)	5 (3.5)		12 (4.9)	5 (2.3)	
Expert antimicrobial opinion available within 1 hour											
Yes (by senior ICU doctors)	266 (57.1)	183 (59.8)	83 (51.9)		88 (52.4)	87 (52.4)	83 (58.5)		116 (47.2)	150 (68.2)	
Yes (by non-ICU expert)	120 (25.8)	87 (28.4)	33 (20.6)	***< 0.001***	27 (19.1)	52 (31.3)	37 (26.1)	0.189	79 (32.1)	41 (18.6)	***< 0.001***
No	80 (17.2)	36 (11.8)	44 (27.5)		26 (18.4)	27 (16.3)	22 (15.5)		51 (20.7)	29 (13.2)	
How frequently non-ICU opinion is sought on the initiation of AMT											
More than 90% of cases	21 (4.5)	12 (3.9)	9 (5.6)		9 (6.4)	4 (2.4)	7 (4.9)		13 (5.3)	8 (3.6)	
50 - 90 % of cases	83 (17.8)	51 (16.7)	32 (20)		21 (14.9)	32 (19.3)	23 (16.2)		52 (21.1)	31 (14.1)	
In 25-50% of cases	101 (21.7)	71 (23.2)	30 (18.8)	0.588	28 (19.9)	43 (25.9)	30 (21.1)	0.720	59 (24)	42 (19.1)	***0.022***
<25%	231 (49.6)	154 (50.3)	77 (48.1)		70 (49.6)	78 (47)	75 (52.8)		112 (54.5)	119 (54.1)	
Never (0%)	30 (6.4)	18 (5.9)	12 (7.5)		13 (9.2)	9 (5.4)	7 (4.9)		10 (4.1)	20 (9.1)	

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	All (N=466)	Income Class			Background Training				Practice Years		
		HICs (N=306)	LMICs (N=160)	*P*	Critical Care Only (N=141)	Anesthesia & Critical Care (N=166)	Medicine & Critical Care (N=142)	*P*	≤10 years (N=246)	>10 years (N=220)	*P*
Specialties involved in initial AMT decision											
Infectious diseases doctors	163 (35)	107 (35)	56 (35)	1	51 (36.2)	56 (33.7)	47 (33.1)	0.846	86 (35)	77 (35)	1
Microbiologists	158 (33.9)	118 (38.6)	40 (25)	***0.004***	42 (29.8)	61 (36.7)	48 (33.8)	0.437	84 (34.1)	74 (33.6)	0.922
Pharmacists	82 (17.6)	48 (15.7)	34 (21.3)	0.159	32 (22.7)	25 (15.1)	21 (14.8)	0.131	50 (20.3)	32 (14.5)	0.114
Intensivists	450 (96.6)	398 (97.4)	152 (95)	0.189	136 (96.5)	161 (97)	137 (96.5)	0.957	236 (95.6)	214 (97.3)	0.458
Other	27 (5.8)	14 (4.6)	13 (8.1)	0.144	6 (4.3)	11 (6.6)	7 (4.9)	0.632	14 (5.7)	13 (5.9)	1

HICs, High-Income Countries; LMICs, Low- and Middle-Income Countries; ICU; Intensive Care Unit.

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eTable 4 Infectious diseases/microbiologists rounds & antimicrobial stewardship

	All (N=466)	Income Class			Background Training				Practice Years		
		HICs (N=306)	LMICs (N=160)	*P*	Critical Care Only (N=141)	Anesthesia & Critical Care (N=166)	Medicine & Critical Care (N=142)	*P*	≤10 years (N=246)	>10 years (N=220)	*P*
Frequency of infectious diseases/microbiologists rounds per week											
None or only on request	184 (39.5)	116 (37.9)	68 (42.5)		49 (34.8)	66 (39.8)	62 (43.7)		99 (40.2)	85 (38.6)	
Once per week	88 (18.9)	59 (19.3)	29 (18.1)		24 (17)	37 (22.3)	23 (16.2)		44 (17.9)	44 (20)	
2-3 times per week	83 (17.8)	53 (17.3)	30 (18.8)	0.367	27 (19.1)	34 (20.5)	22 (15.5)	0.130	44 (17.9)	39 (17.7)	0.966
4-5 times per week	75 (16.1)	49 (16)	26 (16.3)		29 (20.6)	19 (11.4)	23 (16.2)		41 (16.7)	34 (15.5)	
7 days a week	36 (7.7)	29 (9.5)	7 (4.4)		12 (8.5)	10 (6)	12 (8.5)		18 (7.3)	18 (8.2)	
Do you have an antimicrobial stewardship policy in your ICU?											
Yes	306 (65.7)	207 (67.6)	99 (61.9)		97 (68.8)	99 (59.6)	95 (66.9)		148 (60.2)	158 (71.8)	
No	131 (28.1)	75 (24.5)	56 (35)	***0.015***	35 (24.8)	52 (31.1)	43 (30.3)	0.130	73 (29.7)	58 (26.4)	***< 0.001***
I don't know	29 (6.2)	24 (7.8)	5 (3.1)		9 (6.4)	15 (9)	4 (2.8)		25 (10.2)	4 (1.8)	

HICs, High-Income Countries; LMICs, Low- and Middle-Income Countries; ICU; Intensive Care Unit.

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eTable 5 Perceptions regarding seeking non-ICU expertise

	All (N=466)	Income Class			Background Training				Practice Years		
		HICs (N=306)	LMICs (N=160)	*P*	Critical Care Only (N=141)	Anesthesia & Critical Care (N=166)	Medicine & Critical Care (N=142)	*P*	≤10 years (N=246)	>10 years (N=220)	*P*
At which point you feel you need most of the non-ICU expertise											
Initiation of Antibiotics	74 (15.9)	43 (14.1)	31 (19.4)	0.144	20 (14.2)	23 (13.9)	23 (16.2)	0.828	44 (17.9)	30 (13.6)	0.253
48/72 hours review	150 (32.2)	104 (34)	46 (28.8)	0.296	43 (30.5)	64 (38.6)	39 (27.5)	0.097	89 (36.2)	61 (27.7)	0.059
To adjust according to culture	182 (39.1)	119 (38.9)	63 (39.4)	0.921	52 (36.9)	66 (39.8)	54 (38)	0.872	109 (44.3)	73 (33.2)	***0.017***
Shifting from intravenous to oral	54 (11.6)	35 (11.4)	19 (11.9)	0.880	20 (14.2)	20 (12)	11 (7.7)	0.219	38 (15.4)	16 (7.3)	***0.006***
On discontinuation	96 (20.6)	63 (20.6)	33 (20.6)	1	19 (13.5)	47 (28.3)	24 (16.9)	***0.003***	63 (25.6)	33 (15)	***0.006***
Never required	94 (20.2)	62 (20.3)	32 (20)	1	36 (25.5)	18 (10.8)	37 (26.1)	***0.001***	31 (12.6)	63 (28.6)	***< 0.001***
Expert non-ICU opinion is most likely required in (patient group)											
Immunocompromised patients	295 (63.3)	200 (65.4)	95 (59.4)	0.225	80 (56.7)	128 (77.1)	79 (55.6)	***< 0.001***	152 (61.8)	143 (65)	0.501
Septic shock patients	108 (23.2)	63 (20.6)	45 (28.1)	0.083	33 (23.4)	52 (31.3)	18 (12.7)	***0.001***	65 (26.4)	43 (19.5)	0.099
Burn patients	45 (9.7)	25 (8.2)	20 (12.5)	0.140	10 (7.1)	20 (12)	13 (9.2)	0.332	27 (11)	18 (8.2)	0.348
Other	68 (14.6)	54 (17.6)	14 (8.8)	***0.012***	19 (13.5)	27 (16.3)	19 (13.4)	0.711	29 (11.8)	39 (17.7)	0.087
All equal	97 (20.8)	58 (19)	39 (24.4)	0.187	35 (24.8)	24 (14.5)	32 (22.5)	0.057	67 (27.2)	30 (13.6)	***< 0.001***
Never required	39 (8.4)	25 (8.2)	14 (8.8)	0.861	15 (10.6)	5 (3)	19 (13.4)	***0.003***	15 (6.1)	24 (10.9)	0.067
Expert non-ICU opinion is most likely required in (site of infection)											
Respiratory tract infection	131 (28.1)	70 (22.9)	61 (38.1)	***0.001***	47 (33.3)	42 (52.3)	37 (26.1)	0.240	84 (34.1)	47 (21.4)	***0.003***

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	All (N=466)	Income Class			Background Training				Practice Years		
		HICs (N=306)	LMICs (N=160)	*P*	Critical Care Only (N=141)	Anesthesia & Critical Care (N=166)	Medicine & Critical Care (N=142)	*P*	≤10 years (N=246)	>10 years (N=220)	*P*
Urosepsis	63 (13.5)	35 (11.4)	28 (17.5)	0.086	19 (13.5)	21 (12.7)	19 (13.4)	0.972	39 (15.9)	24 (10.9)	0.136
Abdominal sepsis	161 (34.5)	97 (31.7)	64 (40)	0.081	50 (35.5)	57 (34.3)	45 (31.7)	0.788	97 (39.4)	64 (29.1)	***0.020***
Post-operative or SSI	151 (32.4)	89 (29.1)	62 (38.8)	***0.037***	47 (33.3)	52 (31.3)	45 (31.7)	0.925	91 (37)	60 (27.3)	***0.029***
Blood stream infection	156 (33.5)	98 (32)	58 (36.3)	0.408	51 (36.2)	58 (34.9)	41 (28.9)	0.373	99 (40.2)	57 (25.9)	***0.001***
Non-surgical soft tissue infection	190 (40.8)	132 (43.1)	58 (36.3)	0.165	50 (35.5)	84 (50.6)	47 (33.1)	***0.003***	107 (43.5)	83 (37.7)	0.220
CNS infection	227 (48.7)	153 (50)	74 (46.3)	0.495	59 (41.8)	93 (56)	65 (45.8)	***0.035***	134 (54.5)	93 (42.3)	***0.009***
Other	81 (17.4)	63 (20.6)	18 (11.3)	***0.014***	29 (20.6)	22 (13.3)	27 (19)	0.199	26 (10.6)	55 (25)	***< 0.001***
Expert non-ICU opinion is most likely required in (Organism)											
All equal	72 (15.5)	42 (13.7)	30 (18.8)	0.177	20 (14.2)	23 (13.9)	23 (16.2)	0.828	47 (19.1)	25 (11.4)	***0.021***
MDR	119 (25.5)	74 (24.2)	45 (28.1)	0.372	36 (25.5)	48 (28.9)	32 (22.5)	0.441	70 (28.5)	49 (22.3)	0.137
XDR	200 (42.9)	140 (45.8)	60 (37.5)	0.094	42 (29.8)	85 (51.2)	67 (47.2)	***< 0.001***	120 (48.8)	80 (36.4)	***0.009***
PDR	258 (55.4)	181 (59.2)	77 (48.1)	***0.024***	73 (51.8)	103 (62)	77 (54.2)	0.161	140 (56.9)	118 (53.6)	0.514
Fungal infection	151 (32.4)	102 (33.3)	49 (30.6)	0.603	37 (26.2)	64 (38.6)	46 (32.4)	0.072	88 (35.8)	63 (28.6)	0.113
Viral infection	128 (27.5)	85 (27.8)	43 (26.9)	0.913	32 (22.7)	58 (34.9)	34 (23.9)	***0.028***	65 (26.4)	63 (28.6)	0.605
Other	8 (1.7)	4 (1.3)	4 (2.5)	0.455	4 (2.8)	2 (1.2)	2 (1.4)	0.515	1 (0.4)	7 (3.2)	***0.029***
None	37 (7.9)	20 (6.5)	17 (10.6)	0.148	19 (13.5)	2 (1.2)	14 (9.9)	***< 0.001***	12 (4.9)	25 (11.4)	***0.010***

HICs, High-Income Countries; LMICs, Low- and Middle-Income Countries; ICU, Intensive Care Unit; SSI, Surgical Site Infection; CNS, Central Nervous System; MDR, Multidrug-Resistant; XDR, Extensively Drug-Resistant; PDR, Pandrug-Resistant.

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eTable 6 Knowledge & Training

	All (N= 466)	Income Class			Background Training				Practice Years		
		HICs (N= 306)	LMICs (N= 160)	*P*	Critical Care Only (N= 141)	Anesthesia & Critical Care (N= 166)	Medicine & Critical Care (N= 142)	*P*	≤10 years (N= 246)	>10 years (N= 220)	*P*
Do you think the current level of knowledge and training in intensive care infectious diseases in the country you are practicing is adequate?											
Strongly Agree	36 (7.7)	28 (9.2)	8 (5)		14 (9.9)	11 (6.6)	9 (6.3)		17 (6.9)	19 (8.6)	
Agree	165 (35.4)	127 (41.5)	38 (23.8)		65 (46.1)	54 (32.5)	42 (29.6)		71 (28.9)	94 (42.7)	
Neither	93 (20)	59 (19.3)	34 (21.3)	***< 0.001***	19 (13.5)	33 (19.9)	36 (25.4)	***0.004***	46 (18.7)	47 (21.4)	***< 0.001***
Disagree	150 (32.2)	85 (27.8)	65 (40.6)		36 (25.5)	61 (36.7)	49 (34.5)		96 (39)	54 (24.5)	
Strongly Disagree	22 (4.7)	7 (2.3)	15 (9.4)		7 (5)	7 (4.2)	6 (4.2)		16 (6.5)	6 (2.7)	
Do you think there is more need for training in infectious diseases for intensive care doctors?											
Strongly Agree	264 (56.7)	151 (49.3)	113 (70.6)		84 (59.6)	102 (61.4)	69 (48.6)		165 (63.4)	108 (49.1)	
Agree	181 (38.8)	135 (44.1)	46 (28.8)		52 (36.9)	57 (34.3)	66 (46.5)		80 (32.5)	101 (45.9)	
Neither	17 (3.6)	16 (5.2)	1 (0.6)	***0.014***	5 (3.5)	6 (3.6)	5 (3.5)	0.711	7 (2.8)	10 (4.5)	0.423
Disagree	4 (0.9)	4 (1.3)	0 (0)		0 (0)	1 (0.6)	2 (1.4)		3 (1.2)	1 (0.5)	
Strongly Disagree	0 (0)	0 (0)	0 (0)		0 (0)	0 (0)	0 (0)		0 (0)	0 (0)	
How do you think more training will impact the service in your unit?											
Improve patients' outcome	367 (78.8)	225 (73.5)	142 (88.8)	***< 0.001***	111 (78.7)	133 (80.1)	109 (76.8)	0.773	194 (78.9)	173 (78.6)	1
Decrease cost	298 (63.9)	184 (60.1)	114 (71.3)	***0.019***	93 (66)	104 (62.7)	93 (65.5)	0.803	153 (62.2)	145 (65.9)	0.440

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	All *(N= 466)*	Income Class			Background Training				Practice Years		
		HICs *(N= 306)*	LMICs *(N= 160)*	*P*	Critical Care Only *(N= 141)*	Anesthesia & Critical Care *(N= 166)*	Medicine & Critical Care *(N= 142)*	*P*	≤10 years *(N= 246)*	>10 years *(N= 220)*	*P*
Decrease antimicrobial resistance	396 (85)	256 (83.7)	140 (87.5)	0.339	121 (85.8)	141 (84.9)	119 (83.8)	0.894	209 (85)	187 (85)	1
Save effort and/or time	172 (36.9)	104 (34)	68 (42.5)	0.086	54 (38.3)	60 (36.1)	54 (38)	0.912	89 (36.2)	83 (37.7)	0.773
Sole responsibility will improve communication with patients & relatives	62 (13.3)	28 (9.2)	34 (21.3)	***< 0.001***	20 (14.2)	15 (9)	24 (16.9)	0.114	29 (11.8)	33 (15)	0.340
Other	8 (1.7)	6 (2)	2 (1.3)	0.721	1 (0.7)	2 (1.2)	5 (3.5)	0.157	5 (2)	3 (1.4)	0.728

HICs, High-Income Countries; LMICs, Low- and Middle-Income Countries.

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eTable 7 Impact of medicolegal issues and defensive medicine on AMT decision

	All (N=466)	Income Class			Background Training				Practice Years		
		HICs (N=306)	LMICs (N=160)	*P*	Critical Care Only (N=141)	Anesthesia & Critical Care (N=166)	Medicine & Critical Care (N=142)	*P*	≤10 years (N=246)	>10 years (N=220)	*P*
Do you think medicolegal issues and defensive medicine are impacting antimicrobial prescription?											
Strongly Agree	102 (21.9)	61 (19.9)	41 (25.6)		32 (22.7)	39 (23.5)	26 (18.3)		56 (22.8)	46 (20.9)	
Agree	229 (49.1)	146 (47.7)	83 (51.9)		70 (49.6)	76 (45.8)	74 (52.1)		115 (46.7)	114 (51.8)	
Neither	66 (14.2)	44 (14.4)	22 (13.8)	***0.023***	18 (12.8)	26 (15.7)	21 (14.8)	0.967	31 (12.6)	35 (15.9)	0.111
Disagree	54 (11.6)	41 (13.4)	13 (8.1)		15 (10.6)	22 (13.3)	16 (11.3)		34 (13.8)	20 (9.1)	
Strongly Disagree	15 (3.2)	14 (4.6)	1 (0.6)		6 (4.3)	3 (1.8)	5 (3.5)		10 (4.1)	5 (2.3)	
In your opinion, by which mean medicolegal issues and defensive medicine are affecting antimicrobial prescription?											
Lower threshold to prescribe antibiotics	257 (55.2)	167 (54.6)	90 (56.3)	0.769	73 (51.8)	93 (56)	79 (55.6)	0.722	138 (56.1)	119 (54.1)	0.709
More antibiotic combinations	199 (42.7)	112 (36.6)	87 (54.4)	***< 0.001***	73 (51.8)	60 (36.1)	57 (40.1)	***0.018***	102 (41.5)	97 (44.1)	0.575
Longer course	204 (43.8)	130 (42.5)	74 (46.3)	0.491	62 (44)	81 (48.8)	52 (36.6)	0.098	103 (41.9)	101 (45.9)	0.401
Less frequent de-escalation	213 (45.7)	140 (45.8)	73 (45.6)	1	69 (48.9)	74 (44.6)	61 (43)	0.578	111 (45.1)	102 (46.4)	0.852
Seeking non-ICU expertise	99 (21.2)	63 (20.6)	36 (22.5)	0.635	33 (23.4)	37 (22.3)	26 (18.3)	0. 543	52 (21.1)	47 (21.4)	1
Other	11 (2.4)	11 (3.6)	0 (0)	***0.019***	4 (2.8)	5 (3)	2 (1.4)	0.621	5 (2)	6 (2.7)	0.763

HICs, High-Income Countries; LMICs, Low- and Middle-Income Countries; AMT, Antimicrobial Therapy.