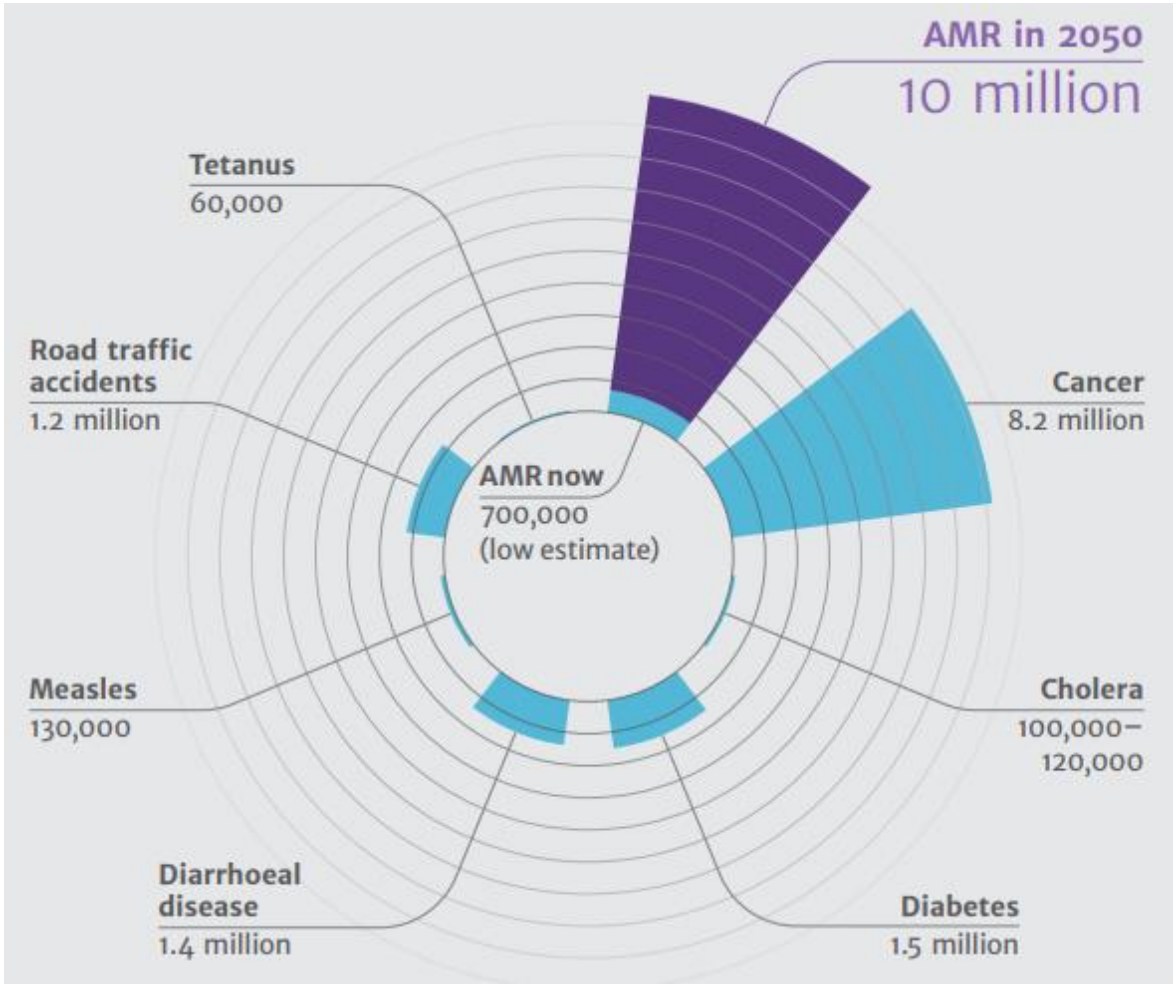
Antimicrobial Resistance (AMR) Countermeasures and Surveillance

Tokyo Metropolitan Government
Bureau of Public Health

Introduction

- At the Countermeasures to Combat Infectious Diseases in Asia (CCIDA) Project small meeting held on December 19, we have reported on the Japan's AMR countermeasures, including the following:
  - Data on antibiotic usage was published in the “One Health Trend Survey Report 2018.”
  - The total amount of antibiotics used in Japan has decreased by 7% compared to 2013, and the use of broad-spectrum oral antibiotics has also decreased by 10%.
  - On the other hand, although on the decline, the resistance rates of Staphylococcus aureus and Pseudomonas aeruginosa are still not close to their targets.
- Today we will report on AMR trends in Tokyo and the efforts of Tokyo Metropolitan Government (TMG).

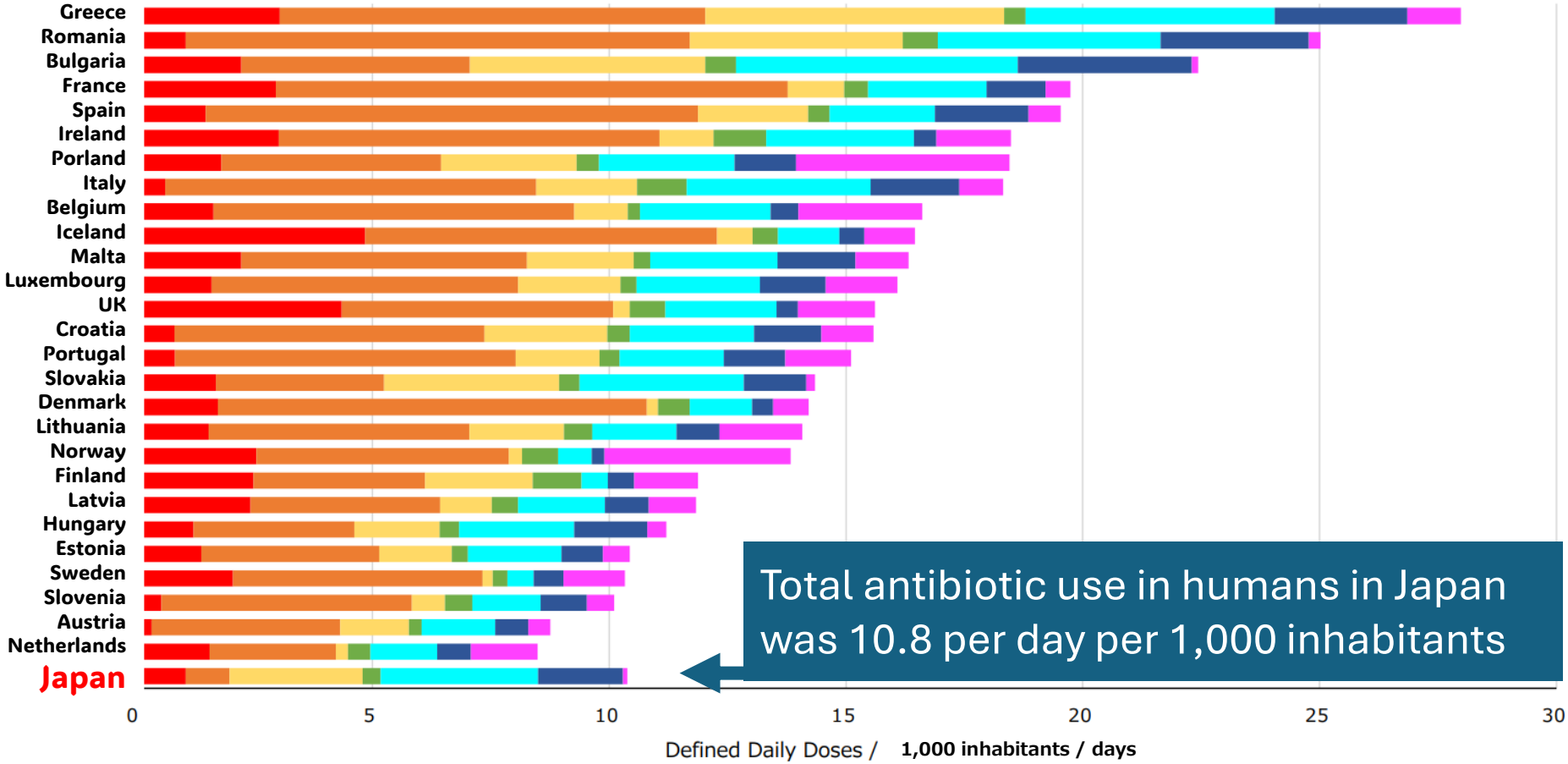
Deaths attributable to AMR every year compared to other major causes of death



- As of 2013, a low estimate of 700,000 people died from AMR worldwide.
- If no countermeasures are taken, it is estimated that 10 million people will die worldwide from resistant bacteria by 2050. This will exceed the current number of cancer deaths.
- It is estimated that the number of deaths due to drug-resistant bacteria will be limited to 700,000 in Europe and the United States, with the majority occurring in Africa and Asia.

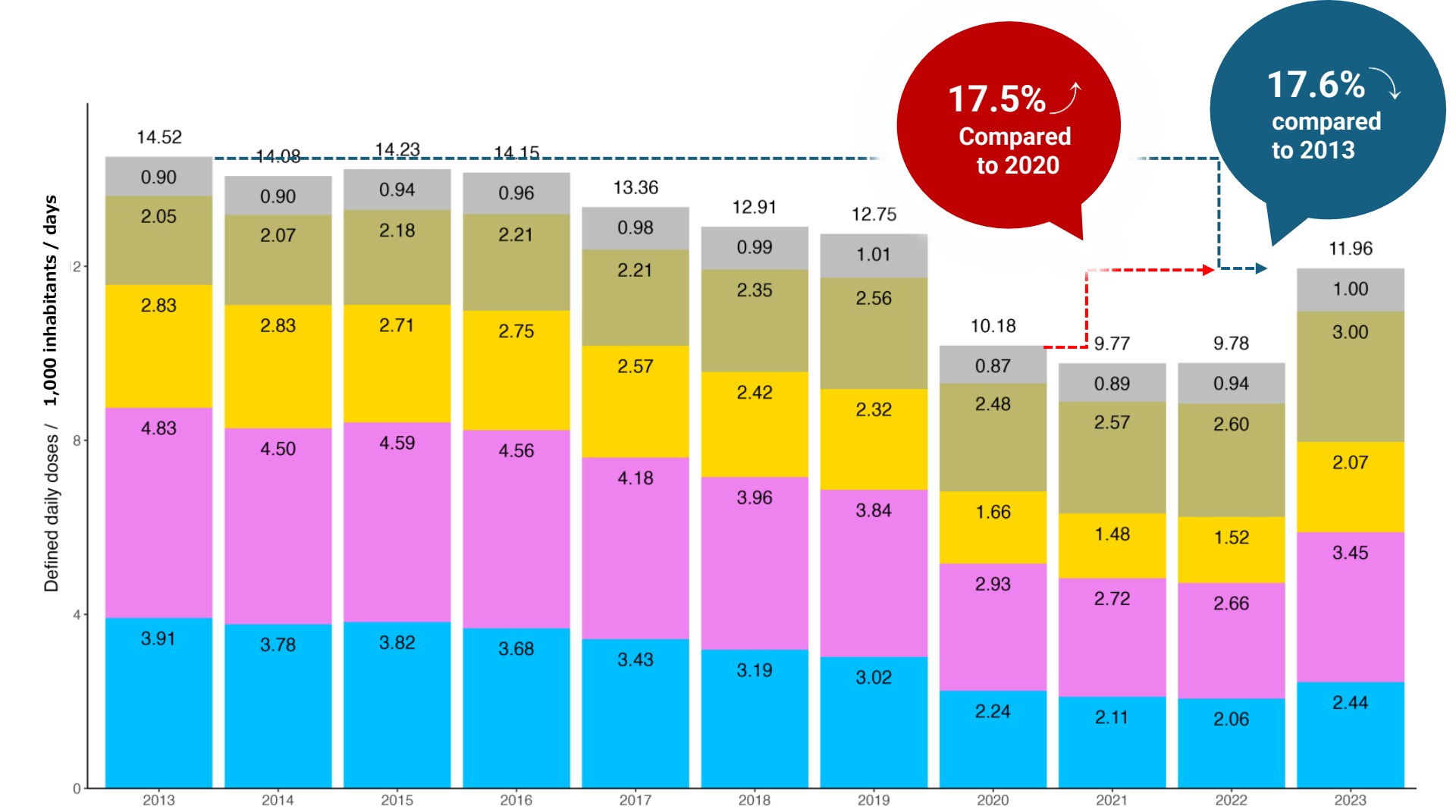
Antimicrobial Resistance: Tackling a crisis for health and wealth of nations, the O'Neill Commission, UK, Dec. 2014
https://amr-review.org/sites/default/files/AMR%20Review%20Paper%20-%20Tackling%20a%20crisis%20for%20the%20health%20and%20wealth%20of%20nations_1.pdf

Comparison of antibiotic use for humans in EU countries and Japan(2020)



- Tetracycline
- Penicillin
- Cephalosporins and other beta-lactams
- Sulfonamide / Trimethoprim
- Macrolides, Lincosamides and Streptomycin
- Quinolones
- Other antibiotics

- According to the 2020 Japan Society of Antibiotic Use (JSAC) report, the amount of antibiotics used by humans in **Japan** in 2020 was approximately **10.8 times** per 1,000 people per day, which is **lower** than that of developed countries in the European Union (EU) and a low level compared to other countries.
- However, regarding the use of antibiotics, the use of **oral cephalosporins, fluoroquinolones, and macrolides**, which are effective against a wide range of bacteria, is **higher** than in other countries, and the use of penicillins is lower.



- “Intravenous” antibiotics
- Other “oral” antibacterial agents
- “Oral” Fluoroquinolones
- “Oral” Macrolides
- “Oral” Cephalosporins

The amount of antibiotics used in 2023 increased by 17.5% compared to 2020.

Source: AMR Clinical Reference Center

AWaRe

WHO “AWaRe” system for antimicrobial stewardship

ACCESS GROUP

- first or second choice antibiotics
- offer the best therapeutic value, while minimizing the potential for resistance

WATCH GROUP

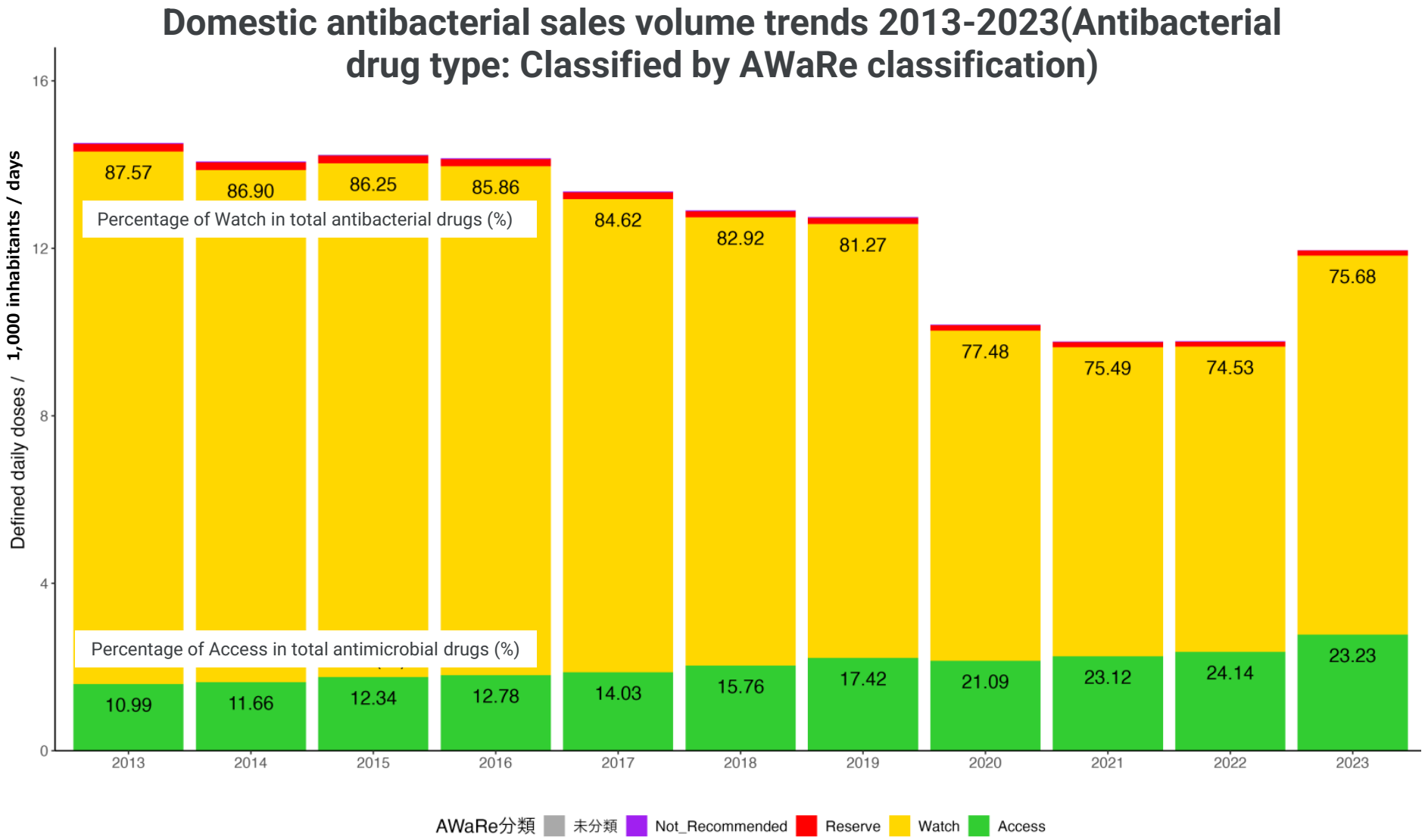
- first or second choice antibiotics
- only indicated for specific, limited number of infective syndromes
- more prone to be a target of antibiotic resistance and thus prioritized as targets of stewardship programs and monitoring

RESERVE GROUP

- “last resort”
- highly selected patients (life-threatening infections due to multi-drug resistant bacteria)
- closely monitored and prioritized as targets of stewardship programs to ensure their continued effectiveness

Target: “Access” drugs, 60%

Citation: AMR Clinical Reference Center



Although the "Access" ratio is not reaching the target of 60%, the "Watch" ratio is decreasing.

Source: AMR Clinical Reference Center

International comparison of antimicrobial resistance rates in major microorganisms showing tendency toward antimicrobial resistance in humans (2020)

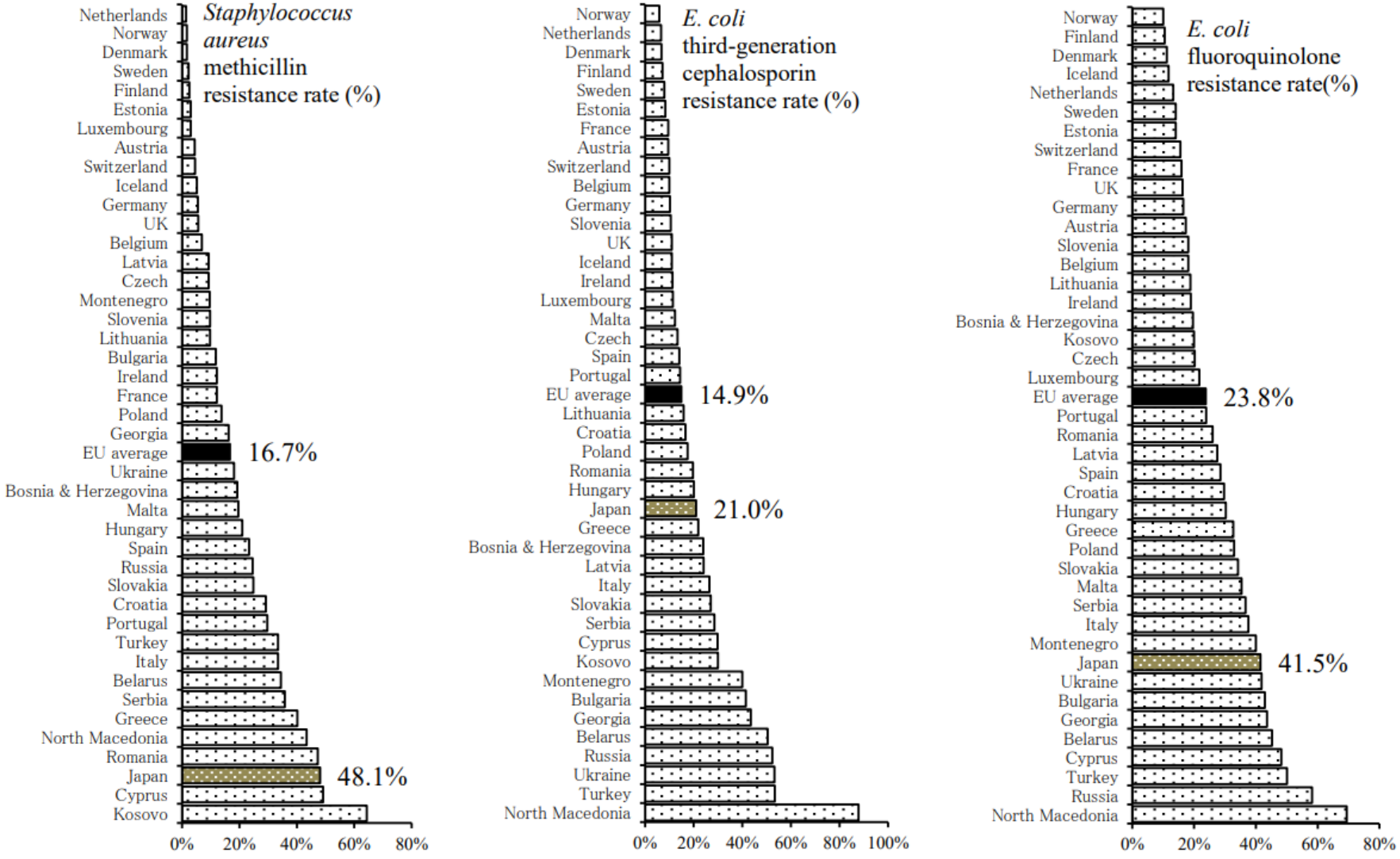


Figure shows that the antimicrobial resistance rates in methicillin-resistant Staphylococcus aureus (**MRSA**) and **third-generation cephalosporin-resistant E. coli** are **higher in Japan** than in other countries.

Infectious disease outbreak trend survey

Extact of drug-resistant bacteria-related diseases from all category 5 diseases

<Tokyo Metropolitan> Category 5 diseases and drug-resistant bacteria

	2015	‘16	‘17	‘18	‘19	‘20	‘21	‘22	‘23	‘24
Carbapenem-Resistant Enterobacteriaceae bacterial infection	**236**	**190**	**212**	**233**	**237**	**171**	**210**	**208**	**228**	**209**
Vancomycin-Resistant Staphylococcus Aureus infection	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Vancomycin-Resistant Enterococcus infections	**2**	**2**	**8**	**7**	**8**	**8**	**12**	**8**	**9**	**7**
MultiDrug-Resistant Acinetobacter infections	**13**	**1**	**6**	**4**	**2**	**0**	**1**	**2**	**3**	**1**

- VRE cases have increased since 2017, reaching 113 cases in 2023. The goal is to maintain the 2019 number of **8 cases**.
- As for CRE, PCR testing for carbapenemase genes is being conducted on strains isolated from notified cases as per a notification from the Ministry of Health, Labor and Welfare in March 2019.

Infectious disease outbreak trend survey #2

Category 5 diseases Excerpts of diseases related to drug-resistant bacteria

<Tokyo Metropolitan> Category 5 fixed point monitoring diseases

		2015	'16	'17	'18	'19	'20	'21	'22	'23	'24
Methicillin-Resistant Staphylococcus Aureus infection	Number of reports	877	867	881	804	894	823	814	731	693	730
	Per fixed point	**35.08**	**34.68**	**35.24**	**32.16**	**35.76**	**32.92**	**32.56**	**29.24**	**27.72**	**29.20**
Penicillin-Resistant Streptococcus Pneumoniae infections	Number of reports	158	138	105	102	96	22	42	40	71	58
	Per fixed point	**6.32**	**5.52**	**4.20**	**4.08**	**3.84**	**0.88**	**1.68**	**1.60**	**2.84**	**2.32**
MultiDrug-Resistant Pseudomonas aeruginosa infections	Number of reports	28	22	3	9	8	7	5	8	8	8
	Per fixed point	**1.12**	**0.88**	**0.12**	**0.36**	**0.32**	**0.28**	**0.20**	**0.32**	**0.32**	**0.32**

- Number of Methicillin-resistant Staphylococcus aureus (**MRSA**) patients has been on the **decline**.
- Penicillin-resistant Streptococcus pneumoniae (**PRSP**) infections temporarily decreased due to the routine administration of pneumococcal vaccines (for children in 2013 and for the elderly in 2014), but has been increasing since the coronavirus outbreak.

Number and Ratio of MRSA isolated patients

Antimicrobial resistance (AMR) action plan (2023-2027)
<2027 target value> Staphylococcus aureus methicillin resistance rate **20% or less**

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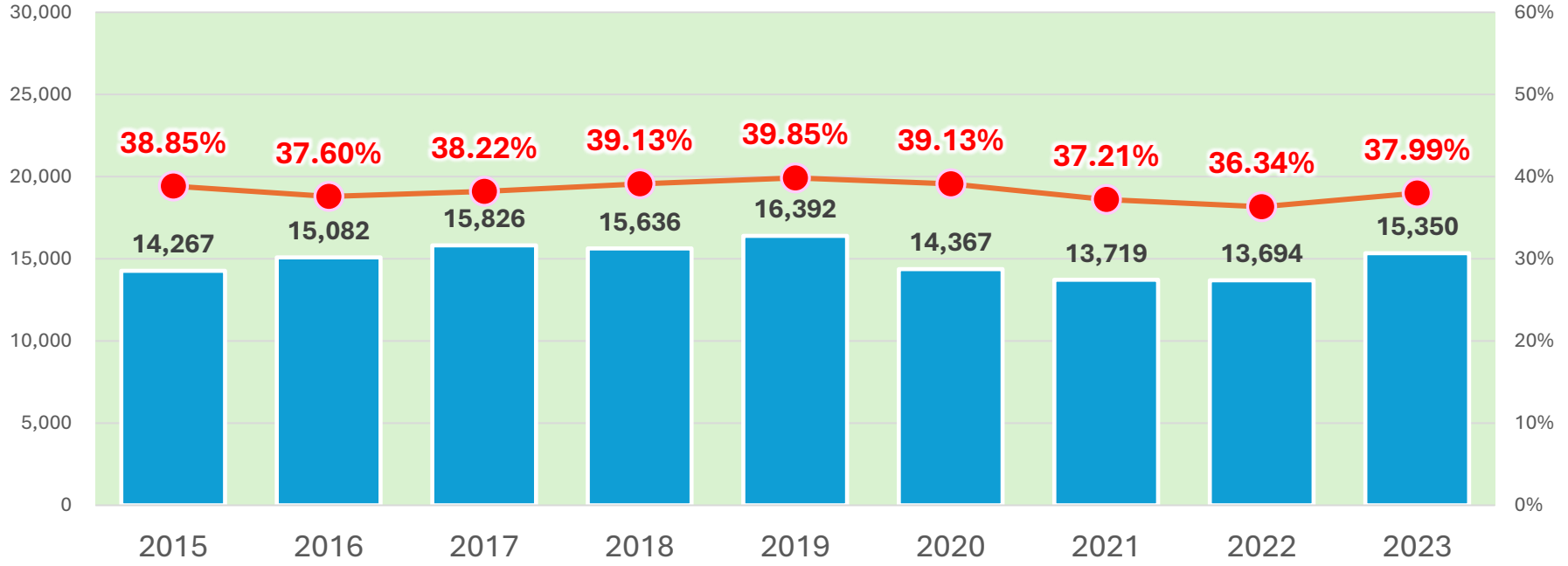

- **The methicillin resistance rate of Staphylococcus aureus(MRSA) is approximately 40%, which is higher than in developed countries (EU: 16.7% (2020)).**
- **In the UK, measures were strengthened over a five-year period from 2006, resulting in a 5% annual decrease. The rate of decline in the isolation rate of MRSA in Japan has slowed.**

Carbapenem-resistant Pseudomonas aeruginosa

Antimicrobial resistance (AMR) action plan (2023-2027)
<2027 target> Carbapenem resistance rate of Pseudomonas aeruginosa **3% or less**

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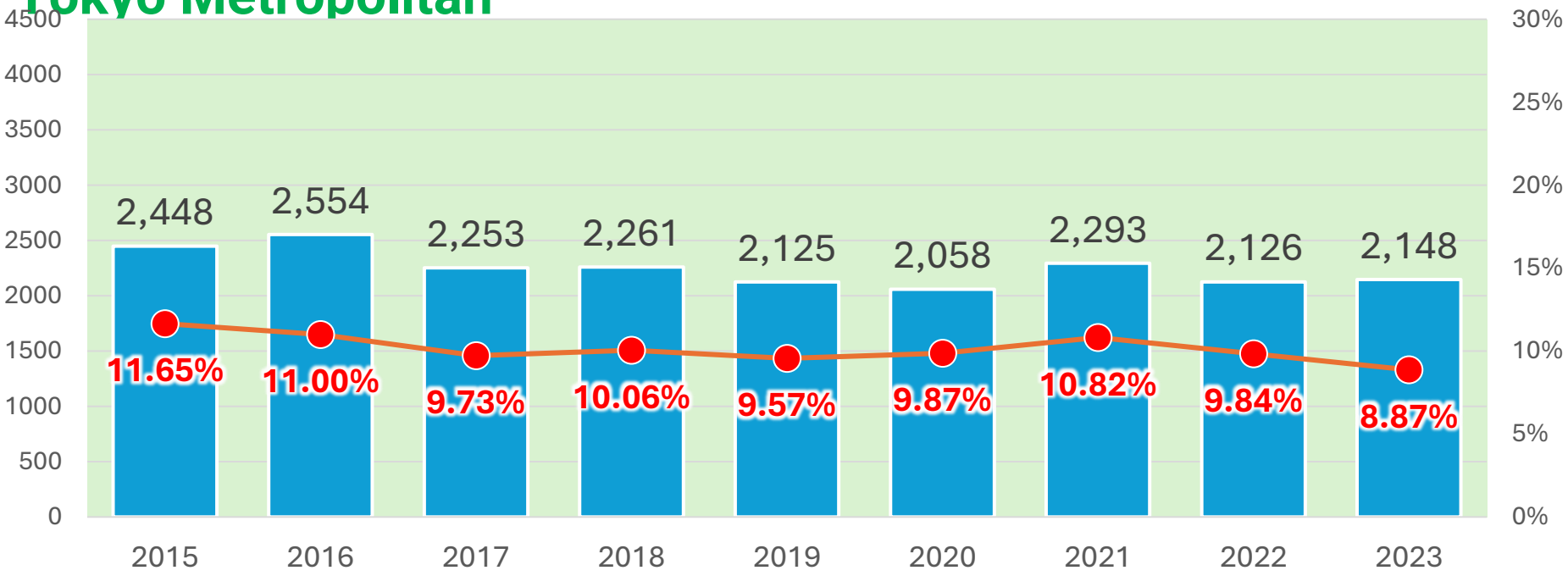

- **The carbapenem resistance rate of Pseudomonas aeruginosa (8.87%) is not high compared to other countries.**
- **It has been reduced to less than 10% by 2023.**
- **To achieve the target (3% or less), the reduction rate needs to accelerate to 1-2% per year.**

Fluoroquinolone resistance rate of Escherichia coli

Antimicrobial resistance (AMR) action plan (2023-2027)

< 2027 target value > Fluoroquinolone resistance rate of E. coli: **30% or less (maintained)**

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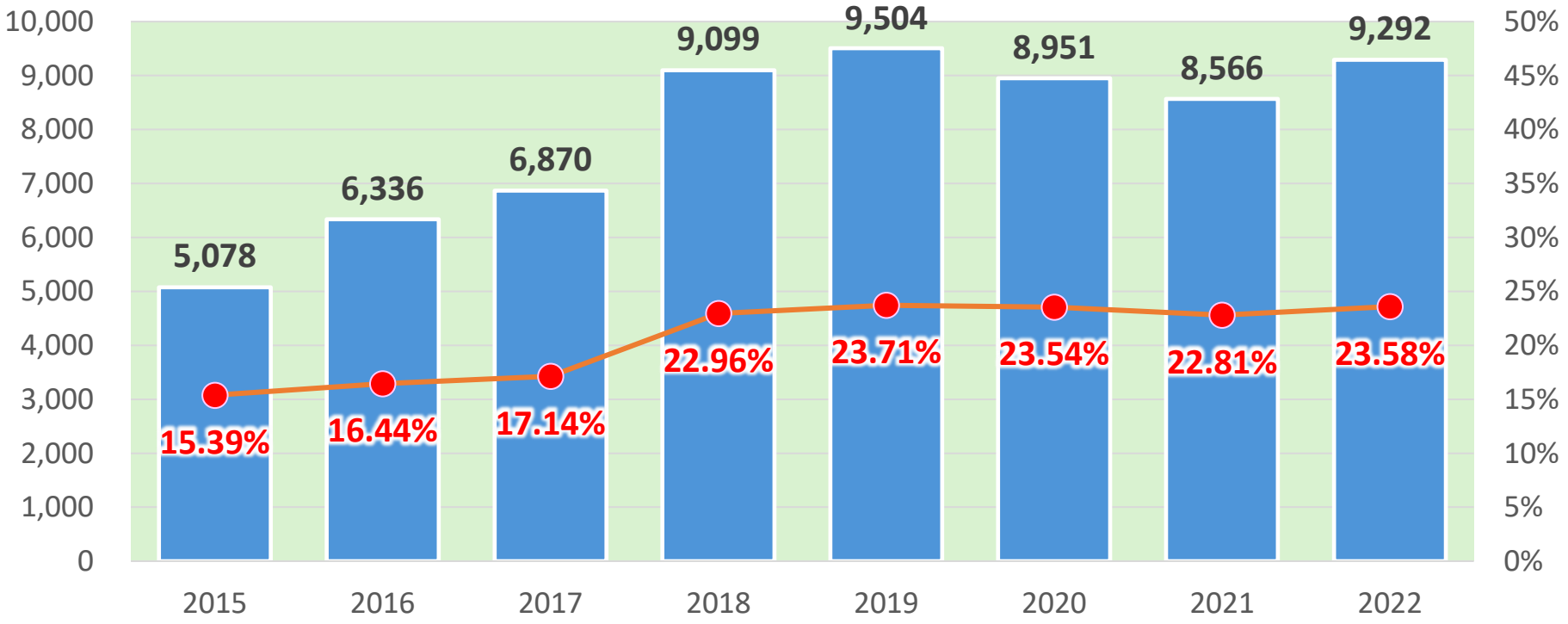
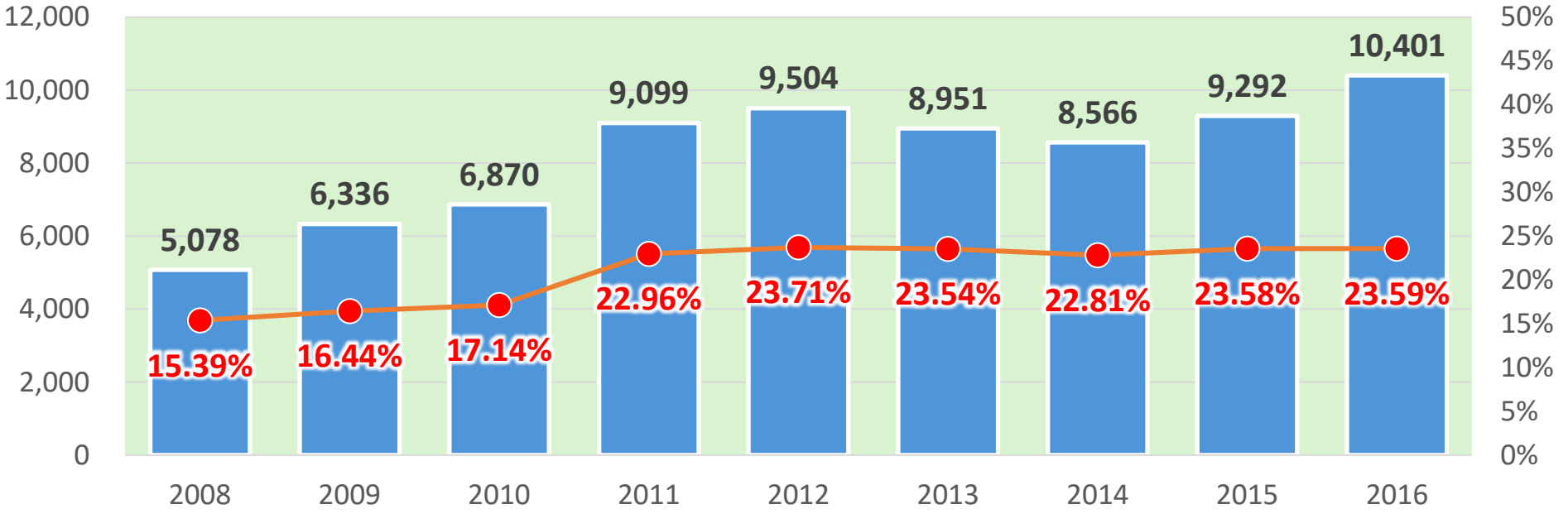


- **Fluoroquinolone resistance rate of Escherichia coli is highly correlated with the use of quinolone antibiotics.**
- **The resistance rate is higher than in other countries (EU: 23.8%).**

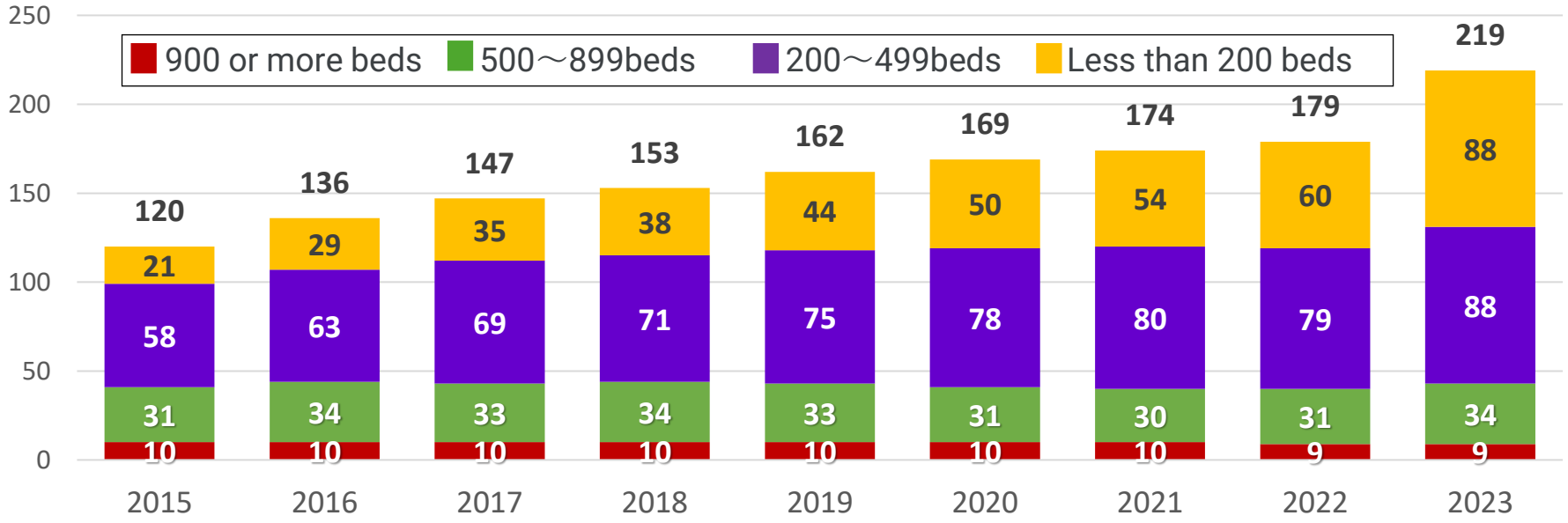
Third-generation cephalosporin resistance rate of Escherichia coli

Tokyo Metropolitan



- Reflects the increase in bacteria carrying the ESBL gene. The resistance rate is higher than in other countries (EU: 14.9% (2020)).
- The increase has slowed in recent years as chickens, pigs and cows are monitored at livestock farms. ESBL-producing ST-131 strains, which are transmitted between humans, animals, and the environment, are spreading around the world.
- The Tokyo metropolitan government is analyzing the ST-131 strain from domestically produced, imported food (chicken), and E. coli from rivers.

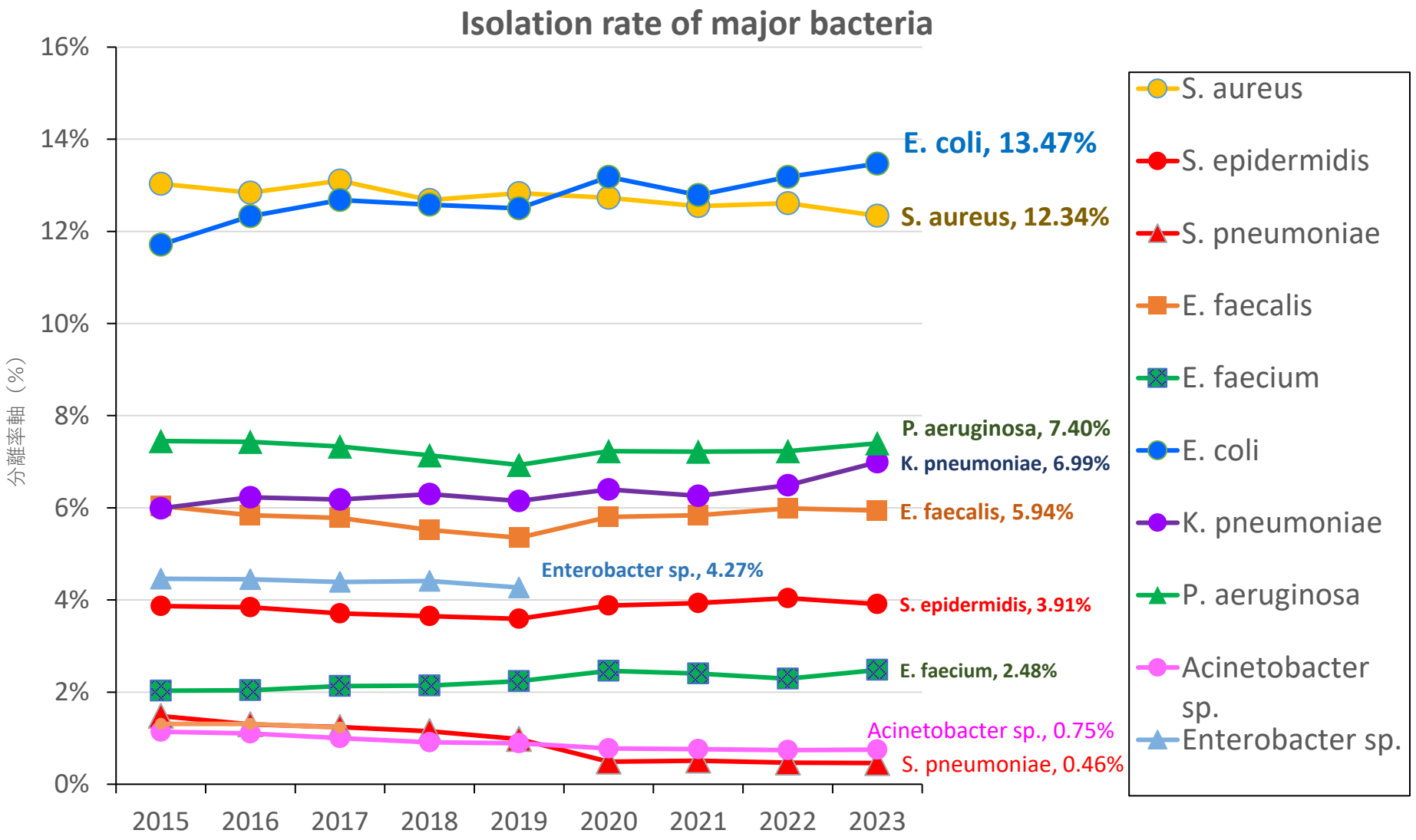
Number of medical institutions subject to data collection (Tokyo)



■ **Number of medical institutions submitting JANIS data in 2023 (219 medical institutions, Tokyo)**

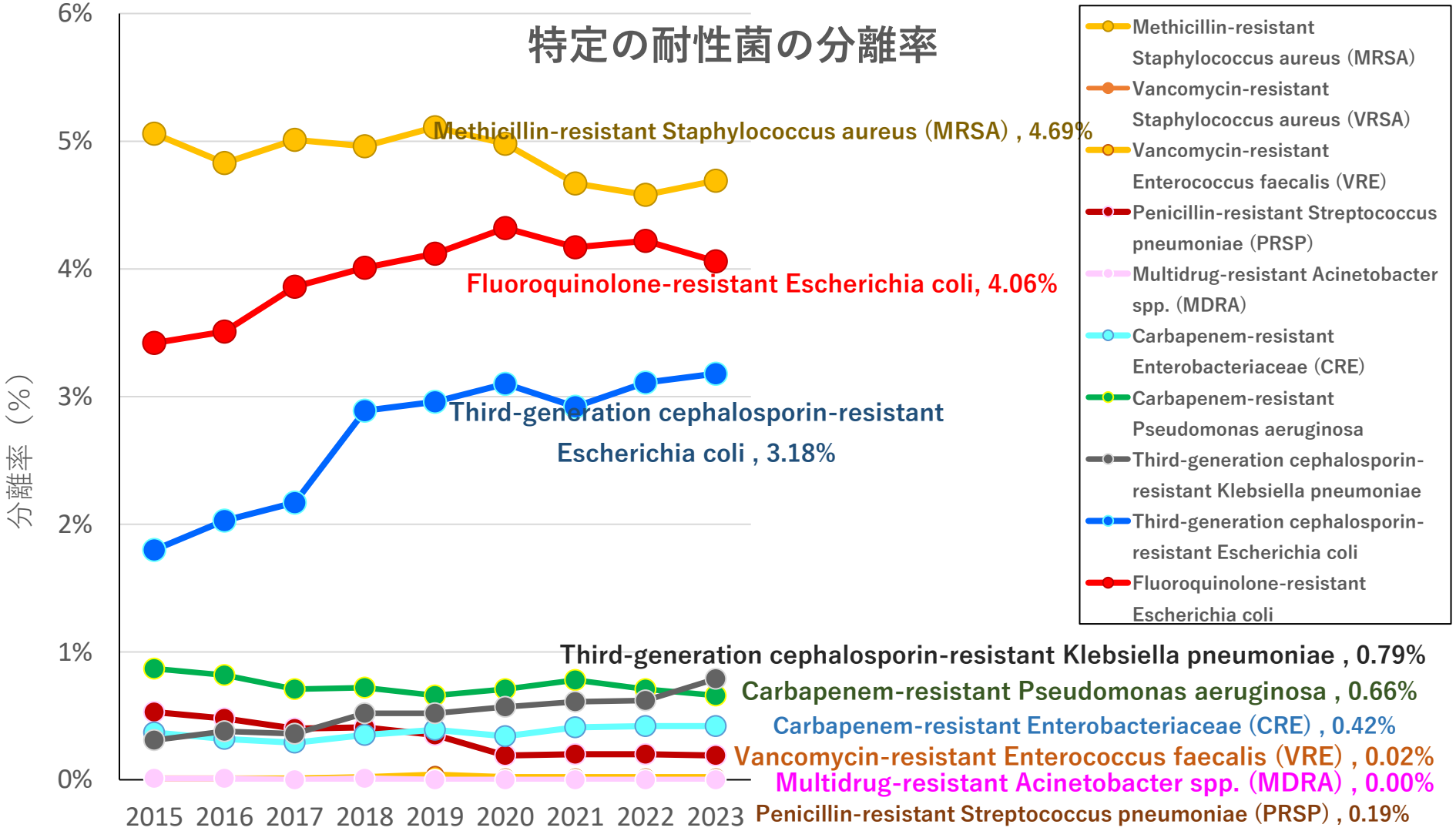
	Number of Hospitals in Tokyo	Number of hospitals participating in the surveillance	%
900 or more beds	10	9	90.0%
500～899beds	36	34	94.4%
200～499beds	146	88	60.3%
Less than 200 beds	437	88	**20.1%**
Total	629	219	34.8%

Annual trends in the isolation rate of “major bacteria” (Tokyo)



In 2020, E. coli surpassed S. aureus to become the most commonly isolated pathogen.

Isolation rate of certain resistant bacteria (Tokyo)



- The rate of decline in the isolation rate of MRSA is slowing down.
- The isolation rate of fluoroquinolone-resistant E. coli has increased significantly.
- In 2018, the isolation rate of third-generation cephalosporin-resistant E. coli increased due to changes in criteria.

Incentives for medical facilities: Medical treatment fee "Hospital infection control improvement surcharge“ – Tokyo Metropolitan

1 point = 10 yen

Additional reimbursement for initial visit/revisit			Number of facilities	
Additional fee for reinforcing infection control measures	**Addition 1**	710point	**114**	**Priority medical institutions** for new coronas
Additional fee for Enhanced guidance<Option>		+30point		
Additional fee for reinforcing infection control measures	**Addition 2**	175point	**113**	**Priority or cooperating medical institutions** for new coronas
Additional fee for strengthening cooperation<Option>		+30point		
Additional fee for enhanced surveillance<Option>		+5point		
Additional fee for reinforcing infection control measures	**Addition 3**	75point	**140**	**Priority medical institutions, cooperating medical institutions, or medical examination institutions** for new coronas
Additional fee for strengthening cooperation<Option>		+30point		
Additional fee for enhanced surveillance<Option>		+5point		
Additional fee for improvement of outpatient infection control measures		6point	**3,536**	**Medical examination medical institution related** to new corona
Additional fee for strengthening cooperation<Option>		+3point		
Additional fee for enhanced surveillance<Option>		+1point		

Additives 1 and 2 are calculated on the first day of hospitalization, and Addititive 3 is calculated once per first day of hospitalization and each time the length of hospitalization exceeds 90 days. The additional fee for improving outpatient infection control measures may be calculated once a month.

Training for hospital infection control leaders

Online training session produced by Tokyo Metropolitan Government

東京都受託事業 令和6年度

東京都感染対策リーダー養成研修のご案内

東京都看護協会では、東京都からの委託を受け、都内医療機関における感染対策のリーダー的役割を担うことができる人材育成を目的に「東京都感染対策リーダー養成研修」を計画いたしました。
本研修では、感染症ならびに感染対策に必要な知識・技術を修得した指導的役割を担う感染対策リーダーを養成して都内医療機関における感染対策の向上を目指します。令和4年度から3年間の計画で実施して参りました本研修事業は今回が最終年度となります。これまでに本研修を受講していないご施設からの積極的なお申込みをお待ちしております。
ご施設の感染対策の強化、感染対策に関わる人材育成にぜひご活用ください。

修了者の声

自施設にとってこの研修はレベルが高いのではないかと不安に感じていたが、手指衛生やPPEの着脱等現場に活かせる内容が多くあった。感染対策の課題が見いだせた半面、できていることも見え自信につながった。（看護師）

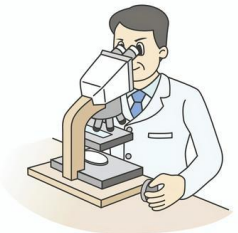
演習では他の病院の現状や取り組みなどを聞くことができ大変参考になった。普段はPPEを着用する機会がないため、実際に着脱練習をして、手順や根拠など指導方法のポイントを理解できた。（薬剤師）

臨床検査技師として感染対策を任され不安だったが、基礎から学ぶことができ、疑問の解決ができた。研修内容・学びを自施設の感染対策マニュアルの見直しに活用することができた。また、自信をもって指導に当たれるようになった。（臨床検査技師）

目的	施設内感染対策の取り組みに対して、リーダーシップを発揮できる人材の育成 ・感染症、感染対策に関する基本的な知識・技術をアップデートできる ・自施設内の感染対策の取り組みを考えリーダーとして実践的な指導ができる
対象	都内医療機関に勤務する看護職・薬剤師・臨床検査技師
参加要件	① 感染対策リーダー、または今後リーダーを担う予定の者 ② 病院長等からの推薦者
定員	200名 定員を超えた応募があった場合は、選考となります。同一施設から複数応募いただいた場合には、調整させていただきます。
修了証	講義・演習の全時間数を出席・視聴、期日までに課題提出をされた方に修了証を発行します。
研修方法	オンライン研修 ライブ配信型（Zoom予定） 演　習 集合研修　会場　公益社団法人東京都看護協会 オンデマンド研修 eラーニングシステム使用
申込期間	令和6年7月1日(月) 9:00 ～ 7月31日(水) 17:00
申込方法	東京都受託事業「東京都感染対策リーダー養成研修」の専用フォームからお申し込みください。 URL https://www17.webcas.net/form/pub/tna/kansen_l

受講料 無料

- **Title:** Tokyo Infection Control Leader Training Course
- **Audience:** Nurses, pharmacists, and clinical laboratory technicians working in hospitals.
- **Lecture format:** Online training, on-site training.
- **Period:** 20th September to 31st December 2024
- **Classes:** 40 classes (30 hours)



November is AMR Awareness Month in Japan.

Awareness-raising event for residents about AMR.

Awareness poster

一般部門
金賞

ただの風邪
抗菌薬の
出番なし

ぱたこ

（English Translation）
“Just a cold,
no antibiotics needed“

Poster Exhibition

Laboratory Tour

※ **Senryu** are a kind of short poem that arose in Edo in the mid-eighteenth century.

Explanatory document regarding AMR in the high school health textbook

特設⑫ 発展

新たな脅威～薬剤耐性菌～

A HEALTH THREAT: ANTIMICROBIAL RESISTANCE"

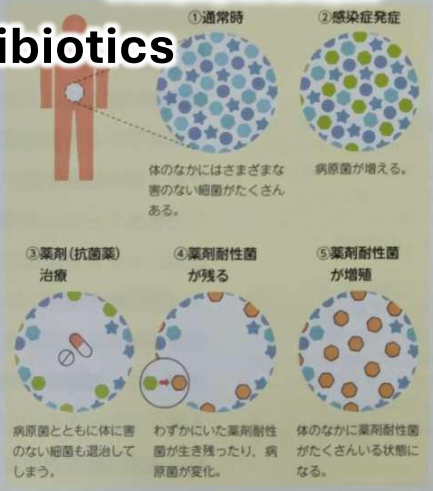
1 抗菌薬の誕生

(1)Discovery of Antibiotics

1928年，イギリス人の細菌学者フレミングは，[illegible]のまわりにだけ，ブドウ球菌が増殖していないことに気がつきました。カビが産生する物質にブドウ球菌を殺す作用があることを発見したのです。フレミングは，この物質をペニシリンと名づけ，その後，研究が進み，ペニシリンを粉末状に分離し，人間の感染症に治療効果をもつ抗菌薬*が誕生しました。ペニシリンの登場により，肺炎や敗血症，梅毒など，これまで治療できなかった多くの感染症の治療が可能になったのです。こうして，日本でも感染症による死亡者は減り続けています。

細菌学者 アレクサンダー・フレミング

資料1 薬剤[illegible]



2 薬剤耐性菌とは

(2) What are drug resistant bacteria?

[illegible]では，感染症はすでに過去の病気なのでしょうか。[illegible]るのです。薬剤耐性菌は，ペニシリンなどの抗菌薬を投与しても，死なない細菌のことです。細菌もさまざまな手段を使って薬剤から逃[illegible]め，抗菌薬の使用が増えるにつれて，抗菌薬が効かない細菌も増えているのです。薬剤耐性をもった細菌が，人間や動物を介して世界中に広がると，かつて，痘そうやペストで多くの人々が死亡した時代に逆戻りすることになります。実際，2050年には，世界中で1,000万人が薬剤耐性菌で死亡し，がんによる死亡者数を超えるという予測もあるのです。WHOは2011年に“No action today, no cure tomorrow（今日動かなければ，明日の治療はない）”と宣言し，薬剤耐性菌を世界中で取り組むべき課題としました。

薬剤耐性菌は 資料1 のような流れで生まれます。抗菌薬を使用すると必ず薬剤耐性菌が生まれるわけではありませんが，抗菌薬を使う機会が多いほど，発生の可能性は高まります。

3 私たちにできること

(3)What we can do to prevent AMR

薬剤耐性菌を増やさないために，私たちにもできることがあります。

❶ 不必要な抗菌薬は飲まない

[illegible]ますが，その大きさやしくみは異なります。抗菌薬は，細菌に対して効果を発揮する薬なので，ウイルンザは，細菌ではなくウイルスが原因です。それにもかかわらず，かぜのときに病院で抗菌薬をもらおうとしたり，家に残っている抗菌薬を飲んだりしたことはないでしょうか。必要がないときの抗菌薬の使用は，薬剤耐性菌の発生の可能性を高めます。

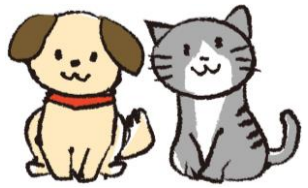
❷ 抗菌薬は医師の指示どおりに服用する

抗菌薬が処方された際，症状がよくなったからと，自分の判断で途中で服用をやめてしまったことはありませんか。症状がよくなった場合でも，体内に細菌が残っていることがあります。治療が終わらないうちに抗菌薬の服用をやめると，症状がぶりかえしたり，薬剤耐性菌が発生しやすくなったりします。用法・用量も含めて，医師や薬剤師の指示どおりに服用することが大切です。

Tokyo Metropolitan Institute of Public Health
東京都健康安全研究センター

Research contributing to AMR countermeasures

1. Understanding the current status and genome analysis of drug-resistant bacteria in humans and companion animals
2. Research into the isolation status and epidemiological analysis of drug-resistant bacteria derived from food and the environment
3. Development of new test methods and investigation of the actual status of residues of highly polar antimicrobial drugs in livestock foods
4. Development of analytical methods for antimicrobial drugs in agricultural foods and understanding the actual status of their residues
5. Elucidation of the current status of agricultural fungicides in environmental water and their behavior after water purification treatment, etc.



Ann. Rep. Tokyo Metr. Inst. Pub. Health, 75, 901-917, 2024

Conclusions

In order to promote measures against antimicrobial resistance (**AMR**), we have worked together to intensively with stakeholders in the following **5 areas**:

① **PUBLIC AWARENESS & EDUCATION**

② **SURVEILLANCE & MONITORING**

③ **INFECTION PREVENTION & CONTROL**

④ **ANTIMICROBIAL STEWARDSHIP**

⑤ **RESEARCH**