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par **Anaïs ESSILINI**

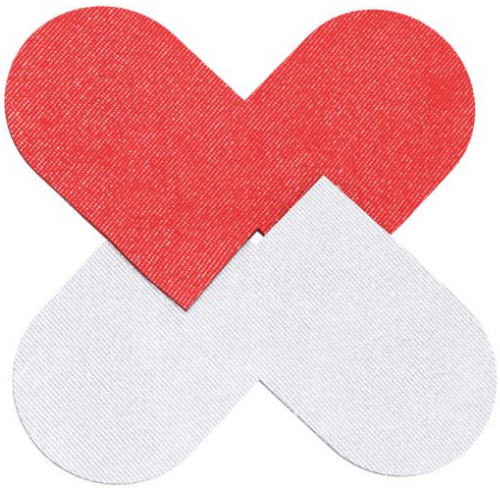
Sous la direction des Pr Nathalie Thilly et Pr Céline Pulcini

Bon usage des antibiotiques en soins primaires

Le 2 décembre 2021

Membres du jury :

Directeur(s) de thèse :	Madame Nathalie Thilly	PU-PH, EA4360 APEMAC, Université de Lorraine, Nancy
	Madame Céline Pulcini	PU-PH, EA4360 APEMAC, Université de Lorraine, Nancy
Président de jury :	Monsieur Olivier Epaulard	PU-PH, Groupe de Recherche en Infectiologie Clinique, Université Grenoble Alpes, Grenoble
Membre du jury :	Monsieur Frédéric Mauny	PU-PH UMR 6249, Laboratoire Chrono-environnement, Université de Bourgogne Franche-Comté, Besançon



Symbole de la lutte contre l’antibiorésistance

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Table des matières

Abréviations		9
Chapitre 1	Introduction	11
Partie 1	**Exploration des pratiques autour de l'usage des antibiotiques et des stratégies pour les améliorer**	29
Chapitre 2	'I don't know if we can really, really change that': a qualitative exploration of public perception towards antibiotic resistance in France	31
Chapitre 3	Community pharmacists' views on their current role and future opportunities towards antibiotic stewardship: a French qualitative study	43
Partie 2	**Interventions visant à promouvoir le bon usage des antibiotiques et leurs évaluations**	61
Chapitre 4	Antibio'Malin: an e-health resource to raise awareness of antibiotic stewardship and resistance in France	63
Chapitre 5	Impact of a public commitment charter associated with patient information leaflets on antibiotics prescribed by General Practitioners: a randomised controlled interrupted time series study	81
Chapitre 6	French general practitioners' and patients' acceptability of a public commitment charter and patient information leaflets targeting unnecessary antibiotic use: a qualitative study	95
Chapitre 7	Discussion	123
Communications		139

Abréviations

ABS : *Antibiotic Stewardship*

BLSE : Bêta-Lactamases à Spectre Etendu

CP : *Community Pharmacists*

FAQs : *Frequently Asked Questions*

FG : *Focus Group*

GP : *General Practitioner*

HPs : *Health Professionals*

HSUs : *Health System Users*

MoH : *Ministry of Health*

OMS : Organisation Mondiale de la Santé

POCT : *Point-Of-Care Testing*

ROSP : Rémunération sur Objectif de Santé Publique

SARM : Staphylocoques résistants à la méticilline

TROD : Test Rapide d'Orientation Diagnostique

UTI : *Urinary Tract Infection*

Chapitre 1

Introduction

Le miracle des antibiotiques

L'âge d'or des antibiotiques commence avec la découverte de la pénicilline par Alexander Fleming en 1928 et son industrialisation à la fin de la Seconde Guerre mondiale.[1–4] C'est le début d'un miracle. En effet, les antibiotiques n'ont pas uniquement soigné des infections jusque-là mortelles, mais ont aussi permis de grandes avancées médicales.

Suite à leurs premiers usages pour guérir des infections bactériennes dans les années 40, les antibiotiques sont perçus comme un « remède miracle » (Figure 1). De 1950 à 1980, la recherche explose et les laboratoires découvrent et introduisent toujours plus de nouvelles molécules.[2,3,5] En réduisant les risques et complications d'infections graves, les antibiotiques permettent l'utilisation de chimiothérapies plus puissantes, la réalisation de greffes, la guérison de grands brûlés et l'amélioration de la survie des patients en réanimation.[6] Avec l'introduction de la vaccination et les progrès de l'hygiène, l'asepsie et l'antisepsie, l'espérance de vie augmente considérablement. Produits massivement, les antibiotiques deviennent bon marché et attirent l'intérêt de l'industrie agroalimentaire dès la fin des années 50. L'utilisation à grande échelle étant désormais possible, l'élevage intensif et l'agriculture utilisent les antibiotiques pour prévenir le risque de maladies avant de s'en servir comme facteurs de croissance.[3,7] Au début des années 80, la médecine est totalement dépendante des antibiotiques et l'utilisation des antibiotiques s'est ancrée dans les habitudes de prescription des médecins.[2,3]



Figure 1. Affiche publicitaire développée par le gouvernement américain (1940)[8]

Le cauchemar de la résistance

Qu'est-ce que la résistance bactérienne ?

La résistance bactérienne ou antibiorésistance est un phénomène où les bactéries deviennent insensibles à l'action des antibiotiques. L'exposition répétée des bactéries aux antibiotiques induit une pression de sélection qui favorise le développement de souches résistantes. Certaines bactéries sont naturellement résistantes aux antibiotiques. Ce type de résistance ne se transmet qu'aux générations suivantes par transfert vertical. Mais la résistance peut être aussi dite « acquise » lorsqu'une bactérie préalablement sensible aux antibiotiques devient résistante à un ou plusieurs antibiotiques. Cette résistance peut être due à une mutation génétique ou à l'acquisition de gènes résistants étrangers par transfert horizontal. Les bactéries peuvent se transmettre entre humains, animaux et dans l'environnement (Figure 2).

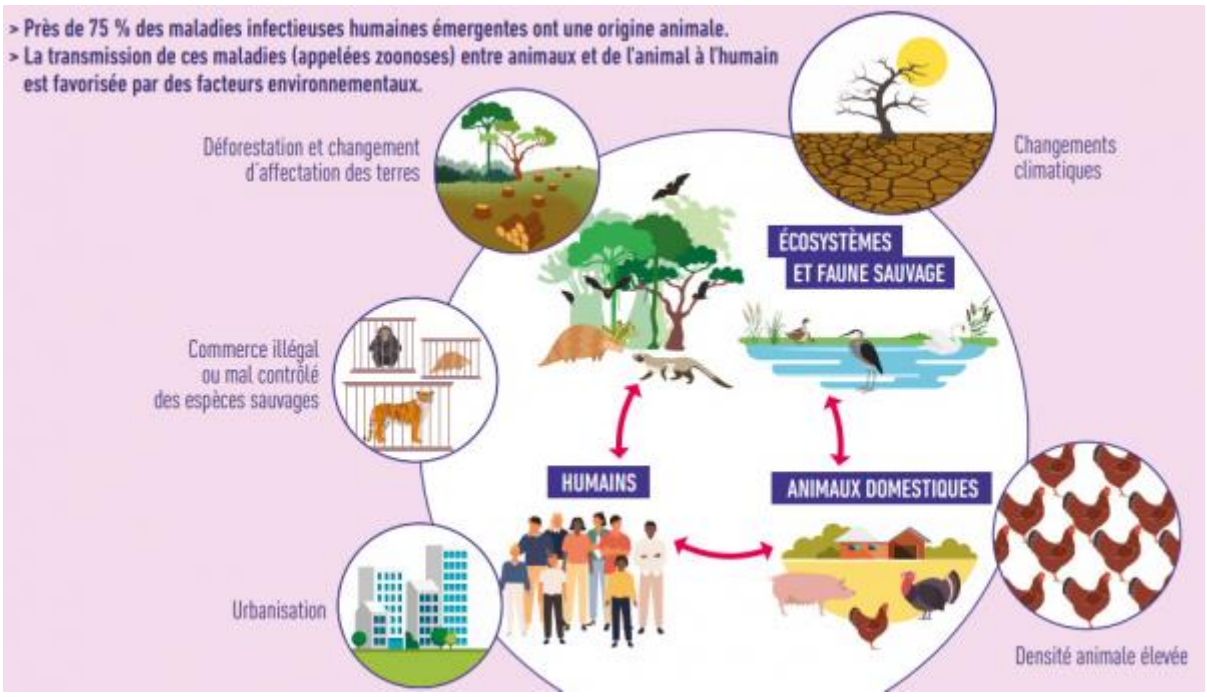


Figure 2. Transmission de la résistance entre animaux, de l'animal à l'humain via l'environnement[9]

L'alerte d'Alexander Fleming

Lors de son discours de remise du prix Nobel, le 11 décembre 1945, Alexander Fleming évoque le risque que les bactéries deviennent résistantes si les antibiotiques ne sont pas utilisés à une dose suffisante

pour toutes les éliminer. Son discours est le premier appel public au bon usage des antibiotiques : « le temps viendra peut-être où la pénicilline pourra être achetée par n'importe qui dans les magasins. Il y a alors le danger que l'homme ignorant puisse facilement se sous-doser et, en exposant ses microbes à des quantités non mortelles du médicament, les rendre résistants. […] Moralité : si vous utilisez la pénicilline, utilisez-en suffisamment ».[10]

La fin du rêve

Comme présentées en Figure 3, après l'introduction d'un nouvel antibiotique, des souches résistantes sont rapidement identifiées.[2,11,12] Dans les années 50, une épidémie mondiale de *Staphylococcus Aureus* résistants dans les hôpitaux est responsable de nombreux décès[2], mais la recherche riposte en produisant de nouvelles classes d'antibiotiques. Après la mise sur le marché de la pénicilline et de la streptomycine dans les années 40, arrivent dans les années 50 les antibiotiques dits à large spectre (tétracyclines et chloramphénicol) efficaces sur un grand nombre de bactéries puis les macrolides et les antibiotiques en associations. Dans les années 60, des agents modifiés chimiquement pour être plus efficaces sont introduits, comme la méticilline.[2,13,14] Un an après sa mise sur le marché, les staphylocoques résistants à la méticilline (SARM) sont identifiés, c'est la première bactérie multi-résistante. Les années 70 sont marquées par la propagation des bactéries multi-résistantes (notamment les SARM et les entérobactéries). Malgré l'augmentation des taux de bactéries multi-résistantes pouvant conduire à des impasses thérapeutiques, l'antibiorésistance n'est pas encore perçue comme une menace mondiale et est peu médiatisée.[1,2,4,15] Mais la recherche de nouvelles molécules antibiotiques s'épuise et est peu à peu abandonnée au profit des traitements des maladies chroniques qui s'avèrent bien plus rentables.[2,3] En France, c'est dans les années 90 que le problème éclate au grand jour à l'hôpital sous la forme des maladies nosocomiales. Une enquête nationale menée en 1996 auprès de 830 hôpitaux montrait que 6,7% des patients hospitalisés avaient développé une ou plusieurs infections liées aux soins.[16] Les infections aux SARM et aux bactéries multi-résistantes atteignaient des taux importants en soins intensifs.[3,16,17] A la fin des années 90, les mesures d'hygiène sont renforcées dans les hôpitaux. On croit alors que la résistance ne concerne que le monde



Figure 3. Chronologie de la découverte des antibiotiques et de l'antibiorésistance[12]

hospitalier, mais la surconsommation et le mauvais usage des antibiotiques en médecine de ville contribuent aussi sensiblement à cette résistance. C'est d'abord l'augmentation de pneumocoques de sensibilité diminuée à la pénicilline responsables d'infections invasives chez les enfants et les personnes âgées qui alarme sur la gravité de la situation, puis la diffusion en ville des entérobactéries productrices de bêta-lactamases à spectre étendu (BLSE) à partir des années 2000.[17–19]

Deux autres plans nationaux antibiotiques de 2007 à 2010 et de 2011 à 2016, une feuille de route interministérielle en 2016 et un chapitre dans la Stratégie Nationale de Santé 2018-2022 se sont ensuite succédés pour sensibiliser, par le biais de diverses actions, à la lutte contre le mauvais usage et la surconsommation d'antibiotiques à usage humain, vétérinaire et environnemental.[20–24] En 2006, l'Union Européenne interdit l'usage des antibiotiques comme facteurs de croissance dans l'élevage et promeut une approche globale, « *One Health* », permettant de préserver la santé humaine, la santé animale et l'environnement.[2,25]

En 2015 dans l'Union Européenne, environ 670 000 infections et 33 000 décès étaient attribués à la résistance bactérienne dont 125 000 infections et plus de 5 500 décès recensés en France.[12,26] Dans son rapport sur la menace que représente l'antibiorésistance, Jim O'Neill prédit que sans une mobilisation internationale, d'ici 2050, la résistance des agents infectieux aux antimicrobiens au sens large (antibiotiques, antiviraux, antiparasitaires, antifongiques) sera responsable de plus de décès que le cancer avec 10 millions de décès par an et un manque à gagner en produit intérieur brut de 100 milliards de dollars.[27] En 2015, l'OMS publie un plan d'actions mondial recommandant à chaque Etat membre l'instauration d'un plan national de lutte contre l'antibiorésistance.[28] En septembre 2016, l'Assemblée Générale de l'Organisation des Nations-Unies désigne l'antibiorésistance comme une priorité internationale. C'était la quatrième fois seulement qu'un problème de santé y était abordé.[29] La mobilisation internationale pour lutter contre l'antibiorésistance est accélérée (Figure 4).

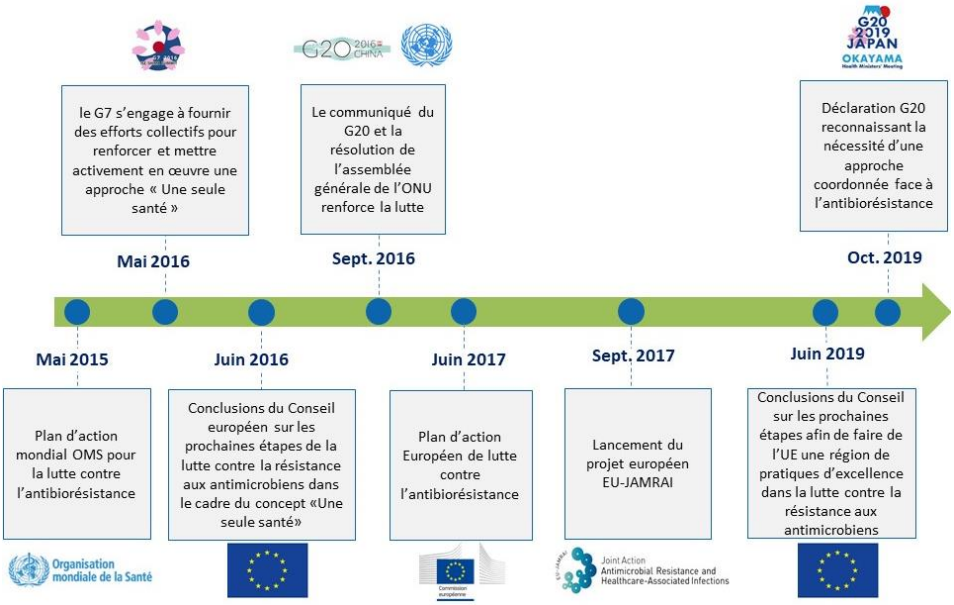


Figure 4. Chronologie de la mobilisation européenne et internationale dans la lutte contre l'antibiorésistance[30]

La surconsommation en ville

La France a toujours été l'un des pays d'Europe les plus consommateurs d'antibiotiques en santé humaine.[31] Malgré des efforts pour diminuer les consommations depuis 20 ans, la France reste bien supérieure à la moyenne européenne et consomme par exemple près de trois fois plus d'antibiotiques que les Pays-Bas, un des pays les moins consommateurs. Cette consommation représente environ 71 millions d'euros de dépenses supplémentaires par rapport à la moyenne européenne.[31,32] Entre 2009 et 2019, le nombre de prescriptions d'antibiotiques a diminué de 15%, mais cela reste encore insuffisant.[33] En 2019, la majorité des antibiotiques en santé humaine sont prescrits (78%) et dispensés (93%) en ville, 15% relevant de prescriptions hospitalières.[34] Les médecins généralistes sont responsables de 70% des prescriptions.[35] A l'inverse de certains pays européens, en France, tous les antibiotiques sont dispensés sur prescription par les pharmaciens. Près d'un tiers de ces prescriptions sont inutiles, principalement utilisées pour traiter des infections virales.[32] En 2015, deux tiers des prescriptions concernaient des infections ORL et des voies respiratoires basses.[35] En 2018, la consommation d'antibiotiques en ville était de 2,38 prescriptions/1000 habitants/jour. Les bêta-lactamines représentaient la moitié des prescriptions d'antibiotiques (1,23 prescriptions/1000

habitants/jour) en particulier l'amoxicilline qui est l'antibiotique le plus prescrit et l'association amoxicilline-acide clavulanique, qui fait partie des antibiotiques critiques (regroupant les antibiotiques particulièrement générateurs de résistances et ceux à utiliser en dernier recours). Les moins de cinq ans et les plus de 55 ans sont les deux populations qui consomment le plus d'antibiotiques, avec une augmentation de la consommation avec l'âge après 55 ans.[33] L'évolution du nombre de prescriptions d'antibiotiques par classes d'âge est présentée dans la figure 5.

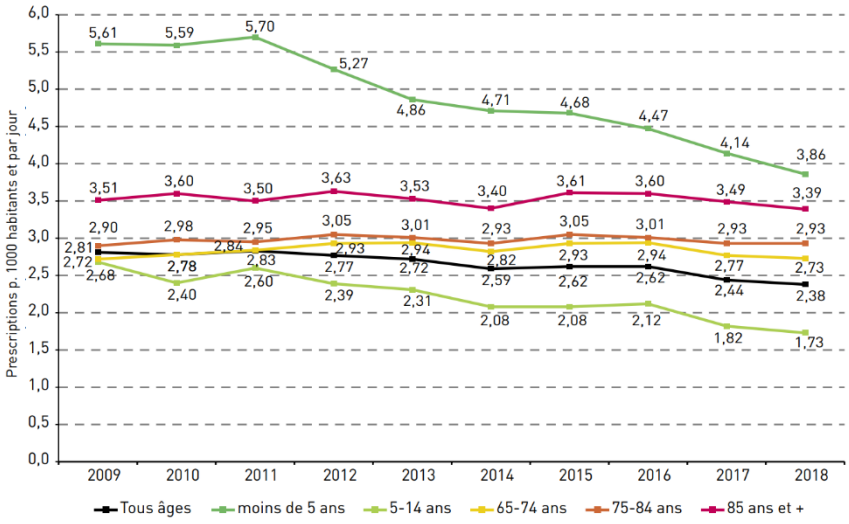


Figure 5. Consommation d'antibiotiques (nombre de prescriptions/1000 habitants/jour) en médecine de ville en fonction de l'âge, en France, de 2009 à 2018[33]

Le bon usage des antibiotiques

La résistance est un phénomène réversible. En l'absence de la pression de sélection générée par un usage d'antibiotiques, les populations bactériennes perdent en général rapidement les avantages sélectifs relatifs à l'antibiorésistance. Une réduction de l'utilisation des antibiotiques diminue les taux de résistance.[36] La lutte contre l'antibiorésistance passe donc par la prévention des infections et la limitation de la transmission des agents infectieux et des gènes de résistance (par la vaccination et les mesures d'hygiène) ainsi qu'un meilleur usage des antibiotiques.[12] Le bon usage des antibiotiques est défini comme l'utilisation des antibiotiques uniquement quand ils sont nécessaires, en recourant alors à la bonne molécule, à la bonne dose, pour la bonne durée, la bonne indication et le bon patient, comme détaillé dans la figure 6.

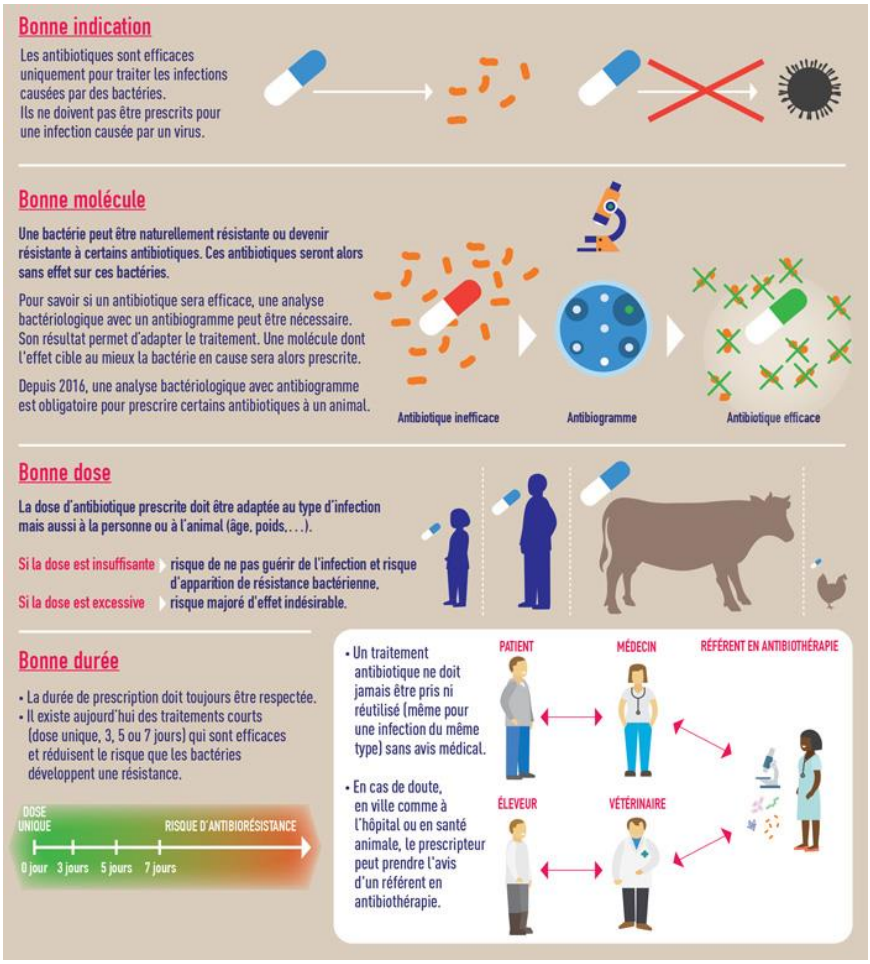


Figure 6. Infographie du bon usage des antibiotiques[12]

Les programmes de bon usage des antibiotiques

Les programmes de bon usage des antibiotiques ou « *Antimicrobial stewardship »* en anglais ont été définis par Dyar *et al.* comme « un ensemble cohérent d'actions qui encourage l'utilisation responsable des antimicrobiens ».[37] Ils peuvent être constitués d'une seule ou plusieurs actions mises en place localement ou nationalement. Jusqu'à présent, la majorité des interventions visant le bon usage s'est concentrée sur le secteur hospitalier alors même que les antibiotiques sont principalement utilisés en médecine de ville.[38]

Les interventions visent à réduire les antibiothérapies inutiles (notamment en cas d'infections virales) ou inappropriées (pas le bon antibiotique, pas la bonne dose, et/ou pas la bonne durée) et à améliorer l'usage des antibiotiques. Les cibles du bon usage sont le consommateur, les prescripteurs et les

professionnels de santé. En médecine de ville, elles ciblent principalement les médecins généralistes et les infections des voies respiratoires.[38–40] Le tableau 1 présente des exemples d'interventions que l'on peut retrouver en soins primaires. De manière générale, ces interventions tendent à avoir un faible impact sur la prescription d'antibiotiques (diminution des prescriptions de moins de 25%) mais les résultats des études sont de niveau de preuve faible en raison de biais potentiels liés à la méthodologie utilisée. Ces études ont montré qu'il était plus facile d'améliorer le choix de la molécule la plus adaptée ou la durée que de réduire les initiations de traitement antibiotique[38,40] bien qu'il soit essentiel d'agir à la fois sur les antibiothérapies inappropriées et les antibiothérapies inutiles pour lutter contre l'antibiorésistance. Il reste donc encore beaucoup à faire pour changer les comportements des utilisateurs et les pratiques des prescripteurs des antibiotiques.

Tableau 1. Exemple d'interventions de bon usage des antibiotiques en ville[39–42]

Intervention	Description
Education du médecin	Matériels éducatifs en format papier, électronique ou audiovisuel ciblant le médecin
Education du patient	Matériels éducatifs en format papier, électronique ou audiovisuel ciblant le patient
Campagne médiatique	Campagne de sensibilisation à destination du grand public ou des professionnels de santé
Communication	Interventions auprès des professionnels de santé visant à améliorer la communication avec le patient
Formation	Formation des professionnels de santé
Recommandations	Mise à disposition de recommandations nationales concernant la prescription d'antibiotiques
Prescription retardée	Prescription d'antibiotique à ne récupérer qu'en cas d'aggravation des symptômes
Charte d'engagement	Engagement public au respect des bonnes pratiques
Test de diagnostic rapide	Tests rapides permettant de déterminer l'origine d'une infection
Antibiogramme ciblé	Sélection des antibiotiques rendus dans l'antibiogramme pour orienter les prescriptions vers les antibiotiques de première intention selon les recommandations nationales
Indicateurs de prescriptions	Indicateurs quantitatifs ou qualitatifs permettant d'estimer le volume ou la qualité des prescriptions
Audit et retour d'informations	Evaluation des pratiques avec retour au professionnel
Mesures de restriction	Mesures limitant la liberté de prescription
Interventions financières	Incitations ou sanctions financières visant les professionnels de santé
Visite par un pair	Visite d'un professionnel pour stimuler l'échange autour des bonnes pratiques

Objectifs de la thèse et plan du manuscrit

Cette thèse s'intéresse au bon usage des antibiotiques en soins primaires au travers de deux objectifs : 1) explorer les pratiques autour de l'usage des antibiotiques et les stratégies susceptibles de les améliorer, 2) évaluer des interventions visant à promouvoir leur bon usage. Elle cible trois acteurs incontournables de l'usage des antibiotiques en ville : le médecin généraliste qui prescrit, le pharmacien d'officine qui dispense et le patient qui les consomme.

La première partie de ce manuscrit répond au premier objectif d'explorer les pratiques vis-à-vis de l'usage des antibiotiques et les stratégies pour les améliorer.

Le **chapitre 2** explore les perceptions de personnes âgées et de parents de jeunes enfants sur la résistance aux antibiotiques, leurs pratiques de consommation des antibiotiques et leurs attentes vis-à-vis des messages des campagnes de sensibilisation.

Le **chapitre 3** se focalise sur les pharmaciens d'officine et sur la façon dont ils perçoivent l'évolution possible de leur métier et de leurs missions pour contribuer au bon usage des antibiotiques.

La seconde partie présente l'évaluation de deux interventions réalisées auprès des usagers et de professionnels de santé.

Le **chapitre 4** décrit le développement et l'évaluation d'Antibio'Malin, un site web ayant pour objectif d'éduquer, informer et faciliter la communication entre les professionnels de santé et patients sur les antibiotiques et l'antibiorésistance.

Le **chapitre 5** présente l'évaluation de l'impact d'une charte d'engagement et d'outils associés sur la prescription d'antibiotiques par les médecins généralistes du Grand Est. Le **chapitre 6** présente les résultats concernant l'adhésion des médecins à l'intervention et son acceptabilité par les médecins et les patients.

Le **chapitre 7** discute des principaux résultats de ce travail et de leurs implications.

Références

1. Giacomini E, Perrone V, Alessandrini D, Paoli D, Nappi C, Esposti LD. Evidence of antibiotic resistance from population-based studies: A narrative review. *Infect Drug Resist* 2021; **14**: 849–58.

2. Podolsky SH. The evolving response to antibiotic resistance (1945–2018). *Palgrave Commun 2018 41* 2018; **4**: 1–8.

3. Andremont A, Muller S. *Antibiotiques, l'overdose*. (Bayard Editions, ed.). Bayard Culture; 2017.

4. Davies J. Origins and evolution of antibiotic resistance. *Microbiologia* 1996; **12**: 9–16.

5. Trémolières F. Quand le miracle antibiotique vire au cauchemar. *médecine/sciences* 2010; **26**: 925–9.

6. Teillant A, Gandra S, Barter D, Morgan DJ, Laxminarayan R. Potential burden of antibiotic resistance on surgery and cancer chemotherapy antibiotic prophylaxis in the USA: a literature review and modelling study. *Lancet Infect Dis* 2015; **15**: 1429–37.

7. Michael CA, Dominey-Howes D, Labbate M. The antimicrobial resistance crisis: Causes, consequences, and management. *Front Public Heal* 2014; **2**.

8. DHEC. Penicillin cures gonorrhea. Disponible sur : https://fr.m.wikipedia.org/wiki/Fichier:Penicillin_cures_gonorrhea.jpg.

9. Santé publique France. Résistance aux antibiotiques. Disponible sur : https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/resistance-aux-antibiotiques.

10. Fleming A. Penicillin. *Nobel Price* 1945.

11. European Centre for Disease Prevention and Control. *Antimicrobial consumption in the EU/EEA - Annual epidemiological report for 2018*.

12. Santé publique France. Résistance aux antibiotiques. Disponible sur : https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/resistance-aux-antibiotiques.

13. Ventola CL. The antibiotic resistance crisis: causes and threats. *P T J* 2015; **40**: 277–83.

14. Huttner A, Harbarth S, Carlet J, *et al.* Antimicrobial resistance: a global view from the 2013 World Healthcare-Associated Infections Forum. *Antimicrob Resist Infect Control 2013 21* 2013; **2**: 1–13.

15. Ministère des Solidarités et de la Santé. L'antibiorésistance : pourquoi est-ce si grave ? Disponible sur : https://solidarites-sante.gouv.fr/prevention-en-sante/les-antibiotiques-des-medicaments-essentiels-a-preserver/des-antibiotiques-a-l-antibioresistance/article/l-antibioresistance-pourquoi-est-ce-si-grave.

16. Gachie J, Astagneau P, Branger B, *et al.* Enquête nationale de prévalence des infections nosocomiales, 1996. *Bull Epidémiologique Hebd* 1997; **36**: 161–3.

17. Crémieux A-C. Brève histoire du plan antibiotique du ministère de la Santé en France. *Quest Commun* 2016: 87–93.

18. Laurans G, Murbach V, Cattier B. Surveillance de la sensibilité aux antibiotiques des pneumocoques isolés en situation pathogène en France en 1999.

20. Ministère des Solidarités et de la Santé. Lutte et prévention en France. *Ministère des Solidar la Santé* 2019. Disponible sur : https://solidarites-sante.gouv.fr/prevention-en-sante/les-antibiotiques-des-medicaments-essentiels-a-preserver/des-politiques-publiques-pour-preserver-l-efficacite-des-antibiotiques/article/lutte-et-prevention-en-france.

21. Ministère du travail de l'emploi et de la santé. *Plan national d'alerte sur les antibiotiques 2011 - 2016*. Disponible sur : http://www.omedit-idf.fr/wp-content/uploads/2015/01/plan_antibiotiques_2011-2016_.pdf

22. Le Galès C, Michelet C, Anger E, Tran B. *Évaluation du plan national pour préserver l'efficacité des antibiotiques, 2007-2010*. 2011.

23. Ministère des Solidarités et de la Santé. *Stratégie Nationale de Santé 2018-2022*. Disponible sur : https://solidarites-sante.gouv.fr/IMG/pdf/dossier_sns_2017_vdef.pdf

24. Comité Interministeriel pour la santé. *1 ère RÉUNION DU COMITÉ INTERMINISTÉRIEL POUR LA SANTÉ MAÎTRISER LA RÉSISTANCE BACTÉRIENNE AUX ANTIBIOTIQUES*. Disponible sur : https://solidarites-sante.gouv.fr/IMG/pdf/feuille_de_route_antibioresistance_nov_2016.pdf

25. Commission Européenne. Interdiction des antibiotiques comme facteurs de croissance dans les aliments pour animaux. Disponible sur : https://ec.europa.eu/commission/presscorner/detail/fr/IP_05_1687. Accessed August 18, 2021.

26. Cassini A, Högberg LD, Plachouras D, *et al.* Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: a population-level modelling analysis. *Lancet Infect Dis* 2019; **19**: 56–66.

27. O'Neill J. TACKLING DRUG-RESISTANT INFECTIONS GLOBALLY : FINAL REPORT AND RECOMMENDATIONS. *Rev Antimicrob Resist* 2016. Disponible sur : https://amr-review.org/sites/default/files/160518_Final%20paper_with%20cover.pdf

28. World Health Organization. Antimicrobial resistance: global report on surveillance 2014. 2014. Disponible sur : http://www.who.int/drugresistance/documents/surveillancereport/en/.

29. General Assembly of the United Nations. PRESS RELEASE: High-Level Meeting on Antimicrobial Resistance. Disponible sur : https://www.un.org/pga/71/2016/09/21/press-release-hl-meeting-on-antimicrobial-resistance/.

30. Ministère des Solidarités et de la Santé. La mobilisation européenne et internationale dans la lutte contre la résistance aux antibiotiques. Disponible sur : https://solidarites-sante.gouv.fr/prevention-en-sante/les-antibiotiques-des-medicaments-essentiels-a-preserver/mobilisation-europeenne-et-internationale/article/la-mobilisation-europeenne-et-internationale-dans-la-lutte-contre-la-resistance.

31. ECDC. Antimicrobial consumption - Annual Epidemiological Report for 2018. Disponible sur : https://www.ecdc.europa.eu/en/publications-data/surveillance-antimicrobial-consumption-europe-2018.

32. Carlet J, Le Coz P. *Proposals of the special working group for keeping antibiotics effective - REPORT FROM THE SPECIAL WORKING GROUP FOR KEEPING ANTIBIOTICS EFFECTIVE*. 2015.

33. Santé Publique France. Consommation d'antibiotiques en secteur de ville en France de 2009 à 2018. Synthèse des indicateurs mis en ligne sur Géodes. Disponible sur :

https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/resistance-aux-antibiotiques/documents/rapport-synthese/la-consommation-d-antibiotiques-en-secteur-de-ville-en-france-2009-2019.-synthese-preliminaire-des-indicateurs-disponibles-sous-geodes.

34. Santé Publique France. Antibiotiques et résistance bactérienne : une infection virale respiratoire évitée, c'est un antibiotique préservé ! Disponible sur : https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/infections-associees-aux-soins/documents/rapport-synthese/antibiotiques-et-resistance-bacterienne-une-infection-virale-respiratoire-evitee-c-est-un-antibiotique-preserve.

35. Agence nationale de sécurité du médicament et des produits de santé. Evolution des consommations d'antibiotiques en France entre 2000 et 2015. Disponible sur : https://www.omedit-grand-est.ars.sante.fr/system/files/2017-08/ANSM-rapport-antibio_2016_bd2.pdf.

36. Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: Systematic review and meta-analysis. *BMJ* 2010; **340**: 1120.

37. Dyar OJ, Huttner B, Schouten J, Pulcini C. What is antimicrobial stewardship? *Clin Microbiol Infect* 2017; **23**: 793–8.

38. Dyar OJ, Beović B, Vlahović-Palčevski V, Verheij T, Pulcini C. How can we improve antibiotic prescribing in primary care? *Expert Rev Anti Infect Ther* 2016; **14**: 403–13.

39. Wang S, Pulcini C, Rabaud C, Boivin J-M, Birgé J. Inventory of antibiotic stewardship programs in general practice in France and abroad. *Med Mal Infect* 2015; **45**: 111–23.

40. Tonkin-Crine SKG, Tan PS, van Hecke O, *et al.* Clinician-targeted interventions to influence antibiotic prescribing behaviour for acute respiratory infections in primary care: An overview of systematic reviews. *Cochrane Database Syst Rev* 2017; **2017**.

41. Dyar OJ, Beović B, Vlahović-Palčevski V, Verheij T, Pulcini C, Policies) on behalf of E (the E [European S of CM and IDSG for A. How can we improve antibiotic prescribing in primary care? *Expert Rev Anti*

Infect Ther 2016; **14**: 403–13.

42. Del Mar CB, Scott AM, Glasziou PP, *et al.* Reducing antibiotic prescribing in Australian general practice: time for a national strategy. *Med J Aust* 2017; **207**: 401–6.

Partie 1

Exploration des pratiques autour de l'usage des antibiotiques et des stratégies pour l'améliorer

Chapitre 2

‘I don’t know if we can really, really change that’: a qualitative exploration of public perception towards antibiotic resistance in France

Anaïs Essilini*, Joëlle Kivits*, Frédéric Caron, Jean-Marc Boivin, Nathalie Thilly, Céline Pulcini

* Co-premier auteur

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Résumé

Introduction

Depuis les années 2000, les autorités françaises ont mis en place différents plans nationaux pour sensibiliser au bon usage des antibiotiques**.** Vingt ans plus tard, la France reste l'un des pays où la consommation d'antibiotiques est la plus élevée d'Europe. Bien que la lutte contre l'antibiorésistance passe par une meilleure information du grand public sur les risques liés à un mauvais usage des antibiotiques, les données récentes tendent à montrer que les campagnes ciblant la population générale sont nécessaires mais pas suffisantes pour favoriser un changement de comportement.

Objectif

L'objectif de cette étude était d'explorer les perceptions du grand public à propos de l'antibiorésistance, leurs pratiques autour de l'usage des antibiotiques et leurs attentes vis-à-vis des messages des campagnes de sensibilisation.

Méthode

Des focus groupes ont été menés auprès de retraités actifs et de parents de jeunes enfants. Ces deux populations ont été ciblées, car elles consomment plus d'antibiotiques que le reste de la population. Les parents de jeunes enfants ont été recrutés via les écoles primaires ou les activités extra-scolaires et les retraités par des associations culturelles ou lors de loisirs récréatifs. Tous les entretiens ont été réalisés entre mars 2018 et mars 2019 à Nancy sauf un à Paris. Un guide d'entretien a été construit par F.C (étudiant de master promotion de la santé), J.K (sociologue), C.P (médecin infectiologue) et N.T (pharmacien spécialiste de santé publique) autour de trois principaux thèmes : la perception de la résistance aux antibiotiques, les pratiques autour de l'usage des antibiotiques et les attentes vis-à-vis des campagnes de sensibilisation. Les entretiens ont été menés par F.C, J.K ou A.E (doctorante de santé publique). Tous les entretiens ont été enregistrés avec l'accord des participants et retranscrits mot à mot par F.C et A.E. Une analyse thématique a été réalisée en utilisant le logiciel Nvivo 11® par A.E, J.K et F.C.

Résultats

Neuf focus groupes ont été réalisés. Les participants avaient des connaissances partielles sur la résistance aux antibiotiques et ses mécanismes. Ses conséquences n'étaient pas vécues comme préoccupantes, mais une fois les participants informés, les prédictions étaient jugées alarmantes. La résistance aux antibiotiques n'était pas perçue comme une responsabilité personnelle, mais un phénomène subi. Dans leur perception des acteurs de la résistance aux antibiotiques, ils distinguaient les autorités sanitaires (dont ils se méfiaient) et la communauté médicale (jugée peu compétente) de leur médecin de famille, en qui ils avaient généralement confiance. L'idée d'être impuissant face à leur maladie et de devoir attendre une guérison spontanée était très frustrante et difficile à accepter. L’antibiotique est perçu comme le seul médicament efficace pour guérir immédiatement et rapidement. Malgré leur connaissance de l'inefficacité des antibiotiques pour les infections virales, la pression sociétale, essentiellement professionnelle (nécessité de rester actif et perception négative de l'arrêt maladie) les ont amenés à mettre en place des stratégies pour obtenir des antibiotiques. Certains participants retournaient plusieurs fois chez leur médecin tandis que d'autres conservaient les antibiotiques restants.

Conclusion

Cette étude montre que la résistance aux antibiotiques était considérée comme un problème émergent par les Français. Les campagnes de sensibilisation ciblant le public devraient prendre en considération les principales conclusions suivantes : les médecins généralistes jouent un rôle essentiel dans la communication autour de la résistance aux antibiotiques et devraient faire partie d'une approche « *One Health »* plus large. En outre, les actions visant le public et les professionnels de la santé n'auront que peu d'impact si, dans le même temps, des efforts sur les représentations du milieu de travail ne sont pas entrepris.

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'I don't know if we can really, really change that': a qualitative exploration of public perception towards antibiotic resistance in France

Anaïs Essilini [1]*†, Joëlle Kivits[1]†, Frédéric Caron[1], Jean-Marc Boivin[1], Nathalie Thilly[1,2] and Céline Pulcini[1,3]

[1]Université de Lorraine, APEMAC, équipe MICS, F-54000 Nancy, France; [2]Université de Lorraine, CHRU-Nancy, Département Méthodologie, Promotion, Investigation, Nancy, France; [3]Université de Lorraine, CHRU-Nancy, Département des Maladies Infectieuses, Nancy, France

*Corresponding author. E-mail: anais.essilini@univ-lorraine.fr
†Joint first authors.

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Background: Since the 2000s, French authorities have put in place various national plans to make the general public aware of antibiotic stewardship. Twenty years later, France is still one of the countries with the highest use of antibiotics in Europe.

Objectives: Our study explored the general public's perceptions of antibiotic resistance, their behaviour around antibiotic use and their expectations regarding awareness campaigns.

Methods: A qualitative study was performed from March 2018 to March 2019 in a French region using focus groups. Two types of public were targeted: parents of young children and retired people. The interview guide contained open-ended questions organized around three main themes: perceptions of antibiotic resistance; experience and use of antibiotics; and health information and campaigns.

Results: Nine focus groups were created, including 17 parents and 19 retirees. Participants did not link antibiotic overuse and antibiotic resistance. Antibiotic resistance was not perceived as a personal responsibility but as a suffered phenomenon on which the participants could not act. The blame was particularly put on the presence of antibiotics in the environment. Although participants expressed trust in their GPs, antibiotics remained perceived as the only solution for them to be cured quickly.

Conclusions: The study highlighted that the GPs were the preferred information source regarding the use of antibiotics. Actions targeting the public and health professionals will have little impact if, at the same time, efforts on work environment representation are not undertaken.

Introduction

Antimicrobial resistance, and in particular antibiotic resistance, is a global threat. In France, the health authorities have implemented national action plans for 20 years, all including interventions to raise awareness among the general public.[1–5] Repeated every winter from 2002 to 2007, the nationwide campaign *'Les antibiotiques, c'est pas automatique'* (antibiotics are not automatic) had an impact on the total antibiotic use (decrease by 26.5%).[6] From 2009 to 2018, the number of prescriptions per 1000 inhabitants per day continued to decrease (2.81 in 2009 versus 2.38 in 2018), but more slowly.[7] This decrease was observed in all age groups up to 64 years of age.[7] Despite this, antibiotic overuse is still an issue in France, which has one of the highest total antibiotic uses in Europe.[8]

To target and evaluate antibiotic stewardship actions, various studies have been conducted to explore general public perceptions of antibiotic resistance.[9–18] Those studies showed that people behaved inappropriately when taking antibiotics, including poor compliance with treatment or self-medication; knowledge about antibiotics was often poor. The 2018 Eurobarometer survey highlighted that, in France, '35% of patients thought that antibiotics are effective against viruses, 16% thought that antibiotics should be stopped when they feel better and only 45% remembered getting information about how unnecessary use of antibiotics leads to their ineffectiveness during the last year'.[18] This European survey also highlighted that 57% of Europeans and 35% of French people did not know that antibiotics are ineffective against viral infections. For France, this represents a decrease of 6% compared with the

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survey conducted in 2016.[18] A survey performed in a middle-sized French city (Nancy, Northeastern France) in 2017 showed that public knowledge was good, with 75.5% and 52.5% of participants, respectively, knowing that antibiotic prescription was not justified for colds and viral infections. The main cause of antibiotic resistance identified was overuse (92%).[19] Recent studies conducted in the UK, the USA and Sweden also revealed a lack of knowledge about antibiotics and antibiotic resistance, with individuals claiming to know their bodies and thus to know when they need an antibiotic prescription. In addition, if participants identified antibiotic resistance as a threat or an emerging problem they did not consider themselves at risk.[20–23] All of the recent French studies and most of the recent data in high-income countries are based on quantitative studies[18,19,24] and there are few qualitative studies.[9,13,17,20,22,25–29]

While it can be assumed that fighting antibiotic resistance requires the public to be more informed about the risks of antibiotic misuse, ultimately promoting behavioural change, current data tend to show that campaigns targeting the general population are necessary but not sufficient.[30–33] If the aim is to enhance health campaigns' potential regarding behaviour change, a better understanding of the general public's perceptions of antibiotic resistance and what underlies it is necessary. The way in which the individual will understand a health message is a complex social process.[34] The individual constructs meaning to a received message, drawing on his/her experience and knowledge. For example, cancer screening messages will not be the same for a young person as for a middle-aged person receiving cancer screening invitation letters. In addition, the context in which an individual evolves daily also constitutes a frame of reference in the appropriation of a message.[35,36] New strategies to tackle antibiotic resistance aligned with the general public's experiences need to be devised. It therefore seems essential to better understand the general public's perceptions of antibiotic resistance and use and what is at the root of these perceptions.

The objective of the present qualitative study was to explore the general public's perceptions of antibiotic resistance, as well as their attitudes around antibiotic use and their expectations regarding awareness campaigns.

Methods

To best answer our research objective, a qualitative approach was chosen. We opted for the focus group (FG) technique as it allows collection of a broad variety of ideas, opinions and beliefs on a specific topic.[37,38] The study followed the COREQ reporting guidelines.[39]

Participants and setting

FGs were organized with parents of young children and retired people, two populations consuming more antibiotics than the rest of the general population.[7]

Recruitment modes were diverse. Parents were recruited either through primary schools or sports' clubs where parents often stayed to watch their children during the training. Retired people were recruited through cultural and recreational groups. The first contact was always an e-mail sent to the institution (schools, sports' clubs, leisure groups) explaining the study's objectives. Once the agreement for organizing an FG in the institution had been received, researchers spent time during activities to invite parents/retired people to participate in the FG. FGs were held at the activity's venues and at one participant's home for one parent FG. All but one FG were conducted in Nancy, a middle-sized city in Northeastern France, with one FG organized in Paris. All FGs took place between March 2018 and March 2019 and were planned for a 40 to 60 min duration.

FGs

FGs followed an interview guide constructed around three main themes: perceptions of antibiotic resistance; attitudes around antibiotic use; and expectations towards awareness campaigns. The interview guide was created by F.C. (a public health Master's student) and reviewed by J.K. (a sociologist), C.P. (an infectious disease specialist) and N.T. (a pharmacist). The guide was tested during the first FG interview and no modification was made. Each FG interview was conducted by two researchers [A.E. (a public health PhD student), J.K. or F.C.] with one leading the discussion and the other one taking notes.

FG interviews were recorded after verbal informed consent was obtained and were transcribed. FG interviews were continued until data saturation was reached. Participation was voluntary and not compensated.

Analysis

Anonymized transcripts were analysed, once all FG interviews had been performed, using a comprehensive thematic analysis using QSR International's NVivo 11 software. The analysis grid was constructed by three researchers (A.E., F.C., J.K.); each of the themes and subthemes were discussed within the research team until a consensus on a final list of themes was reached. Each FG was then coded according to the analysis grid.

Ethics statement

The study was completely anonymous at all stages and no information on the health of participants was collected. No ethical approval was thus required in accordance with French law.

Results

Thirty-six participants (19 retired people and 17 parents) were recruited while organizing nine FGs (Table 1). Most participants were women (28/36) (Table 1 and Supplementary data). The average duration of a FG interview was 40 min.

Three main issues emerged from data analysis: knowledge and perceptions of antibiotic resistance; the ambiguous approach to antibiotic prescription; and the social role of antibiotics.

Illustrative verbatim quotations are listed in Table 2.

Knowledge and perception of antibiotic resistance

1. What is antibiotic resistance?

When asked about antibiotic resistance, most participants had never heard of it before. They had difficulty explaining the term and often resorted to their experience or one of a relative. In most FGs, the consequences of antibiotic resistance were not a concern and remained unclear and distant. The awareness obtained during the FG interviews about the severity of the situation was alarming for some participants. They were confused about the mechanism of antibiotic resistance, often described as the body becoming resistant. According to participants, overuse of antibiotics would lead to 'habituation': the bodies of individuals who took too many antibiotics would no longer respond to treatment. Another cause of 'habituation' could be the failure to comply with the prescribed

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Table 1. Description of FGs

FG number	Population	Number of participants	Number of women	Mode of recruitment
1	retired people	4	2	computer workshop
2	retired people	2	1	computer workshop
3	parents	4	2	swimming club
4	parents	6	6	swimming club
5	retired people	3	2	leisure workshop
6	parents	2	2	sport club
7	retired people	6	5	association
8	retired people	4	3	association
9	parents	5	5	school

Table 2. Selection of the most illustrative verbatim quotations

FG	Verbatim quotation
What is antibiotic resistance?	
FG6	'For my part, no, I didn't try to find out'
FG1	'It's a scary subject, I find it scary'
FG7	'I am part of a generation where there were not many antibiotics in our youth, so we react well, it's a matter of habituation'
FG2	'you certainly have to take it, it's from a certain amount not [that you become resistant]'
FG9	'no no no no no, it is not transmitted [. . .] each body is different and reacts differently (everyone agrees)'
FG3	'I don't know if we can really, really change that' [antibiotic resistance]
The responsibility of others on an individual burden	
FG1	'Because the drugs, we can be careful, I can only take what I really need, but we don't know elsewhere, if the antibiotic resistance wouldn't also come from that, from those tiny doses that we eat all the time'
FG2	'to be in contact with antibiotics hidden in food or meat, or whatever, the body no longer defends itself even if the antibiotics are given'
FG3	'So I don't know if we, as an antibiotic consumer, can really, really change that [. . .], we feed animals antibiotics all the time, [. . .] will taking a little less antibiotics makes us feel better?'
FG7	'Farmers have the same approach as they do with their animals. Today, it's antibiotics at all costs, so [. . .] they measure remaining traces in the food, of pesticides, but also antibiotics [. . .] they used and continue to use far too much, especially on intensive farms.'
My trust, my GP	
FG9	'I think they were more warned about it; before, the antibiotic was the solution and that's it'
FG1	'Awareness campaigns coincides with need to cut public costs'
FG8	'The Ministry wants to save money, but the working mother has to come back, and the child suffers for three or four days'
FG4	'No, I trust my doctor'
FG2	'when I call for help, saying "I came because I really need to be accompanied", if the treatment is not effective, I go back 3 or 4 days later, in a pitiful state, so we need antibiotics, it seems obvious to me, essential. It's the doctor who prescribes antibiotics, it's not me who will ask for it, but it's obvious that I want my little dose'
FG8	'when I go to the doctor, it's because I'm really feeling sick, but I may not express it loud enough, so I'm not given antibiotics, which makes me go several times'
FG1	'If they say that we must give less (antibiotics) or eliminate them, they must give another solution to replace them, by what we replace them, because if we are told we must not take many, but if we are sick what should we take instead'
FG7	'we're not going to be suspicious of antibiotics when they've saved so many people, I don't agree, if there weren't antibiotics we wouldn't be here'
The unspoken consequences of being sick	
FG5	'Only antibiotics cure you [. . .], it takes much longer with anything else'
FG2	'there are times when I resisted to get them but I really needed to get back to work'
FG7	'going back to work and putting the children back to school [. . .] antibiotics allow that [. . .] fastest solution'
FG3	'With no prescription you don't feel well, you feel less healed than when you have a prescription'
FG8	'eight days twice a day and well, there are still 3/4 pills left. I keep those 3/4 pills and add them to previous ones, that makes me 8 pills so it serves me the week I still have a problem'

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treatment duration, which would allow the disease to return more strongly. Participants had an individual and bodily vision of resistance. They were positive one can build immunity, but antibiotic resistance cannot be transmitted from one person to another.

2. A risk for the individual generated by others' responsibility

When they tried to explain the main causes of antibiotic resistance, participants mentioned the presence of antibiotics in the environment, particularly linked to agricultural activities and water. The blame was put on farmers who irresponsibly give antibiotics to their animals and on people who did not properly dispose of their antibiotics, with these ending up in soil or water. Transmission between humans and the environment was perceived only in the direction of the environment to humans and was worrying.

Antibiotic resistance was not felt as a personal responsibility but as a suffered phenomenon on which the participants could not act. The 2002 awareness campaign 'antibiotics are not automatic' was well accepted by all generations and mentioned by almost all FG participants. They perceived the message, however, as emphasizing the GP's sole responsibility.

The ambiguous approach to antibiotic prescription

Regarding their behaviour toward antibiotic prescription, participants made a distinction between the medical community, health authorities and their GP.

Participants were particularly suspicious towards the medical community. Except for their family GP, 'doctors' were described as prescribers who did not take the time to come up with a proper diagnosis during the consultation. Participants distinguished the 'old generation' from the 'new generation'. The new generation was described as more informed, prescribing only when necessary and performing diagnostic tests, unlike the 'old generation' who used antibiotics because it was quick and easy.

Antibiotic awareness campaigns were seen as an attempt by the health authorities to decrease medication costs and the deficit of the French National Health Insurance. Cost reduction was viewed poorly, especially in a context where antibiotics enjoyed great popularity and were considered as an absolute necessity. Participants negatively saw the perceived priority set by the government on health budget cuts and its failure to consider the consequence of sick leave, which also has a cost. In addition, they were condemning the pressure exerted by health authorities on doctors to reduce their prescriptions.

Despite their expressed mistrust of authorities, health agencies and the medical community, the participants expressed an entire trust in their doctors. They described their family GP as someone who understood them and 'knew them'. They felt they could discuss the prescription with him/her but would respect their decision no matter what.

The social role of antibiotics

1. The miracle of antibiotics

Although some individuals admitted overusing antibiotics and requesting them when they were not recommended by their doctors, participants felt they had a good knowledge of their bodies and only took them when necessary. Indeed, in their expectations of being cured, they often felt frustrated if no antibiotics were given to them when they felt really sick. While they considered that they did not ask for antibiotics, many of them returned to see their doctor after 3 or 4 days if they did not feel better. Other participants expressed their surprise that no antibiotics were prescribed to them. The support provided by the doctor to the patient during the healing process was often synonymous with the prescription of an 'effective treatment' and antibiotics were frequently regarded as the treatment of choice. Antibiotics were perceived as a special treatment and the only solution for them to be cured quickly.

2. The unspoken consequences of being sick

When asked about the non-prescription of antibiotics, all generations of participants expressed concern about sick leave. Sick leave was negatively perceived and difficult to experience; staying at home to rest for a common infection without any 'effective' treatment was an idea badly accepted by participants. Although they were aware that antibiotics were not effective for viral infections, the need to be active—for parents to be at work, for retired persons to take care of their grandchildren or being able to do their activities—was again their main priority regardless of their understanding of antibiotic use. Some participants, in order to prevent consulting their GP, were prone to self-medicate or medicate their children. Leftovers of previous antibiotic prescriptions were then preserved and sometimes leftovers of different treatments were combined. Antibiotics were seen as the only solution to cure any infection quickly. If they were not prescribed, participants were expecting an alternative treatment.

Discussion

Summary of main findings

Participants had partial knowledge about antibiotic resistance and its mechanisms. Its consequences were not experienced as a concern or seen as a close threat and the predictions were considered alarming. Antibiotic resistance was not perceived as a personal responsibility.

In their perception of antibiotic resistance stakeholders, they distinguished health authorities—whom they mistrusted—and the medical community—deemed to have little competence—from their family GP, whom they generally trusted.

The idea of being powerless over their illness and having to wait for a spontaneous recovery was very frustrating and difficult to accept. Despite their knowledge of the ineffectiveness of antibiotics for viral infections, the need to stay active and their negative perception of sick leave led them to set up strategies to get antibiotics. Some participants returned to their doctors several times while others kept leftover antibiotics.

Comparison with existing literature

Despite numerous awareness campaigns targeting the general population in France, participants had partial knowledge on antibiotic resistance. As described in many studies, participants thought it was their bodies that were becoming resistant, not the bacteria.[17,20,25] Although they did not feel responsible for the increase in antibiotic resistance, participants were very concerned

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about it. American and British studies have shown that unlike French and Swedish patients, most people in these countries did not identify antibiotic resistance as a threat.[21,22,25] The causes of antibiotic resistance identified by French participants were their presence in the environment and their overuse in agriculture and animal breeding, which has not been reported before to the best of our knowledge.[17,21,28]

As is well described in the literature, antibiotics were considered as the miracle treatment and a validation of the severity of the disease.[20,27] Despite their understanding of the ineffectiveness of antibiotics for viral infections, the non-prescription of antibiotics was seen as a minimization of the severity of the disease.[20,25,27]

Participants made a real distinction between the trust they have in their family GP, the suspicion towards the medical community and the disapproval of economic choices perceived to be driving health authorities. To the best of our knowledge this result had never been observed or reported. This may be explained by crises and health scandals having amplified distrust attitudes towards health expertise in France and in the rest of the world over the last few years.[40] Confidence in experts' assessments has become somehow relative and this phenomenon appears generalized in contemporary society.[41,42] Regarding antibiotics, the question is not so much the validity of scientific knowledge, often doubted such as in the case of vaccination,[43] but the faith placed in authorities whose interests are not perceived as being those of patients. Being suspicious of the medical community and authorities corresponds to a reflective positioning and a generalized attitude of mistrust toward institutions, characteristic of risk societies.[41,44,45] In such societies, scientific communication is often challenged.[46] However, our study shows the centrality of the doctor–patient relationship, particularly within uncertain times.

Often seen as an effective treatment and a way to heal quickly, participants expressed that antibiotics constitute an effective treatment to avoid sick leave. Sick leave was negatively perceived and difficult to experience for participants, therefore leading to overuse of antibiotics. This reflects another societal issue: the relationship between work and health status. While there exists today abundant literature on how patients with chronic disease, disability or long-term illness may encounter difficulties and need to adjust to the work market—and possibly on how the work environment finds solutions to keep them at work—the question of sick leave for acute illnesses, to our knowledge, is poorly documented. However, our study results highlight the social pressure for French people to return to work as soon as possible, and for retired people in our sample to recover quickly to stay active, notably regarding family duties. The phenomenon of presenteeism is today known but often explored with regards to poor workers' performance and mental health risks;[47,48] what remain to be better addressed and understood are social representations of recovery time after acute diseases, such as most viral infections.

Strengths and limitations

The qualitative approach in this study was particularly appropriate; the FGs, through group dynamics and confrontation of points of view, permitted participants' poor behaviour to be situated within their perception of antibiotics as miracle cures and antibiotic resistance as a distant threat. Identification and description of these perceptions and misconceptions will help target and implement specific interventions. However, the study presents some limitations. A possible selection bias cannot be excluded because: (i) those who agreed to participate are probably more knowledgeable about antibiotic stewardship than those who refuse; (ii) the sample had an over-representation of women, who are known to have better knowledge of antibiotics than men;[18] and (iii) retirees and parents of young children were targeted because they are heavy consumers of antibiotics, and therefore probably have knowledge and perception of antibiotics that cannot be generalized to the general population.

Implications

Widely promoted these days, the notion of 'One Health' is becoming increasingly important for antibiotic resistance. The interviews showed that participants were very concerned about the presence of antibiotics in the environment and its consequences for their health. The participants' interpretation of the presence of antibiotics in the environment (in particular in water), perceived to be mostly due to animal breeding, for example, was for them the main cause of antibiotic resistance. They denied their own involvement and responsibility for their suboptimal behaviour around their use of antibiotics. It is therefore crucial that awareness campaigns include a coherent One Health approach, to avoid misinterpretation and suspicion from the general public. This is all the more important since we are currently living in a context where one builds up a distrust in the authorities.

Participants expressed their doubts and dissatisfaction with political decisions affecting their daily lives. Any development of public health interventions must consider that the population is distrustful from the outset. The current context and its implications on health policy interpretations will not be changeable through public health interventions.

During the interviews, the need to be treated with antibiotics even in the case of viral infections highlighted an important drift of the idea 'I can't be sick'. Antibiotics are considered to be the miracle cure. Going home from the doctor, feeling very sick, without any antibiotic because the infection is viral, was unthinkable for the participants. Limiting the treatment to symptomatic medications is perceived as a lack of acknowledgement. Messages in awareness campaigns often associate viral infections with a benign and self-limiting illness. Asking individuals to be patient and to let the disease progress seems very poorly accepted. A spontaneous evolution of the disease towards healing over time, with a positive perception of the self-healing capacity of the body, are counterintuitive ideas as contemporary society leaves little place for disease and inactivity.[49]

Patients' trust in their family GP has made them the ideal ambassadors for antibiotic stewardship. This privileged position is a double-edged sword. Many high antibiotic prescribers are not convinced they overprescribe. In turn, their patients are unaware of good prescribing practices and current awareness campaign messages are not very effective on them. It is therefore a priority to inform and train doctors, to assist them in changing their communication and prescribing habits, as they have an essential role to play.

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Conclusions

This study showed that antibiotic resistance was considered an emerging problem by French people. Awareness campaigns targeting the public should take into consideration the following key findings: GPs play a vital role in the communication around antibiotic resistance and should be part of a wider One Health approach. Furthermore, actions targeting the public and health professionals will have little impact if, at the same time, efforts on work environment representations are not undertaken.

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Transparency declarations

None to declare.

Supplementary data

The survey is available as Supplementary data at *JAC-AMR* Online.

References

1 Ministère des Solidarités et de la Santé. Lutte et Prévention en France. 2019. https://solidarites-sante.gouv.fr/prevention-en-sante/les-antibiotiques-des-medicaments-essentiels-a-preserver/des-politiques-publiques-pour-preserver-l-efficacite-des-antibiotiques/article/lutte-et-prevention-en-france.

2 Ministère du Travail, de l'Emploi et de la Santé. Plan National d'Alerte sur les Antibiotiques 2011–2016. http://www.omedit-idf.fr/wp-content/uploads/2015/01/plan_antibiotiques_2011-2016_.pdf.

3 Le Galès C, Michelet C, Anger E *et al*. Évaluation du Plan National pour Préserver l'Efficacité des Antibiotiques, 2007-2010. 2011. https://www.hcsp.fr/explore.cgi/hcspr20110204_pnpeantibio.pdf.

4 Ministère des Solidarités et de la Santé. National Health Strategy 2018-2022. 2018. https://solidarites-sante.gouv.fr/IMG/pdf/dossier_sns_2017_synthesev6-10p_anglaisv2-2.pdf.

5 Comité Interministeriel pour la Santé. 1ère Réunion du Comité Interministériel pour la Santé Maîtriser la Résistance Bactérienne aux Antibiotiques. 2016. https://solidarites-sante.gouv.fr/IMG/pdf/feuille_de_route_antibioresistance_nov_2016.pdf.

6 Sabuncu E, David J, Bernède-Bauduin C *et al.* Significant reduction of antibiotic use in the community after a nationwide campaign in France, 2002–2007. *PLoS Med* 2009; **6**: e1000084.

7 Santé Publique France. Consommation d'Antibiotiques en Secteur de Ville en France de 2009 à 2018. Synthèse des Indicateurs mis en Ligne sur Géodes. 2019. https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/infections-associees-aux-soins/documents/rapport-synthese/consommation-d-antibiotiques-en-secteur-de-ville-en-france-de-2009-a-2018.-synthese-des-indicateurs-mis-en-ligne-sur-geodes.

8 ECDC. Antimicrobial Consumption in the EU/EEA—Annual Epidemiological Report for 2018. 2019. https://www.ecdc.europa.eu/sites/default/files/documents/Antimicrobial-consumption-EU-EEA.pdf.

9 Pechère JC. Patients' interviews and misuse of antibiotics. *Clin Infect Dis* 2001; **33**: S170–3.

10 Pechère JC, Hughes D, Kardas P *et al*. Non-compliance with antibiotic therapy for acute community infections: a global survey. *Int J Antimicrob Agents* 2007; **29**: 245–53.

11 Gautier A, Jauffret-Roustide M, Jestin C. Enquête Nicolle 2006—Connaissances, Attitudes et Comportements Face au Risque Infectieux. 2006. http://blogs.senat.fr/maladies-emergentes/files/Enqu%C3%AAte-sur-les-maladies-%C3%A9mergentes-INVS-2010.pdf.

12 Francis NA, Gillespie D, Nuttall J *et al.* Antibiotics for acute cough: an international observational study of patient adherence in primary care. *Br J Gen Pract* 2012; **62**: 429–37.

13 Wun YT, Lam TP, Lam KF *et al.* The public's perspectives on antibiotic resistance and abuse among Chinese in Hong Kong. *Pharmacoepidemiol Drug Saf* 2013; **22**: 241–9.

14 Llor C, Hernández S, Bayona C *et al.* A study of adherence to antibiotic treatment in ambulatory respiratory infections. *Int J Infect Dis* 2013; **17**: 168–72.

15 McNulty CAM, Boyle P, Nichols T *et al*. Don't wear me out—the public's knowledge of and attitudes to antibiotic use. *J Antimicrob Chemother* 2007; **59**: 727–38.

16 André M, Vernby Å, Berg J *et al.* A survey of public knowledge and awareness related to antibiotic use and resistance in Sweden. *J Antimicrob Chemother* 2010; **65**: 1292–6.

17 Hawkings NJ, Wood F, Butler CC. Public attitudes towards bacterial resistance: a qualitative study. *J Antimicrob Chemother* 2007; **59**: 1155–60.

18 Eurobarometer. Special Eurobarometer 478: Antimicrobial Resistance (in the EU)—Datasets. https://data.europa.eu/euodp/en/data/dataset/S2190_90_1_478_ENG.

19 Demoré B, Mangin L, Tebano G *et al.* Public knowledge and behaviours concerning antibiotic use and resistance in France: a cross-sectional survey. *Infection* 2017; **45:** 513–20.

20 Wellcome Trust. Exploring the Consumer Perspective on Antimicrobial Resistance. 2015. https://wellcome.ac.uk/sites/default/files/exploring-consumer-perspective-on-antimicrobial-resistance-jun15.pdf.

21 Carter RR, Sun J, Jump RLP. A survey and analysis of the American public's perceptions and knowledge about antibiotic resistance. *Open Forum Infect Dis* 2016; **3**: ofw112.

22 Ancillotti M, Eriksson S, Veldwijk J *et al*. Public awareness and individual responsibility needed for judicious use of antibiotics: a qualitative study of public beliefs and perceptions. *BMC Public Health* 2018; **18**: 1153.

23 Van Hecke O, Wang K, Lee JJ *et al*. Implications of antibiotic resistance for patients' recovery from common infections in the community: a systematic review and meta-analysis. *Clin Infect Dis* 2017; **65**: 371–82.

24 Kosiyaporn H, Chanvatik S, Issaramalai T *et al*. Surveys of knowledge and awareness of antibiotic use and antimicrobial resistance in general population: a systematic review. *PLoS One* 2020; **15**: e0227973.

25 Van Hecke O, Butler CC, Wang K *et al.* Parents' perceptions of antibiotic use and antibiotic resistance (PAUSE): a qualitative interview study. *J Antimicrob Chemother* 2019; **74**: 1741–7.

26 Brookes-Howell L, Elwyn G, Hood K *et al*. 'The body gets used to them': patients' interpretations of antibiotic resistance and the implications for containment strategies. *J Gen Intern Med* 2012; **27**: 766–72.

27 Cabral C, Ingram J, Lucas PJ *et al.* Influence of clinical communication on parents' antibiotic expectations for children with respiratory tract infections. *Ann Fam Med* 2016; **14**: 141–7.

Downloaded from https://academic.oup.com/jacamr/article/2/3/dlaa073/5917562 by guest on 02 March 2021

28 Bakhit M, Del Mar C, Gibson E *et al*. Exploring patients' understanding of antibiotic resistance and how this may influence attitudes towards antibiotic use for acute respiratory infections: a qualitative study in Australian general practice. *BMJ Open* 2019; **9**: e026735.

29 Mangione-Smith R, McGlynn EA, Elliott MN *et al*. Parent expectations for antibiotics, physician-parent communication, and satisfaction. *Arch Pediatr Adolesc Med* 2001; **155:** 800–6.

30 WHO. Global Action Plan on Antimicrobial Resistance. 2015. https://apps.who.int/iris/bitstream/handle/10665/193736/9789241509763_eng.pdf?sequence=1.

31 O'Neill J. Tackling Drug-Resistant Infections Globally: Final Report and Recommendations. Review on Antimicrobial Resistance. 2016. https://amr-review.org/sites/default/files/160518_Final%20paper_with%20cover.pdf.

32 Huttner B, Goossens H, Verheij T *et al*. Characteristics and outcomes of public campaigns aimed at improving the use of antibiotics in outpatients in high-income countries. *Lancet Infect Dis* 2010; **10**: 17–31.

33 Louise E, Cross A, Tolfree R *et al*. Systematic review of public-targeted communication interventions to improve antibiotic use. *J Antimicrob Chemother* 2017; **4**: 975–87.

34 Kivits J, Hanique M, Jacques B *et al*. L'appropriation de l'information médiatique au sujet de la prévention et du dépistage des cancers. *Temps des Medias* 2014; **23**: 151–63.

35 Quéré L. Faut-il abandonner l'étude de la réception? Point de vue. *Réseaux* 1996; **79**: 31–7.

36 Kivits J. Everyday health and the internet: a mediated health perspective on health information seeking. *Sociol Heal Illn* 2009; **31**: 673–87.

37 Kreuger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research*. Sage, 2014.

38 Kitzinger J, Markova I, Kalampalikis N. Qu'est-ce Que les Focus Groups? https://halshs.archives-ouvertes.fr/halshs-00533472.

39 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Heal Care* 2007; **19**: 349–57.

40 Ward JK, Cafiero F, Fretigny R *et al*. France's citizen consultation on vaccination and the challenges of participatory democracy in health. *Soc Sci Med* 2019; **220**: 73–80.

41 O'Neill O. *A Question of Trust*. Cambridge University Press, 2002.

42 Origgi G. *Qu'est-ce Que la Confiance*? Vrin - Chemins Philosophiques, 2008.

43 Larson HJ, de Figueiredo A, Xiahong Z *et al*. The state of vaccine confidence 2016: global insights through a 67-country survey. *EBioMedicine* 2016; **12**: 295–301.

44 Giddens A. *Modernity and Self-Identity: Self and Society in the Late Modern Age*. Stanford University Press, 1991.

45 Beck U, Ritter M. *Risk society: Towards a New Modernity*. Sage Publications, 1992.

46 Claessens M. *Science et Communication, pour le Meilleur ou pour le Pire*? Editions Quæ, 2009.

47 Gosselin E, Lauzier M. Le présentéisme. Lorsque la présence n'est pas garante de la performance. *Rev Française Gest* 2011; **211**: 15–27.

48 Aronsson G, Gustafsson K, Dallner M. Sick but yet at work. An empirical study of sickness presenteeism. *J Epidemiol Community Health* 2000; **54**: 502–9.

49 Sjöberg O. Positive welfare state dynamics? Sickness benefits and sickness absence in Europe 1997–2011. *Soc Sci Med* 2017; **177**: 158–68.

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Supplementary data

Sociodemographic data survey

Sex:

Age:

Domicile:

Marital status:

- ☐ Married
- ☐ Single
- ☐ Divorced
- ☐ Widowed

Number of minor children:

Level of education:

- ☐ None
- ☐ Diploma of Higher Education
- ☐ A level
- ☐ Bachelor
- ☐ Master
- ☐ PhD

Employment status:

- ☐ Unemployed
- ☐ Retired
- ☐ Student
- ☐ Employed

Estimated state of health:

- ☐ Very good
- ☐ Good
- ☐ Poor
- ☐ Very poor

Chronic health problem:

Chapitre 3

Community pharmacists' views on their current role and future opportunities towards antibiotic stewardship: a French qualitative study

Anaïs Essilini, Amélie Pierre, Aurélie Bocquier, Céline Pulcini, Christophe Wilcke, Julien Gravoulet, Béatrice Demoré, Nathalie Thilly

JAC-Antimicrobial Resistance, Volume 3, Issue 3, September 2021, dlab129, https://doi.org/10.1093/jacamr/dlab129

Résumé

Introduction

En France, 93% des antibiotiques sont dispensés en ville. Les pharmaciens d'officine ont donc un rôle essentiel dans le bon usage des antibiotiques. Depuis 2009, de nouvelles missions de santé publique sont accordées aux pharmaciens d'officine, élargissant leur rôle. Dans ce contexte d'évolution constante de leur profession, il semble intéressant d'étudier quelles missions et quels rôles les pharmaciens d'officine pourraient se voir attribuer dans le cadre de la lutte contre l'antibiorésistance, en ciblant les actions promouvant le bon usage des antibiotiques.

Objectif

L'objectif de cette étude était d'explorer les perceptions des pharmaciens d'officine concernant le bon usage des antibiotiques et l'antibiorésistance, leur rôle, leurs pratiques actuelles et l'évolution éventuelle de leurs missions pour contribuer au bon usage des antibiotiques.

Méthode

Des entretiens semi-directifs ont été conduits par A.E (doctorante de santé publique) et A.P (étudiante en 6ème année de pharmacie) dans deux départements du Grand Est (la Meurthe-et-Moselle et la Meuse) entre mai et octobre 2019. Un guide d'entretien, élaboré par A.E, N.T (pharmacienne, spécialiste de santé publique), C.P (médecin infectiologue), C.W et J.G (pharmaciens d'officine), a été construit autour de trois principaux thèmes : l'utilisation des antibiotiques et l'antibiorésistance, les pratiques actuelles des pharmaciens d'officine et les futures missions qu'ils se verraient attribuer dans le cadre du bon usage des antibiotiques. Tous les entretiens ont été enregistrés avec l'accord des participants et retranscrits mot à mot par A.E et A.P. Une analyse thématique a été réalisée en utilisant le logiciel Nvivo 11® par A.E et A.P.

Résultats

Vingt-sept entretiens ont été réalisés. La plupart des pharmaciens interrogés avaient conscience du problème de la résistance et de bonnes connaissances sur le bon usage des antibiotiques. Ils se

Perceptions des pharmaciens d’officine concernant le bon usage des antibiotiques considéraient comme les « gardiens du bon usage des médicaments » mais exprimaient des difficultés à agir en tant que tels en raison de relations difficiles avec les médecins généralistes. Actuellement, leurs principales implications dans le bon usage des antibiotiques consistaient à (i) éduquer les patients sur leur traitement et (ii) s’assurer de l’absence de contre-indications ou d’interactions médicamenteuses. Les pharmaciens interrogés estimaient qu'ils pourraient réaliser davantage de tests rapides d’orientation diagnostiques (TROD) pour les angines et plus encourager les patients à retourner les traitements non-utilisés à la pharmacie. Ils étaient divisés sur la possibilité de modifier la prescription du médecin et la plupart étaient contre l’initiation de la prescription d'antibiotiques par le pharmacien et la dispensation à l’unité des antibiotiques.

Conclusion

Les pharmaciens interrogés étaient prêts à agir davantage dans le cadre du bon usage des antibiotiques. Il est cependant nécessaire de travailler sur la collaboration entre les prescripteurs et les pharmaciens d’officine.

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JAC-Antimicrobial Resistance

Community pharmacists' views on their current role and future opportunities for antibiotic stewardship: a French qualitative study

Anaïs Essilini [1]*, Amélie Pierre[1], Aurélie Bocquier[1], Céline Pulcini[1,2], Christophe Wilcke[3], Julien Gravoulet[3,4], Béatrice Demore[1,4,5] and Nathalie Thilly[1,6]

[1]Université de Lorraine, APEMAC, F-54000 Nancy, France; [2]Université de Lorraine, CHRU-Nancy, Service des Maladies Infectieuses et Tropicales, F-54000 Nancy, France; [3]Union Régionale des Professionnels de Santé Pharmaciens du Grand Est, 4 rue Piroux, F-54000 Nancy, France; [4]ANTIBIOEST, CHRU Nancy, Réseau d'Antibiologie, F-54000 Nancy, France; [5]Université de Lorraine, CHRU-Nancy, Pôle Pharmacie-Stérilisation, F-54000 Nancy, France; [6]Université de Lorraine, CHRU-Nancy, Département Méthodologie, Promotion, Investigation, F-54000 Nancy, France

*Corresponding author. E-mail: anais.essilini@univ-lorraine.fr

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Background: Different healthcare professionals should contribute to antibiotic stewardship (ABS) activities. Involvement of community pharmacists (CPs) has been little explored worldwide to date.

Objectives: To explore French CPs' views on ABS and antibiotic resistance, their role and current practices, and future opportunities for ABS.

Methods: A qualitative study using semi-structured face-to-face individual interviews was performed from May to October 2019 among CPs from north-eastern France. Transcripts of the interviews were analysed using a thematic analysis.

Results: Twenty-seven interviews were conducted. Most participants had a clear understanding of antibiotic resistance and ABS. They considered themselves as 'guardians of the appropriate use of drugs' but often failed to fulfil this mission because of difficult relationships with physicians. Their current ABS practices are: (i) counselling patients about the antibiotic treatment; and (ii) reporting to the prescriber when they identify contraindications/drug interactions. Concerning their potential increased involvement in ABS, CPs felt they could perform more rapid diagnostic testing for sore throat; they were divided on the possibility for them to change the antibiotic prescription made by a physician and were mainly against the possibility of initiating an antibiotic prescription. The idea of systematically collecting unused antibiotics was perceived well by CPs, while unit dose delivery was not.

Conclusions: French community pharmacists are willing to become more involved in ABS activities. Collaboration and trust between pharmacists and prescribers should however be improved.

Introduction

Antibiotic resistance is a public health issue caused mostly by the overconsumption and misuse of antibiotics.[1–3] In France, most antibiotics are prescribed in the community setting (81% in 2015), especially by general practitioners (GPs) who are responsible for 70% of those prescriptions.[4] Since the 2000s, antibiotic stewardship (ABS) activities have thus been implemented, especially in French primary care (e.g. training of healthcare professionals, feedback to the GPs on their prescriptions, pay for performance).[5,6] Although consumption of antibiotics has declined since then in France, it still remains 30% higher than the European average.[7–9]

Community pharmacists (CPs) have a key role to play in ABS. They are often the most accessible healthcare professionals (geographical proximity, free consultation without appointment) and are in a unique position to educate patients and to provide triage for common primary care conditions.[10,11] In France, CPs' role in ABS is mostly limited to date to the transmission of information to patients and counselling.[12,13] However, since 2009, French CPs have been encouraged to have a more active public health role, by performing prevention, screening, rapid diagnostic testing or educational interventions.[14] In 2016, regulations went further, supporting the diversity of pharmaceutical practices, particularly in the context of antibiotic resistance.[15] Indeed, CPs' role in ABS has since been

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extended to rapid diagnostic testing for sore throat and, more recently, to flu and COVID-19 testing and vaccination.

However, CPs' knowledge and skills may be used to perform other activities, as is the case in other countries, such as: (i) prescription or delivery of some targeted antibiotics after a point-of-care testing;[12,15–18] (ii) structured collaboration with GPs as part of an agreement between both professionals;[16] and (iii) delivering the exact number of antibiotic pills for the treatment prescribed (unit dose delivery).[19]

Few studies[20–26] and one systematic review[27] have been performed to evaluate CPs' knowledge, perceptions and current practices towards ABS. Four survey studies were conducted in Pakistan, two each in Australia and the UK, and one in each of Malaysia, Qatar, Canada, China, Jordan and Ethiopia. Eight surveys were conducted recently.[20,21,24,25,27] Only three of them, conducted recently in Pakistan and two in the UK, were qualitative ones, which allow to explore an in-depth point of view[22,23,26] and none investigated potential expanded CP missions.

We performed a qualitative study to explore French CPs' views on: (i) antibiotic use/resistance and ABS; (ii) their role and current practices in ABS; and (iii) the future potential opportunities for ABS given the evolution of their profession.

Methods

Study design

We performed a qualitative study using semi-structured face-to-face individual interviews with CPs working in two regional areas of north-eastern France (Meurthe-et-Moselle and Meuse), between May and October 2019. The study follows the COREQ reporting guidelines (see Table S1, available as Supplementary data at *JAC-AMR* Online).[28]

French context regarding the antibiotic delivery process and ABS in community pharmacies

In France, antibiotics are delivered by CPs only on medical prescription, and these prescriptions should comply with existing national Best Practice Guidelines in infectious diseases, in particular those published and regularly updated by the French National Authority for Health.[29] As part of the medication delivering process, the CPs' role is to: (i) analyse the medication order (by checking the dosage, duration of treatment, absence of contraindications and drug interactions or redundancies and by checking that the medication order complies with regulatory requirements); (ii) validate it; and (iii) when delivering the medication, give patients advice about the antibiotic and its appropriate use.[30] All this process is called 'medication dispensation'.

CPs deliver the number of packages necessary to cover the duration of the treatment prescribed. This may exceed the exact number of pills required and produce leftovers. Some patients may keep leftovers and self-medicate or share their antibiotics with relatives.[19,31] Patients are however encouraged to return unused drugs (including antibiotics) to their pharmacist for safe disposal through the French system for retrieving and disposing of unused drugs called Cyclamed®, in place since 1993 (this system does not include any incentive for patients).[32]

Since 2016, French CPs have been authorized to use three types of point-of-care testing (POCT), including for sore throat (streptococcal test) and influenza. However, rapid diagnostic testing for sore throat has been reimbursed for CPs by the French National Health Insurance Fund since February 2020.[33] The measure has been suspended since March 2020 due to the COVID-19 pandemic.

Participants and setting

Firstly, we randomly selected 60 community pharmacies among the 320 pharmacies present in the study area [list provided by the Regional Pharmacist Society of Grand Est (URPS)]. Randomization was stratified by the pharmacy location (urban, suburban or rural area) with a planned final sample target of around 30 pharmacies agreeing to participate (10 in urban, 10 in suburban and 10 in rural areas) or fewer if data saturation was reached before. According to the literature, an heterogeneous sample of about 20 individuals is generally considered to be sufficient to reach data saturation.[34–36] However, randomization of an additional sample of 10 pharmacies was planned if data saturation was not reached with the first sample.

Secondly, we contacted the selected pharmacies by phone to explain the study's objectives, and then recruited by e-mail one graduate CP by pharmacy who agreed to participate. The restriction to one CP by pharmacy was motivated by the fact that CPs practicing in the same pharmacy often share the same perceptions of their current or future missions. Other professionals working in the pharmacy (e.g. technicians, pharmacy students) were not eligible.

Semi-structured interviews

The interviews followed an interview guide (Appendix S1) composed of open-ended questions exploring CPs' perceptions regarding three main topics: (i) antibiotic use/misuse and antibiotic resistance; (ii) pharmacists' current role in ABS; and (iii) the potential evolution of the pharmacists' missions towards ABS. At the end of the interview, participants also completed a short questionnaire on their sociodemographic characteristics (Appendix S2). The interview guide was developed by a multidisciplinary team composed of one infectious disease physician (C.P.), two public health specialists (one junior, one senior) with expertise in qualitative studies (A.E., N.T.) and two community pharmacists (J.G., C.W.), through an informal consensus based on an exhaustive literature review on antibiotic stewardship and CPs, and collective discussion.

The interviews were face-to-face individual interviews conducted on the premises of each participating pharmacy by students (A.E., public health, and A.P., pharmacist) trained in qualitative research interviews and analysis, and the expected duration was about 1 h. After an oral consent, all the interviews were recorded (to avoid incorrect or missing data) and transcribed. Participation was voluntary and not compensated. After the first interview, the two interviewers reviewed the transcripts and discussed with the multidisciplinary team whether some adjustments were needed to increase the relevance and the understanding of the guide questions.

Analysis

A thematic analysis was used to analyse transcripts with QSR International's Nvivo 12 software. An analysis grid was developed by the students who conducted the interviews after an independent analysis of 10% of the transcripts and was validated by the public health and infectious disease specialists. Each theme and subtheme were discussed until a consensus was reached. Each interview was then coded according to this grid.

Ethics

No ethical approval was required for such studies exploring perceptions in accordance with French law.

Results

Data saturation was reached after interviewing 27 CPs (from 27 different pharmacies) and we had to contact a total of 40

Table 1. Community pharmacists' characteristics ($n = 27$)

Characteristic	*N* (%)
Location of the pharmacy	
rural	9 (33)
suburban	9 (33)
urban	9 (33)
Sex	
male	13 (48)
Age, years	
[20–30[	6 (22)
[30–40[	4 (15)
[40–50[	8 (30)
[50–60[	6 (22)
≥60	3 (11)
Number of years of practice	
<5	6 (22)
[5–10[	2 (7)
[10–20[	8 (30)
≥20	11 (41)
Pharmacy's owner	16 (59)
Recent training in infectious diseases[a]	3 (11)

[a]Any post-university training in the year prior to the interview.

pharmacies to recruit these participants (participation rate = 67.5%). Characteristics of participants are presented in Table 1. About half were men, and the majority had at least 10 years of professional experience.

CPs' views on ABS and antibiotic use/misuse (Table 2)

Most participants (24/27) had a clear understanding of ABS, and of the different aspects that it includes. When asked about the importance of ABS, most CPs (19/27) first cited the risk of antibiotic resistance, perceived as an emerging public health issue.

The misuse of antibiotics perceived by almost all participants (22/27) was mainly due to prescribers' (mostly GPs) poor prescription practices. Participants often expressed harsh judgements about GPs, who 'prescribe however they want' without complying with guidelines (regarding molecule, dosage or treatment duration), yield to patient pressure, do not perform POCT and prescribe antibiotics in viral infections to prevent 'superinfection'. Some CPs (14/27) mentioned that it was urgently needed to remind physicians of guidelines on antibiotics.

Most participants (20/27) also reported patients' inappropriate practices, including self-medication, pressure put on GPs to prescribe or on CPs to obtain antibiotics without prescription, and discontinuation of treatment earlier than prescribed when symptoms improve. Such pressure was perceived to be due to the fact that patients consider antibiotics as the only treatment to stay active despite the illness. Most CPs (16/20) perceived patients as being highly demanding for antibiotics, but a few of them (5/27) reported that patients were increasingly aware of messages they provided regarding ABS.

CPs' views on their current role and practices (Table 3)

CPs' view of their role

Many participants (20/27) suffered from a lack of recognition of their profession. While they considered themselves as 'guardians of the appropriate use of drugs', CPs (12/20) felt to be perceived as mere salesmen of drugs, deliverers of drug prescriptions. Some participants (7/20) also reported that GPs positioned themselves 'above' the pharmacists. CPs felt that this lack of recognition prevented them from carrying out properly their 'guardian functions'.

Counselling patients

Providing information to or counselling patients was the main ABS action, done by all participants. When they deliver antibiotics to patients, CPs systematically reported providing advice on intake, respect of duration ('do not stop the treatment before the end, especially not when symptoms disappear'), reconstitution of oral suspension (judged as very poorly done by patients), adverse events and the importance of not sharing the treatment with relatives or not using it for another infection. A minority (3/27) even took advantage of this time to make patients aware of antibiotic resistance.

Medication order analysis and validation

When analysing orders, CPs may face prescriptions of antibiotics that they consider inappropriate. If they identify a contraindication or a drug interaction issue, all participants declared they contact the GP to discuss the prescription. If they identify that the choice of the molecule or the dosage is not appropriate according to guidelines, only CPs who have good relationships with the GPs (11/27) contact them to discuss the prescription. Duration of antibiotic treatment was rarely a reason for calling the prescriber.

When they feel it is necessary to contact the GP, some CPs (11/27) expressed having difficulty in reaching the prescriber at the right time, i.e. when the patient is waiting for his/her treatment in the pharmacy. Indeed, these CPs explained that, as the opening hours of the pharmacy correspond to GPs' consultation hours, physicians are often not available to answer the phone.

Another difficulty encountered by most CPs (22/27) is poor communication with prescribers. CPs feel that they are not always listened to by GPs, and sometimes even badly received. If the prescriber maintains his/her position concerning the prescription, some CPs (11/27) deliver the antibiotic without informing the patients of their doubts. Fewer CPs (7/27) involve the patients in the decision of delivering the treatment or not: they refer to guidelines or to specialized physicians' practices, explain to patients both points of view and let them make the choice.

However, some CPs (5/27) mentioned emergent collaborations between GPs and pharmacists to discuss difficult cases, and that they experience an easier dialogue with younger GPs. Most CPs (17/27) made practical suggestions to make communication between CPs and prescribers easier to improve ABS, such as: (i) using a secured instant messaging system with time slots during which physicians would reply (10/17); (ii) having access to the electronic patient medical record (e.g. clinical data, biological results, prescription history) to optimize the order analysis and thus to avoid disturbing the prescriber whenever possible (7/17); (iii) setting up multidisciplinary meetings to discuss patients' therapeutic

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Table 2. Selection of the most illustrative verbatims regarding participants' views on antibiotic stewardship and antibiotic use/misuse

Subtheme	Interview	Verbatim
Antibiotic stewardship	I1	*'The right antibiotic for the right condition, for the right amount of time, for the right purpose'*
Prescribers' antibiotic use/misuse	I18	*'You call the general practitioner and tell him/her "I have done the test, it's viral", he'll tell you "I know my patient. If I don't give him/her antibiotics, I'll see him/her again in three days, s/he'll be superinfected."'*
	I21	*'I have a person [paediatrician] in front of me who tells me that s/he doesn't believe in these guidelines and that her/his extensive experience as a paediatrician gives her/his practices that are out of the guidelines.'*
Patients' antibiotic use/misuse	I6	*'[. . .] and patients also ask for them [antibiotics], some patients start treatment at home with leftover tablets, and then there are requests for antibiotics, particularly for urinary tract infections.'*

Table 3. Selection of the most illustrative verbatims regarding participants' views on their current role and practices

Subtheme	Interview	Verbatim
Role	I20	*'We need to have more [responsibilities] with the change that's coming if we don't want our role to be reduced to a simple seller of drugs and for the patient to be able to identify us as a true healthcare professional'*
Counselling patients	I14	*'I have three words: recommendations, compliance, and associated advice [. . .] there is more but the most important is this'*
Prescription analysis and validation	I8	*'Except contacting the GP if you are facing a contraindication or drug interaction, you don't take the risk otherwise you get scolded because the GP has decided to prescribe it'*
	I23	*'We check the prescribed dose in relation to the pathology, then there is the duration. . . Unfortunately, we do not check with duration, which is often inadequate. We stop there'*
	I17	*'I don't do anything, because anyway the physician is going to be offended and we're not there to call him/her and disturb him/her, especially as the pharmacist is below the [medical] doctors'*
	I15	*'I have been insulted by a GP: "I prescribe, you deliver", a prescription means "to order"'*

management and share opinions (6/17); and (iv) integrating pharmacies into multidisciplinary medical practices (4/17), as geographical proximity allows a closer collaboration between healthcare professionals. Finally, 'in an ideal world', some CPs (5/17) imagined that physicians would be responsible for the diagnostic process and, when a drug is needed, pharmacists would be responsible for prescribing (including the choice of the molecule and the duration of treatment) and drug dispensing as, according to them, is the case in some Canadian areas.[37]

CPs' potential future missions (Table 4)

Prescription modification

Regarding the new ABS activities they would like to perform, many participants (14/27) mentioned prescription modification, defined as the possibility to: (i) change (if needed) an empirical antibiotic treatment after receiving the results of the antibiotic susceptibility testing (8/14); (ii) adapt the dosage and/or the molecule according to the patient's characteristics (5/14) (e.g. comorbidity, contraindication, allergy or renal insufficiency) without calling the prescriber for approval but informing him/her of the change; (iii) modify treatment duration to comply with guidelines (5/14); (iv) deliver a narrower-spectrum antibiotic than the one prescribed (3/14); and (v) unless contraindicated, switch to a first-line antibiotic (according to guidelines) if it has not been considered by the prescriber (3/14).

Initiating the antibiotic prescription

Most participants (22/27) mentioned the initiation of the antibiotic prescription, perceived to be the topical subject. Some of them (8/22), the most experienced ones (≥20 years of practice), were in favour of pharmacists being authorized to prescribe antibiotics, but only in very specific situations: for uncomplicated infections

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Table 4. Selection of the most illustrative verbatims regarding participants' opinions on their potential increased involvement in ABS in the future

Subtheme	Interview	Verbatim
Prescription changing	I9	*'The GP prescribes an empirical antibiotic treatment and then we have access to the result of the antibiotic susceptibility testing. Being able to correct it seems possible to me for the moment there is really no need to go back to the doctor'*
	I1	*'A lot of prescriptions of antibiotics that are not the first line antibiotics [recommended], so I see myself intervening at this level, so yes change of molecule is possible'*
Initiating prescription	I1	*'No, it's no longer pharmacy but medicine, prescribing within a very specific framework like in urinary tract infection or sore throat yes but not the rest'*
	I18	*'By allowing this, we open the door to misuse and resistance, if we are allowed to give amoxicillin it will banalize its use'*
Point-of-care testing	I14	*'They never, or rarely do [the antibiotic susceptibility testing (AST)], they, say "oh it's ok, I have the medication here". [. . .] Ideally, it would be a rapid diagnostic test [. . .] And then we discuss with the GP and say "well, the antibiotic susceptibility testing says that, what do we do?"'*
	I16	*'It takes time and patients are waiting and they wouldn't necessarily understand. The issue is also that there is no privacy [to conduct the test] at all and that's a problem, we can't do that at the counter'*
Delivering the exact number of pills	I26	*'We didn't do 6 years of study to cut blister packs'*
	I1	*'Doctors should already prescribe the right duration and the right dosage, because the packaging is made so that if the duration is not respected more boxes will be delivered'*
	I15	*'There is no need to deliver the exact number of pills, it is necessary to have the right number of pills per package according to the indications and we should also be allowed to give only for 7 days if it is written for 8 days and the packages are made for 7 days'*
Unused antibiotic disposal	I19	*'Often they bring us the packages of other treatments because they know that we take them back but it is true that I never thought of giving them this kind of information'*

[urinary tract infection (UTI), conjunctivitis and sore throat], after a POCT if available and in case of predefined emergencies (e.g. UTI in women) when a consultation with a GP is impossible. Other participants (14/22) were against the initiation of the prescription by CPs because of (i) the risk of delaying or masking another diagnosis; (ii) the risk of antibiotics becoming trivial if they are available without a prescription by a physician; (iii) the risk of fraud and excessive prescriptions, as the pharmacists' income depends on the quantity of drugs dispensed; and (iv) the risk for some patients to go from pharmacy to pharmacy to get antibiotics.

Point-of-care testing

Most participants (19/27) mentioned POCT, which they perceived as a means to improve patients' care and avoid unnecessary prescriptions of antibiotics. All of them (19/19) wished to do more sore throat tests to avoid medical consultations for viral infections: if the test is positive, the pharmacist refers the patient to the GP; otherwise, the patient is not encouraged to see the GP and a symptomatic treatment is recommended by the CP. Some participants (6/19) also mentioned the creation of rapid diagnostic testing for UTI, more specific than a urine dipstick. Such a test (when negative) would avoid the inappropriate delivery of an antibiotic under patient pressure while waiting for the results of a urine culture.

Some participants identified several barriers to using POCT: (i) they fear that authorization for them to perform POCT would make the GP–pharmacist collaboration even more difficult (8/19); and (ii) the question of the responsibility in withholding antibiotics in case of false negatives (4/19).

Unit dose delivery of antibiotics

Almost all participants (23/27) mentioned the unit dose delivery of antibiotics, which would allow the pharmacist to deliver the exact number of pills according to the prescription. They considered it unnecessary (17/23), ineffective to prevent self-medication and difficult to implement (e.g. not adapted for oral suspensions, commonly used for children). Some CPs (7/23) also argued that the time spent to repackage, print leaflets for each patient and ensure traceability will be more costly for the National Health Insurance than to compensate them for the time spent delivering antibiotic packages. Many CPs (14/27) mentioned alternative solutions to unit dose delivery: (i) the harmonization of prescribing practices (i.e. for a given indication, all physicians would prescribe the same dosage and duration for all patients) and the adaptation of the number of pills per package by pharmaceutical industry to avoid leftovers (7/14); and (ii) the ability for the CP to adapt the treatment duration to deliver a number of antibiotic packages that prevents patients from having leftovers (5/14).

Unused antibiotics' disposal

Many participants (10/27) mentioned disposal of unused antibiotics as an important tool for improving ABS. While many CPs currently fail to remind the patient to return unused antibiotics when delivering them, they were aware that this could improve ABS and reduce self-medication. They were willing to encourage more patients to do it.

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Discussion

Most interviewed CPs had a clear understanding of ABS and were aware of antibiotic resistance. They considered themselves as 'guardians of the appropriate use of drugs' but often failed to fulfil this mission due to difficult relationships with GPs. To date, their main involvement in ABS has included (i) counselling patients about the antibiotic treatment and (ii) reporting to the prescriber when they identify contraindications or drug interactions. Concerning their wish to increase their ABS involvement, CPs felt they could use more rapid diagnostic testing for sore throat, but they were divided on the possibility of them to changing the medical prescription of antibiotics, and most were against the possibility of initiating an antibiotic prescription. Unit dose delivery was not perceived well by CPs.

Unlike previous studies,[21–23] our results show that French CPs had a good knowledge of ABS. Barriers identified in the literature to implement ABS by CPs were: time available, no access to clinical data (especially the diagnosis), reimbursement models and relationships with other healthcare professionals.[26,27] This last factor was also found and particularly emphasized in our study. If patients' education, self-care advice, unit dose delivery and screening guideline compliance of antibiotic prescriptions were cited as CPs' activities in previous studies,[22,23,27] rapid diagnostic testing and CPs' antibiotic prescriptions were not mentioned. However, non-legal antibiotic delivery was observed in low-income countries.[21,24] None of the previous studies explored CPs' perceptions about the evolution of their missions toward ABS. It should be noted that CPs in several countries are allowed to initiate an antibiotic treatment. For example, in the USA, CPs engaged in collaboration practice agreements with GPs can use POCT for sore throat and flu, and then initiate an antibiotic or an antiviral treatment if necessary.[16] In the UK, CPs can initiate a treatment with azithromycin for a patient and his/her partners who test positive for *Chlamydia trachomatis*. In New Zealand, CPs who have completed specific training can initiate a short-term treatment with trimethoprim for an uncomplicated UTI.[38] In some Canadian regions, CPs can initiate antibiotics for some defined diseases and adapt and manage the medical prescription by changing the molecule, the dosage or the formulation.[37] Recently (in March 2020), and after our study was conducted, permission was given for French CPs engaged in a cooperation protocol with GPs to initiate antibiotic treatment for some situations: sore throat (after rapid diagnostic testing)[39] and UTI (after a review of eligible criteria and a urine dipstick).[40] Through dedicated software, CPs may have access to the GPs' electronic record of patients with an uncomplicated UTI or a sore throat within the framework of a cooperation protocol.

Unit dose delivery of antibiotics is routine practice in several countries (e.g. The Netherlands, USA, UK, Czech Republic).[19] In France, unit dose delivery of 14 antibiotics was trialled by 75 pharmacies in 2014–15 in a randomized controlled study, and showed a 10% reduction in the number of pills delivered. Moreover, it was well accepted by patients and improved their compliance with treatment.[41] Unit dose delivery will be implemented for certain drugs in France in 2022, but the exact list of drugs that will be targeted has not been published yet.[42] Our study shows that efforts should be made in order to improve CPs' acceptability of this measure.

Besides discussing potential new activities, participants also expressed a wish to build on their current missions, such as patient education/counselling. Participants also acknowledged the importance of unused drug disposal, and CPs could give patients some leaflets that have been developed by Cyclamed® and relayed by the French College of Pharmacists.[43] The return of unused antibiotics could reduce patients' self-medication or sharing as well as the selection of antibiotic-resistant bacteria caused by antibiotics discarded in household waste bins or in sinks.[44,45]

Antibiotic resistance is a global threat that requires the involvement of all healthcare professionals, not only prescribers, but also other professionals such as pharmacists, nurses or microbiologists. Thinking about the roles and missions of each professional and the way to improve collaboration between them in the field of infection management is essential. Based on a systematic review, Saha *et al.*[27] identified ways to improve ABS in community pharmacies, at various levels: personal (e.g. professional training), interpersonal (e.g. local GP–pharmacy practice agreement), community/policy (e.g. patient education campaigns), health system structure (e.g. decision support tools) and financial (e.g. remuneration for CPs involved in ABS programmes). Our study highlights the need to act at the interpersonal level and to achieve an optimal collaboration between healthcare professionals. Ways to facilitate discussion and teamwork and to promote trust between professionals may include regular GP–CP group meetings, practice agreements and greater interactions during initial and continuing training.[46,47]

The qualitative approach used in this study fit our objective: the semi-structured interviews allowed an in-depth exploration of pharmacists' perceptions and desire for professional development and also of the barriers that prevent them from achieving their goals. Besides, we randomly selected participants among all CPs located in two French regional areas, and the final sample included a diversity of profiles regarding experience and pharmacy location. However, we cannot exclude a possible selection bias as CPs who agreed to participate in interviews were probably more knowledgeable and interested in ABS than those who declined.

Conclusions

CPs who participated in this study had a clear understanding of ABS and were willing to be more involved in ABS activities. They were particularly in favour of doing more rapid diagnostic testing for sore throat and systematically reminding patients to bring back their unused antibiotics. To increase pharmacists' involvement in ABS there is however a critical need to improve collaboration and trust between pharmacists and physicians.

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Transparency declarations

None to declare.

Author contributions

N.T., C.P., C.W., J.G. and B.D. conceived the project. A.E., N.T., C.P., C.W. and J.G. developed the interview guide. A.E. and A.P. collected the data, elaborated the analysis grid and coded the interviews. A.E., A.P. and A.B. interpreted the results. A.E. and A.B. drafted the first version of the manuscript, which was reviewed by all authors.

Supplementary data

Table S1 and Appendices S1 and S2 are available as Supplementary data at *JAC-AMR* Online.

References

1 WHO. Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report. https://www.who.int/publications/i/item/9789240027336.

2 Goossens H, Ferech M, Vander Stichele R *et al*. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. *Lancet* 2005; **365**: 579–87.

3 Costelloe C, Metcalfe C, Lovering A *et al*. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. *BMJ* 2010; **340**: c2096.

4 Agence nationale de sécurité du médicament et des produits de santé. Evolution des Consommations d'Antibiotiques en France entre 2000 et 2015 - Point d'Information. https://www.antibio-responsable.fr/antioresistance/-/media/EMS/Conditions/Consumer%20Healthcare/AntiBioTherapic/PDFFiles/ANSM-rapport-antibio_janv2017.pdf.

5 Wang S, Pulcini C, Rabaud C *et al*. Inventory of antibiotic stewardship programs in general practice in France and abroad. *Med Mal Infect* 2015; **45**: 111–23.

6 Dyar OJ, Beović B, Vlahović-Palčevski V *et al*. How can we improve antibiotic prescribing in primary care? *Expert Rev Anti Infect Ther* 2016; **14**: 403–13.

7 Santé Publique France. Consommation d'Antibiotiques en Secteur de Ville en France de 2009 à 2018. Synthèse des Indicateurs mis en Ligne sur Géodes. https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/infections-associees-aux-soins/documents/rapport-synthese/consommation-d-antibiotiques-en-secteur-de-ville-en-france-de-2009-a-2018.-synthese-des-indicateurs-mis-en-ligne-sur-geodes.

8 Drekonja DM, Filice GA, Greer N *et al*. Antimicrobial stewardship in outpatient settings: a systematic review. *Infect Control Hosp Epidemiol* 2015; **36**: 142–52.

9 ECDC. Antimicrobial Consumption - Annual Epidemiological Report for 2018. https://www.ecdc.europa.eu/en/publications-data/surveillance-antimicrobial-consumption-europe-2018.

10 Rusic D, Bukić J, Seselja Perisin A *et al*. Are we making the most of community pharmacies? Implementation of antimicrobial stewardship measures in community pharmacies: a narrative review. *Antibiotics* 2021; **10**: 63.

11 Légifrance. Article L1411-11 - Code de la Santé Publique. https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000031930722/.

12 Zuzana K, Fighting Antimicrobial Resistance: The Contribution of Pharmacists. International Pharmaceutical Federation. https://www.fip.org/files/fip/publications/2015-11-Fighting-antimicrobial-resistance.pdf.

13 Lee C-R, Cho IH, Jeong BC *et al*. Strategies to minimize antibiotic resistance. *Int J Environ Res Public Health* 2013; **10**: 4274–305.

14 Légifrance. LOI n° 2009-879 du 21 juillet 2009 Portant Réforme de l'Hôpital et relative aux Patients, à la Santé et aux Territoires. https://www.legifrance.gouv.fr/loda/id/JORFTEXT000020879475/.

15 Ameli. Signature de l'Avenant 18 sur les TROD de l'Angine. https://www.ameli.fr/sites/default/files/Documents/658456/document/avenant-18-convetion-nationale-pharmacien.pdf.

16 Klepser ME, Adams AJ, Klepser DG. Antimicrobial stewardship in outpatient settings: leveraging innovative physician-pharmacist collaborations to reduce antibiotic resistance. *Health Secur* 2015; **13**: 166–73.

17 Barnett ML, Linder JA. Antibiotic prescribing to adults with sore throat in the United States, 1997-2010. *JAMA Intern Med* 2014; **174**: 138–40.

18 Linder JA, Stafford RS. Antibiotic treatment of adults with sore throat by community primary care physicians: a national survey, 1989–1999. *JAMA* 2001; **286**: 1181–6.

19 Grigoryan L, Burgerhof JGM, Degener JE *et al*. Determinants of self-medication with antibiotics in Europe: the impact of beliefs, country wealth and the healthcare system. *J Antimicrob Chemother* 2008; **61**: 1172–9.

20 Darwish RM, Baqain GN, Aladwan H *et al*. Knowledge, attitudes, and practices regarding antibiotic use and resistance among community pharmacists: a cross sectional study in Jordan. *Int J Clin Pharm* 2021. doi: 10.1007/s11096-021-01234-1.

21 Feng Z, Hayat K, Huang Z *et al*. Knowledge, attitude, and practices of community pharmacy staff toward antimicrobial stewardship programs: a cross-sectional study from Northeastern China. *Expert Rev Anti Infect Ther* 2021; **19**: 529–36.

22 Pia A, Anita T, Weidmann E *et al*. Views and experiences of community pharmacy team members on antimicrobial stewardship activities in Scotland: a qualitative study. *Int J Clin Pharm* 2020; **42**: 1261–9.

23 Atif M, Asghar S, Mushtaq I *et al*. Community pharmacists as antibiotic stewards: a qualitative study exploring the current status of Antibiotic Stewardship Program in Bahawalpur, Pakistan. *J Infect Public Health* 2020; **13**: 118–24.

24 Akbar Z, Saleem Z, Shaukat A *et al*. Perception and practice of community pharmacist towards antimicrobial stewardship in Lahore, Pakistan. *J Glob Antimicrob Resist* 2021; **25**: 157–61.

25 Waseem H, Ali J, Sarwar F *et al*. Assessment of knowledge and attitude trends towards antimicrobial resistance (AMR) among the community members, pharmacists/pharmacy owners and physicians in district Sialkot, Pakistan. *Antimicrob Resist Infect Control* 2019; **8**: 67.

26 Jones LF, Owens R, Sallis A *et al*. Qualitative study using interviews and focus groups to explore the current and potential for antimicrobial stewardship in community pharmacy informed by the Theoretical Domains Framework. *BMJ Open* 2018; **8**: e025101.

27 Saha SK, Barton C, Promite S *et al*. Knowledge, perceptions and practices of community pharmacists towards antimicrobial stewardship: a systematic scoping review. *Antibiotics* 2019; **8**: 263.

28 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007; **19**: 349–57.

29 Haute Autorité de Santé. Practice Guidelines and Other Guides. https://www.has-sante.fr/jcms/fc_2875171/en/resultat-de-recherche?text=tmpParam=typesf%3Dguidelinestypesf=guidelinesopSearch=portal=prd1_2986155.

30 Ordre National des Pharmaciens. Arrêté du 28 novembre 2016 Relatif aux Bonnes Pratiques de Dispensation des Médicaments dans les Pharmacies d'Officine, les Pharmacies Mutualistes et les Pharmacies de Secours Minières. http://www.ordre.pharmacien.fr/Communications/Publications-ordinales/Bonnes-pratiques-de-dispensation-des-medicaments.

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31 Essilini A, Kivits J, Caron F *et al*. 'I don't know if we can really, really change that': a qualitative exploration of public perception towards antibiotic resistance in France. *JAC-Antimicrobial Resist* 2020; **2**: dlaa073.

32 CYCLAMED. https://www.cyclamed.org/cyclamed/.

33 Ameli. Facturation et Rémunération: TROD Angines. https://www.ameli.fr/pharmacien/exercice-professionnel/facturation-remuneration/trod-angines/trod-angines.

34 Morgan MG, Fischhoff B, Bostrom A *et al. Risk Communication*. Cambridge University Press, 2001.

35 Francis JJ, Johnston M, Robertson C *et al.* What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychol Health* 2010; **25**: 1229–45.

36 Guest G, Bunce A, Johnson L. How many interviews are enough?: an experiment with data saturation and variability. *Field Methods* 2006; **18**: 59–82.

37 Canadian Pharmacists Association. Pharmacists' Scope of Practice in Canada. https://www.pharmacists.ca/pharmacy-in-canada/scope-of-practice-canada/.

38 Gauld NJ, Zeng ISL, Ikram RB *et al*. Antibiotic treatment of women with uncomplicated cystitis before and after allowing pharmacist-supply of trimethoprim. *Int J Clin Pharm* 2017; **39**: 165–72.

39 Légifrance. Arrêté du 6 mars 2020 Relatif à l'Autorisation du Protocole de Coopération «Prise en charge de l'Odynophagie par l'Infirmier Diplômé d'Etat ou le Pharmacien d'Officine dans le Cadre d'une Structure Pluri-Professionnelle». https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000041697956/.

40 Légifrance. Article 1 - Arrêté du 6 mars 2020 Relatif à l'autorisation du Protocole de Coopération «Prise en Charge de la Pollakiurie et de la Brûlure Mictionnelle Chez la Femme de 16 à 65 ans par l'Infirmier Diplômé d'Etat et le Pharmacien d'Officine dans le Cadre d'une Structure Pluri-Professionnelle». https://www.legifrance.gouv.fr/jorf/article_jo/JORFARTI000041697970.

41 Treibich C, Lescher S, Sagaon-Teyssier L *et al.* The expected and unexpected benefits of dispensing the exact number of pills. *PLoS One* 2017; **12**: e0184420.

42 Légifrance. LOI n° 2020-105 du 10 février 2020 Relative à la Lutte Contre le Gaspillage et à l'Économie Circulaire. https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000041553759/.

43 CYCLAMED. Collectivités Locales: Kit de Sensibilisation. https://www.cyclamed.org/partenaire/collectivites-locales-kit-de-sensibilisation/.

44 Wang Y, Tang W, Qiao J *et al*. Occurrence and prevalence of antibiotic resistance in landfill leachate. *Environ Sci Pollut Res Int* 2015; **22**: 12525–33.

45 Fahrenfeld N, Bisceglia KJ. Emerging investigators series: sewer surveillance for monitoring antibiotic use and prevalence of antibiotic resistance: urban sewer epidemiology. *Environ Sci: Water Res Technol* 2016; **2**: 788–99.

46 Saha SK, Kong DCM, Thursky K *et al*. Divergent and convergent attitudes and views of general practitioners and community pharmacists to collaboratively implement antimicrobial stewardship programs in Australia: a nationwide study. *Antibiotics* 2021; **10**: 47.

47 Löffler C, Koudmani C, Böhmer F *et al.* Perceptions of interprofessional collaboration of general practitioners and community pharmacists - a qualitative study. *BMC Health Serv Res* 2017; **17**: 224.

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Supplementary data

Table S1. COREQ checklist

No Item	Guide questions	Reported in page
Domain 1: Research team and reflexivity		
Personal Characteristics		
Interviewer/facilitator	Which author/s conducted the interview or focus group?	6, 15
Credentials	Credentials What were the researcher's credentials? E.g. PhD, MD	6
Occupation	What was their occupation at the time of the study?	6
Gender	Was the researcher male or female?	6
Experience and training	What experience or training did the researcher have?	5
Relationship with participants		
Relationship established	Was a relationship established prior to study commencement?	5
Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	5
Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	NA
Domain 2: study design		
Theoretical framework		
Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	6
Participant selection		
Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	5
Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	5
Sample size	How many participants were in the study?	6
Non-participation Setting	How many people refused to participate or dropped out? Reasons?	6
Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	6
Presence of non-participants	Was anyone else present besides the participants and researchers?	None
Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	6, 22
Data collection		
Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	5, 15
Repeat interviews	Were repeat interviews carried out? If yes, how many?	NA
Audio/visual recording	Did the research use audio or visual recording to collect the data?	6

Field notes	Were field notes made during and/or after the interview or focus group?	NA
Duration	What was the duration of the interviews or focus group?	NA
Data saturation	Was data saturation discussed?	5
Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
Domain 3: analysis and findings		
Data analysis		
Number of data coders	How many data coders coded the data?	6
Description of the coding tree	Did authors provide a description of the coding tree?	No
Derivation of themes	Were themes identified in advance or derived from the data?	6
Software	What software, if applicable, was used to manage the data?	6
Participant checking Reporting	Did participants provide feedback on the findings?	No
Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number	23, 24
Data and findings consistent	Was there consistency between the data presented and the findings?	6-11, 23, 24
Clarity of major themes	Were major themes clearly presented in the findings?	6-11, 23, 24
Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	6-11, 23, 24

Appendix S1. Interview guide

Topic 1: antibiotic stewardship

Estimated time: 15 minutes

1) For you, what is antibiotic stewardship?
2) Why do you think it is important to promote antibiotic stewardship? What are the objectives?
3) Do you have any experience with antibiotic misuse?
    - Are you confronted to antibiotic misuse?
    - What kind?
    - Do you sometimes have an antibiotic prescription for a viral infection? What is your attitude to this?
    - Have you ever informed a patient that the infection was viral and would not heal faster with antibiotics?
    - What is your attitude towards a prescription of antibiotics that is not compliant with guidelines?

Topic 2: Current practices regarding antibiotic stewardship

Estimated time: 15 minutes

4) Through which daily actions do you intend to contribute to antibiotic stewardship?
5) What are, in your opinion, the legally/regulatory defined actions that you could implement to contribute to antibiotic stewardship?
6) How does a dispensation of antibiotics happen?

Topic 3: Future potential missions

Estimated time: 30 minutes

7) In an ideal world, with optimal inter-professional cooperation, without any institutional/regulatory or financial obstacles, what could be your future missions?
    - What types of point-of-care testing could you use? What importance do you attach to these tests?
    - What could be your role in the quantity delivered?
    - How do you validate the appropriateness of an antibiotic prescription? Do you act at all levels?
    - What actions of prevention and education could you perform?
    - Can you imagine prescribing antibiotics? In which cases?

For innovative ideas:

- How would you do it in practice?
- How would you be paid?

8) What would you imagine yourself doing as part of a pharmacist-health professional collaboration?

Is there something you would like to add?

Appendix S2. Demographic data survey

All information collected below will be treated as confidential.

Interview number : _ _ _

Date : _ _/_ _/_ _ _ _

Location : _____

1. Sex :

☐ Female

☐ Male

2. Age range:
3. Number of years of practice: <5, 5-10, 10-20, >20
4. Pharmacy owner: ☐Yes☐ No
5. Participation in training in infectious diseases in the last year: ☐Yes☐ No
6. Postcode:_____

   City: _____
7. Pharmacy characteristics:

   Number of employees:

   Pharmacist:

   Pharmacist assistant:

Number of GPs around the pharmacy:

Pharmacy's size: ☐ small ☐ medium ☐ large

Pharmaceutical consultation: ☐Yes ☐ No

8. Location :

   ☐ Urban

   ☐ Suburban

   ☐ Rural

9. Agreement with a nursing home: ☐ Yes ☐ No
10. Member of an infectious diseases society: ☐ Yes ☐ No

Partie 2

Interventions visant à promouvoir le bon usage des antibiotiques et leurs évaluations

Chapitre 4

Antibio'Malin: an e-health resource to raise awareness of antibiotic stewardship and resistance in France

Sophie Rodari*, **Anaïs Essilini***, Gaëlle Le-Dref, Félicie Patoor, Joëlle Kivits, Nathalie Thilly and Céline Pulcini

* Co-premier auteur

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Chapitre 4

Résumé

Introduction

Des études récentes ont montré que les connaissances du public sur l'usage des antibiotiques sont incomplètes voir erronées. Ces dernières années, Internet est devenu l'une des principales sources d'information sur les sujets de santé, au même titre que les professionnels de santé. En 2016, 68% des Français recherchaient des informations sur la santé sur Internet et moins de la moitié en discutaient avec leur médecin généraliste. Cependant, à notre connaissance, aucun site internet ou application pour smartphone contenant des informations fiables, pratiques et orientées vers le public sur les antibiotiques, les infections, le bon usage et la résistance aux antibiotiques n'est disponible en français ou en anglais.

Objectifs

Les objectifs étaient de : (i) développer un site national d'information sur les principales infections et les traitements antibiotiques ; (ii) l'évaluer auprès de professionnels de santé et d'usagers ; et (iii) lancer une version finale du site.

Méthode

La conception et l'évaluation étaient basées sur le processus suivant : (i) le développement d'un site pilote par un groupe d'experts multidisciplinaire ; (ii) une phase d'évaluation, utilisant des méthodes mixtes impliquant des professionnels de la santé (médecins généralistes et pharmaciens d'officine) et les usagers ; et (iii) le lancement d'une version finale du site web et l'enregistrement des premières données d'utilisation (statistiques d'utilisation sur les six premiers mois).

L'évaluation était constituée : (i) d'entretiens semi-directifs conduits auprès de professionnels de santé (médecins généralistes et pharmaciens d'officine), (ii) un questionnaire en ligne, (iii) des focus groupes réalisés auprès d'usagers et (iv) du recueil de commentaires directement sur le site. Le questionnaire et les guides d'entretiens ont été élaborés par A.E (doctorante de santé publique), G.L-D (épistémologiste) et S.R (interne en infectiologie). Ils ont été relus par J.K (sociologue), N.T (pharmacien

spécialiste de santé publique) et C.P (médecin infectiologue). Les entretiens ont été conduits par A.E et G.L-D, retranscrits mot pour mot par A.E et S.R et analysés par A.E et G.L-D.

Résultats

Antibio'Malin (https://sante.fr/antibiomalin), soutenu par le Ministère des Solidarités et de la Santé, contient des informations pratiques destinées au public sur les antibiotiques utilisés en ambulatoire et sur les infections les plus courantes, pour améliorer l'usage des antibiotiques. Une rubrique " Pour en savoir plus " apporte des précisions sur différents concepts, comme la résistance aux antibiotiques. Dans le cadre de l'évaluation, huit médecins généralistes et cinq pharmaciens d'officine ont été interrogés en entretiens individuels semi-directifs, 46 usagers ont répondu à un questionnaire en ligne et cinq focus groupes auprès d’usagers ont été organisés (17 participants). De plus, plus de 100 personnes (professionnels et usagers) ont donné leur avis directement sur le site. Le site a été bien accueilli par les professionnels de santé, notamment les médecins généralistes, et décrit comme un site de référence pour les patients et un outil de communication. Les usagers avaient aussi apprécié le site. L'évaluation a permis d'améliorer le site avant son lancement officiel le 18 novembre 2019 lors de la semaine mondiale contre l'antibiorésistance. Six mois après son lancement, plus de 25 000 personnes avaient visité le site internet.

Conclusion

Antibio'Malin a été développé pour sensibiliser et fournir des informations sur les antibiotiques, les infections les plus courantes et la résistance aux antibiotiques au public, ainsi que pour servir d'outil de communication avec leurs patients pour les professionnels de santé. Une étude post-lancement serait utile pour explorer l'impact du site sur les perceptions, attitudes et connaissances des usagers. Néanmoins, il est nécessaire d’améliorer la communication autour d'Antibio'Malin pour augmenter son utilisation.

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JAC-Antimicrobial Resistance

Antibio'Malin: an e-health resource to raise awareness of antibiotic stewardship and resistance in France

Sophie Rodari[1]†, Anaïs Essilini [1]*†, Gaëlle Le-Dref[1], Félicie Patoor[1], Joëlle Kivits[1], Nathalie Thilly[1,2] and Céline Pulcini[1,3]

[1]Université de Lorraine, APEMAC, Nancy, France; [2]Université de Lorraine, CHRU-Nancy, Département Méthodologie, Promotion, Investigation, Nancy, France; [3]Université de Lorraine, CHRU-Nancy, Service de Maladies Infectieuses et Tropicales, Nancy, France

*Corresponding author. E-mail: anais.essilini@univ-lorraine.fr
†Both authors contributed equally to this work

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Objectives: To develop a nationwide French website with reliable, practical and public-oriented information on antibiotic stewardship and resistance.

Methods: The design and evaluation were based on the following process: (i) development of a pilot website by a multidisciplinary group; (ii) evaluation phase, using mixed methods and involving health professionals (GPs and community pharmacists) and the general population; and (iii) launch of a final version of the website with 6 month follow-up usage statistics.

Results: The Antibio'Malin website (https://sante.fr/antibiomalin), supported by the French Ministry of Health, contains practical information for the general population on antibiotics marketed in the outpatient setting and on the most common infections, with an antibiotic stewardship perspective. A 'For further information' section provides details on various concepts, such as antibiotic resistance. As part of the evaluation, 8 general practitioners and 5 community pharmacists were individually interviewed, 46 health system users replied to an online questionnaire and 5 focus groups were conducted (17 participants). In addition, more than 100 people (professionals and general population) provided feedback directly on the website. The website was well received by health professionals, particularly general practitioners, and described as a reference site for patients and a communication tool. The general population also found the site useful. Several comments helped improve the website before the launch of the final version on 18 November 2019. At 6 month follow-up, more than 25 000 persons had visited the website.

Conclusions: The Antibio'Malin information website was developed and tested. Post-launch data suggest a useful addition to the multifaceted French national antibiotic stewardship strategy.

Introduction

Antibiotic resistance is a public health emergency. In Europe, in 2015, an estimated 33 000 patients died of multiresistant bacterial infections.[1] As antibiotic resistance is accelerated by the use of antibiotics, antibiotic stewardship programmes are essential to tackle antibiotic resistance. Antibiotic use in France is high as compared with other European countries;[2] 80% of antibiotics are prescribed by primary care providers.[3] Information and communication to the general population on antibiotics and antibiotic resistance is essential.[3,4] In the 2018 French Eurobarometer study, 35% of people declared that antibiotics are effective against viruses, 16% reported that antibiotics should be stopped when they feel better and only 45% remembering getting information in the previous year about how unnecessary use of antibiotics reduces their effectiveness.[5] Internet has become one of the leading sources of information on health topics, along with health professionals (HPs).[6,7] Indeed, 59% of Americans surveyed in The Pew Internet & American Project's study[7,8] in 2013 and 51% of French people in the Ad-Santé-Net survey in 2012[7] declared they had searched for health-related information on the internet in the past year and at least once a week, respectively. In 2016, 68% of French people were looking for health information on the internet and almost half discussed it with their general practitioners (GPs).[9–11] However, to the best of our knowledge, no website or smartphone application with reliable, practical and

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public-oriented information on antibiotics, infections, antibiotic stewardship and resistance is available in French or in English.

Our objective was to develop such a nationwide French website, supported by health authorities, based on the following stepwise process: (i) development of a pilot website by a multidisciplinary group; (ii) evaluation phase, using a mixed-method and involving HPs and the general population; and (iii) launch of a final version of the website with 6 month follow-up usage statistics.

Methods

Design of the website

A multidisciplinary working group was set up in April 2018, including four GPs, seven infectious diseases specialists, four pharmacists, one paediatrician, two dentists, one midwife, one nurse, one microbiologist, one infection prevention and control practitioner, one sociologist, three public health specialists, two patients' representatives, three programmers and five Health Insurance representatives from the Grand Est region. This group was tasked with defining: (i) the objectives; (ii) the target population; and (iii) the content of the website, as well as producing the content and reviewing it based on the evaluation.

The project was coordinated by the public health research unit of Lorraine University, in northeastern France, in collaboration with the Ministry of Health (MoH), the Health Insurance (both national and regional), the regional Health Agency and the regional antibiotic stewardship network (AntibioEst). No specific funding was received to develop the website. The design of the pilot website and its editing was done by the MoH's staff under the supervision of the working group. A pilot version of the website was available in May 2019.

Evaluation of the pilot website

Once a pilot website was available, it was assessed in two ways: (i) evaluation in northeastern France using mixed methods; and (ii) large pilot-testing at national and regional levels, with feedback sent by users directly through the website.

1. Evaluation in northeastern France

This evaluation was based on: (i) semi-directed individual interviews conducted between 31 July and 30 August 2019 with HPs [GPs and community pharmacists (CPs)]; (ii) an online survey conducted among users coming from the general population in August; and (iii) focus groups involving users between 14 and 18 September. The interview guides and the survey were first drafted by G.L.-D. (epistemologist), A.E. (PhD candidate) and S.R. (infectious diseases trainee), and then reviewed by J.K. (senior sociologist), N.T. (public health specialist) and C.P. (infectious diseases specialist).

a. Health professionals GPs were recruited through the professional network of the multidisciplinary working group. CPs were recruited through professional and social networks and by directly approaching CPs on site. The interviews aimed at assessing their opinion and perceptions regarding the relevance and the quality of the website as a source of information for the general population, and as a possible communication tool with patients. They were also asked about modifications, improvements, and additions they felt were necessary or useful to make. The interviews were conducted until data saturation was reached.

b. Health system users (HSUs) Participants were recruited through various methods: (i) through two associations (France Assoc'Santé, Office Nancéien des Personnes Agées); (ii) through the networks of the evaluation team (J.K., A.E., S.R., G.L.-D.); and (iii) through the public mailing list of Lorraine University. The HSUs who agreed to participate were asked to test the website during a 2 week period and complete an online survey (Figure 1). The survey was hosted on SurveyMonkey© (see Appendix S1, available as Supplementary data at *JAC-AMR* Online). Focus groups were then conducted, until data saturation, by G.L.-D. and A.E. to further explore the attractiveness, usability and quality of information of the website and to assess the users' understanding of antibiotic resistance. Focus group participants were recruited from the survey and through the personal and professional networks of the evaluation team. Participants of the survey and focus groups were recruited according to their family situation and/or their age: only elderly people (over 65 years old) and parents of children under 18 years old were included, children and elderly people being the two populations that use antibiotics the most in France.[1,2]

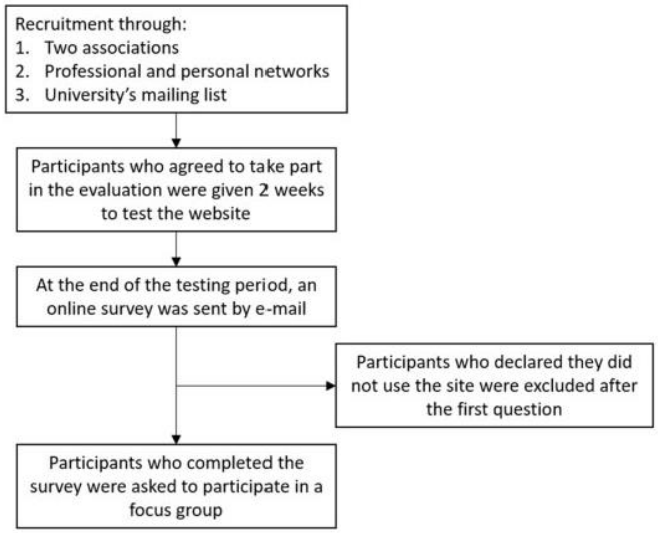


Figure 1. Online survey participation process.

2. Large-scale pilot testing at national and regional levels, with feedback received by users directly through the website

Each page on the website allowed for collection of anonymous feedback from users, with data available in an Excel©spreadsheet.

During a 2 month period (July and August 2019), a large group of HPs, patients and general population was asked to test the website and provide feedback, as well as to ask up to 10 of their relatives, peers or patients to do the same. We sent this request to the multidisciplinary working group of the project as well as to the Antibiotic Resistance National Action Plan stakeholders' group, coordinated by the MoH.

Data analysis

For qualitative studies (individual interviews and focus groups), all interviews were recorded after an oral informed consent from participants. Complete transcripts of the interviews were made. A comprehensive thematic analysis allowing an inductive approach was performed by A.E. and G.L.-D. An analytical grid was elaborated by G.L.-D. to highlight the ideas most often put forward by the participants.

Regarding the online survey and the feedback collected directly from the website, descriptive statistics were performed for closed questions and open-ended responses were analysed using an analysis grid to assess the most frequently recurring ideas.

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Ethical statement

The evaluation was anonymous at all stages thus no ethical approval was required in accordance with French law.

Launch with 6 month follow-up usage statistics

In September and October 2019, the pilot website was amended according to the results of the evaluation. The final version of the website was officially launched on 18 November 2019 by the MoH. Usage statistics were collected during a 6 month follow-up period.

Results

Design of the website

To design the pilot website, three meetings of the project multidisciplinary working group were held (in addition to regular e-mail exchanges) and the website content was revised four times.

The objectives, target audience and content outline of the website were defined by the multidisciplinary working group. Two objectives, each with a specific target population, were identified: (i) providing practical information regarding common infections, antibiotics and antibiotic resistance to the general population, on a website that anyone could access on their own; and (ii) providing support to HPs to facilitate their communication with their patients. The content outline was developed bearing in mind the following principles: (i) the content would address situations commonly met in primary care; (ii) the content would be short and practical (addressing questions commonly raised by patients), with an antibiotic stewardship perspective; and (iii) weblinks pointing towards reliable sources of information (e.g. health authorities) would be listed in case the user wants further information on a specific topic.

The website was organized around three sections: 'Antibiotics', 'Common infections' and 'For further information' (Tables 1, 2 and 3). All systemic antibiotics available in primary care in France were listed.[13] The most common viral and bacterial infections were included.[14–16] The 'For further information' section was presented as frequently asked questions (FAQs), detailing questions commonly asked by patients to HPs.

The name of the website was discussed during the working group meetings. It was finally decided to use the name 'Antibio'Malin', with 'antibio' being a familiar short name for 'antibiotic' and 'malin' meaning 'smart'.

Antibio'Malin was included as a specific thematic resource in the MoH website, called Santé.fr (santé meaning health). The Santé.fr website (also available as an app) was launched by the MoH in early 2019 and intends to become the reference health website for all French people. It provides and aggregates all types of health information, but only includes reliable, high-quality and validated information. Users can send anonymized feedback on all webpages to help improve the content. Antibio'Malin is available in French at the following URL: https://sante.fr/antibiomalin.

Evaluation

The evaluation was conducted using both a mixed-methods study in northeastern France among HPs and HSUs and large-scale pilot testing at national and regional levels using feedback sent by users directly through the website.

Table 1. List of antibiotics presented on the Antibio'Malin website

Antibiotics ($N = 42$)
Amoxicillin
Amoxicillin/clavulanate
Azithromycin
Benzathine benzylpenicillin
Cefaclor
Cefadroxil
Cefalexin
Cefixime
Cefotiam
Cefpodoxime
Ceftriaxone
Cefuroxime
Ciprofloxacin
Clarithromycin
Clindamycin
Cloxacillin
Doxycycline
Erythromycin
Fosfomycin tromethamine
Fusidic acid
Josamycin
Levofloxacin
Lomefloxacin
Metronidazole
Minocycline
Moxifloxacin
Nitrofurantoin
Norfloxacin
Ofloxacin
Ornidazole
Phenoxymethylpenicillin
Pivmecillinam
Pristinamycin
Roxithromycin
Spiramycin
Spiramycin/metronidazole
Sulfadiazine
Sulfamethoxazole/trimethoprim
Telithromycin
Tetracycline/metronidazole/bismuth
Tetracycline
Trimethoprim

For each of them, there is information on the antibiotic class, the risk of resistance [medium or high, according to the National Drug Agency (ANSM) categorization],[32] the main infections for which it is recommended (according to national guidelines), how the antibiotic should be taken by the patient and its potential impact on daily life (e.g. exercise, alcohol). Antibiotics were listed under their international non-proprietary names (INN), as part of the usual policy of government websites.

The northeastern evaluation included: (i) semi-directed interviews of HPs; (ii) an online survey; and (iii) focus groups, the latter two conducted among HSUs. Thirteen individual interviews of HPs (eight GPs and five pharmacists) were conducted, with interviews lasting between 25 and 45 min. Out of a total of 63 people who

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Table 2. List of infections presented on the Antibio'Malin website

Infections ($N = 20$)
Bronchitis
Bronchiolitis
Chickenpox
Dental abscess
Dental caries
Erysipelas
Gastroenteritis
Herpes
Impetigo
Influenza
Laryngitis
Mycosis
Otitis
Pneumonia
Sinusitis
Common cold
Tonsillitis
Urethritis
Urinary tract infection in women
Urinary tract infection in men

For each of them, information on the type of infection (viral or bacterial), how one becomes infected, the duration of symptoms, the treatments that might be useful and how to prevent the infection is specified.

Table 3. List of 'for further information' questions of the Antibio'Malin website

For further information ($N = 24$)
What is inflammation?
What is an infection?
What is a microbe?
What is a virus?
What are bacteria?
What is *S. aureus*?
What is *E. coli*?
What is an antibiotic?
What are the adverse effects of taking antibiotics?
What is the microbiota?
What is antibiotic resistance?
What is the rapid diagnostic test for tonsillitis?
How to reduce the risk of being infected?
How to cough?
How to properly use my antibiotics?
Where can I find the INN on my antibiotic package?
What to do if the name on my prescription is not matching the one on the antibiotic package?
How to reconstitute my medication?
What to do if I forget to take my antibiotic?
What to do if I vomit after taking my antibiotic?
What to do if my child is asking questions?
Where I can find patients' stories?
What is the drug effectiveness?
What is a recommendation?

The 'For further information' section includes 24 FAQs on terminology (e.g. virus, bacteria, inflammation, recommendation), antibiotic resistance, general health advice, where to find the INN and answers to common questions about antibiotic use.

agreed to evaluate the site, 46 responded they used the site for 2 weeks (Figure 1 and Appendices S2 and S3), with 42/46 questionnaires totally completed (Table 4). Five focus groups were performed, with a total of 17 participants (Table 5).

Regarding the large-scale pilot testing at national and regional levels, with feedback received by users directly on the website, more than 100 different persons sent at least one comment. The results presented here focus on the most common comments.

The site was perceived by all as being of high quality and complete, with the most common infections for which antibiotics are used (appropriately or not) being listed. Antibio'Malin was considered to be of public interest and useful in daily life. The site, especially the introduction on the homepage, reminded almost all participants, HSUs and HPs, of the nationwide awareness campaign 'antibiotics are not automatic' that took place in the early 2000s. This campaign was viewed as a good campaign with a clear and useful message. Antibio'Malin was thus perceived favourably as a follow-up of this campaign, raising awareness on antibiotic resistance, and providing more precise information on the infections that may or may not require an antibiotic. During the interviews, all participants expressed a very general acceptance of the government action to inform, communicate and provide guidance on antibiotics and antibiotic resistance.

HPs considered Antibio'Malin as a good communication tool to initiate a discussion with their patients, especially to those requesting an explanation and/or pressing them to prescribe antibiotics. Some of the GPs compared the use they might have of Antibio'Malin to the use they have of the non-prescription pad promoted by the National Health Insurance.[17] HPs, particularly GPs, declared they no longer feel threatened by online health information sites. On the contrary, they said that they appreciate this access to information for their patients as it contributes to make their consultations easier and more efficient. They enjoyed the benefits of a well-informed patient. HPs appreciated that Antibio'Malin was hosted on an official website like the one of the MoH. Many pointed out the need to stress this issue more among the general population so they could realize the seriousness of antibiotic resistance and develop a more responsible attitude towards antibiotics. Although it was not the purpose of Antibio'Malin, some professionals viewed it as a site they could use themselves directly for information or updates. Some of the professionals criticized the site for its information being too specialized.

Among the HSUs, Antibio'Malin was perceived to be user-friendly with an understandable language. The access to direct weblinks to the 'For further information' section on the 'Antibiotics' or 'Common infections' pages was highly appreciated. Participants were surprised to discover some adverse effects of antibiotics (e.g. contraindication to exercise or sun exposure). They were particularly curious about the impact of antibiotics on the microbiota, a topic highly publicized in different media in France. Most of them discovered the threat of antibiotic resistance for modern medicine.

Asked about the impact of such an information website on the relationship they have with their GPs, users did not express any

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Table 4. Survey questionnaire respondents' characteristics ($N = 46$)

Characteristic	*n*
Sex	
female	33
male	13
Age (years)	
18–29	10
30–39	14
40–49	7
50–59	6
60–69	4
≥70	5
Level of education	
A level and under	11
bachelor	14
master	9
PhD	11
Marital status	
married	19
single	18
divorced/widowed	5
Work situation	
unemployed	4
retired	8
student	6
employed	24
Medical background	14
Estimated health status	
very good	12
good	27
poor	3
very poor	0
Has children	10

questioning of the GPs' authority. The website did not tempt them to self-medicate, but rather provided them information on antibiotics to discuss the prescription with their GPs. They viewed Antibio'Malin as a tool to increase their knowledge and take better care of themselves.

We list here the most common suggestions for improvement, made by both the HSUs and HPs. They repeatedly expressed criticism of the form or structure of the site. The navigation was felt as being difficult and there was a poor understanding of the antibiotic resistance risk scale. The introduction was found to be too long, the risk of antibiotic resistance was not sufficiently highlighted and explained, and the urgency of the antibiotic resistance threat should be more detailed. The use of international non-proprietary names (INN) was found impractical to look for a specific antibiotic, since brand names are widely used in French practice.

Improvements made before the official launch

The main changes made prior to the launch concerned the homepage, the content of the introduction, information on antibiotic resistance and the navigation. The homepage was redesigned with each section introduced with a short description of the information included in this section. More information on antibiotics and antibiotic resistance was provided in the relevant sections.

Launch with 6 month follow-up usage statistics

Antibio'Malin was launched by the MoH on 18 November 2019, during the World Antibiotic Awareness Week (18–24 November 2019) and the European Antibiotic Awareness Day (18 November 2019). The MoH, in collaboration with all its partners (e.g. national and regional health agencies, professional organizations, patients' associations), promoted (and continues to do so) the website through different channels, in particular social media, press releases, conferences, flyers, videos and existing antimicrobial resistance related websites.[18]

From 18 November 2019 to 25 May 2020, 27 741 people from more than 26 countries (Table 6 and Figure 2) visited the website and the average time spent on the site was 2 min.

Discussion

Summary of the main findings

A website, Antibio'Malin, was created to support patients and healthcare professionals with common infections, the role of antibiotics and the impact of antibiotic resistance. Antibio'Malin was positively perceived by HPs and the users. GPs reported that the use of such a website would facilitate their consultations and their communication with patients. The HSUs saw in Antibio'Malin the opportunity to be engaged in the decision of care and to initiate a discussion with their GPs.

Comparison to the existing literature

Presented in the early 2000s as a threat to GPs' authority, online information websites have emerged as a new tool to improve quality of care for both GPs and patients.[19] GPs considered Antibio'Malin as a support to their consultation to facilitate discussion especially when they did not wish to prescribe antibiotics. As found in the literature, they were favourable to patient information including through the internet.[20] In addition, the use of information documents for patients is also one of the strategies recommended to decrease antibiotic use.[21] HSUs did not see Antibio'Malin as an opportunity to contradict their GPs, but rather as a way to better communicate with them. Most of them said they trusted their GPs and had no desire to challenge them, which is consistent with the literature.[22,23] Being informed is not questioning medical authority, but, according to several studies, it is being able to have richer exchanges with one's GP and being more active in the process of diagnosis, prevention and care.[24] Users appeared to want to be more involved in their own health, which is in line with health democracy and patient empowerment.[9] Antibio'Malin did not seem to tempt people into self-medication. HSUs interest in the microbiota is also consistent with the idea that taking care of your microbiota is taking care of your health.[25]

Strengths and limitations of Antibio'Malin

The main strength of Antibio'Malin is the access to verified information, hosted on an official government site. The information

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Table 5. Focus group characteristics ($N = 17$)

Participants	Age (years)	Sex	Level of education	Medical background
Group 1. Retirees				
P1	66	female	master	yes
P2	67	female	master	no
P3	67	male	master	no
P4	67	male	PhD	no
Group 2. Parents and retirees				
P1	61	female	master	no
P2	51	female	master	no
Group 3. Parents				
P1	31	female	bachelor	no
P2	33	female	youth training	no
P3	36	female	bachelor	no
Group 4. Retirees				
P1	82	male	A level	no
P2	72	female	master	yes
P3	67	female	master	yes
Group 5. Retirees				
P1	67	female	A level	no
P2	74	female	none	no
P3	69	female	Diploma of Higher Education	yes
P4	74	male	Diploma of Higher Education	no

Table 6. List of countries from which users visited the Antibio'Malin website over the 6 month follow-up period

Countries	Number of visits
France	15 893
United States	168
Belgium	154
Morocco	132
Tunisia	104
Algeria	90
Cameroon	48
Canada	41
United Kingdom	38
Switzerland	28
Senegal	27
Burkina Faso	24
Côte d'Ivoire	23
Gabon	23
Portugal	21
Spain	19
Germany	18
Madagascar	18
Brazil	14
Israel	13
Luxembourg	13
Haiti	12
Netherlands	11
India	10
Mali	10
Turkey	10

thus appears as trustworthy and reliable. The website was co-constructed with a multidisciplinary working group and evaluated by a panel of professionals and HSUs, including GPs and CPs, using a mixed-methods approach. Furthermore, Antibio'Malin responds to most of the recommendations published by the Wellcome Trust on how to communicate effectively about antibiotic resistance.[26] Antibio'Malin provides simple and straightforward information on antibiotic resistance and what actions the general population can perform to tackle it.

One limitation of the evaluation of Antibio'Malin is the profile of participants. Participation in the evaluation requires personal time (using the site and answering the survey or participating in the interviews) without any compensation. HPs who agreed to participate are therefore likely to be HPs interested in antibiotic stewardship. Similarly, users are most likely to be aware of health problems in general, and antibiotics in particular. Moreover, 14 out of 46 respondents to the survey had a 'medical background'. Thus, there is probably a selection bias. Furthermore, Antibio'Malin is hosted by the Santé.fr website of the MoH as a thematic section. Not being a website on its own, Antibio'Malin is so far not referenced as such in search engines. If a search is made on antibiotics, Antibio'Malin currently does not appear among the first results. It will probably then only be consulted by those who are aware of its existence or who regularly consult Santé.fr. An ongoing communication effort is required to make Antibio'Malin known to professionals and the general population. HPs, in particular GPs and pharmacists, in which patients place their trust, have a major role to play to promote the website, using for example the flyer that has been produced (https://solidarites-sante.gouv.fr/IMG/pdf/flyers_antibiomalin_format_a5-final.pdf). Finally, the launch of Antibio'Malin was quite recent, so it is not yet possible to assess the long-term

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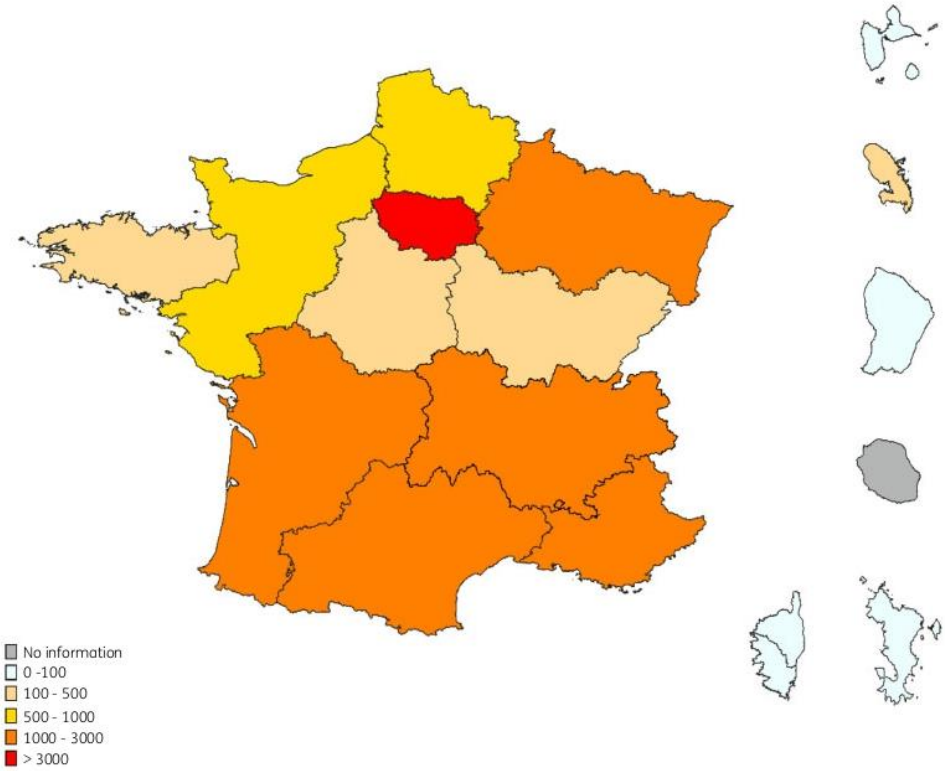


Figure 2. Geographical distribution of the number of French visits to the Antibio'Malin website.

uptake of this resource. Moreover, it will be difficult to assess its impact on antibiotic use, since several antibiotic stewardship interventions are being implemented at the same time in France.[27]

Implications

Antibio'Malin provides expert knowledge to patients and HPs to better inform their antibiotic stewardship and antibiotic resistance understanding. In France, demand from patients is a driver of antibiotic use.[28] This is exacerbated by the anticipation of this demand by prescribers who go beyond their patients' perceived expectations of prescription.[29] Antibiotics are often perceived by patients as the only remedy to be cured fast, even in case of viral infections.[30,31] As a result, improving patient knowledge can lead to improved diagnosis, therapeutic choices and economic gains.[20,24] Antibio'Malin could improve antibiotic appropriateness, and consequently impact: (i) the prescriptions made to 'please the patient' even if prescribers know they are unnecessary; (ii) the prescribers' misreading of patients' expectations regarding prescriptions; and (iii) the patient' awareness of the risks of antibiotics (adverse effects, including the impact on the microbiota and antibiotic resistance). Although the literature shows that information acquired through the internet does not eliminate the need to consult a healthcare professional,[24] the knowledge of the duration of symptoms could also prevent patients from reconsulting too quickly and trying to obtain the antibiotic they were not prescribed the first time.

Antibio'Malin meets the first objective of the WHO's global action plan to improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.[4] Our results might be useful for other countries that are considering implementing a similar intervention.

Future plans

Since its launch, Antibio'Malin's update was entrusted to the Grand Est regional antibiotic stewardship network, AntibioEst, which participated in its development. Continuous feedback from users is collected and will be used to improve the website further; at the end of each page, users are able to assess the usefulness of the information and enter comments. Usage statistics are also automatically collected and made available to AntibioEst and the MoH.

Conclusions

Antibio'Malin was developed to raise awareness and provide information on antibiotics, infections and antibiotic resistance to everyone, as well as serving as a communication tool for HPs. A post-launch study would be useful to explore the website's impact on the HSUs' perceptions, attitudes and knowledge. Nevertheless, it should be associated with other communication and awareness-raising interventions, and ongoing promotion of Antibio'Malin by all stakeholders is needed to increase its uptake.

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Transparency declarations

None to declare.

Author contributions

C.P. conceived the project. S.R., A.E. and F.P. drafted the content of the website, which was first reviewed by C.P. and then by the whole project working group. A.E. and G.L.-D. conducted the mixed-methods evaluation part, under the supervision of J.K., N.T. and C.P. S.R., A.E. and G.L.-D. drafted the first version of the manuscript, which was reviewed by all authors.

Supplementary data

Appendices S1 to S3 are available as Supplementary data at *JAC-AMR* Online.

References

1 Cassini A, Högberg LD, Plachouras D *et al.* Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: a population-level modelling analysis. *Lancet Infect Dis* 2019; **19**: 56–66.

2 ECDC. Antimicrobial Consumption in the EU/EEA: Annual Epidemiological Report for 2018. https://www.ecdc.europa.eu/sites/default/files/documents/Antimicrobial-consumption-EU-EEA.pdf.

3 Ministère des Solidarités et de la Santé. Feuille de Route de l'Antibiorésistance. http://solidarites-sante.gouv.fr/IMG/pdf/feuille_de_route_antibioresistance_nov_2016.pdf.

4 WHO. *Global Action Plan on Antimicrobial Resistance*. WHO Press, 2015. https://www.who.int/antimicrobial-resistance/global-action-plan/en/.

5 Eurobarometer. Special Eurobarometer 478: Antimicrobial Resistance (in the EU). Datasets. 2018. https://data.europa.eu/euodp/en/data/dataset/S2190_90_1_478_ENG.

6 Dupagne D. Les nouvelles informations en santé. *Les Trib la Santé* 2010; **4**: 33–9.

7 Kivits J, Gendarme S, Les institutions publiques, Internet et la santé: de l'offre publique aux usages privés. In: *La Santé: du Public à L'Intime*. Presses de l'EHESP, 2015; 141.

8 Pew Research Center. The Internet and Health. https://www.pewresearch.org/internet/2013/02/12/the-internet-and-health/.

9 Cases A-S. L'e-santé: l'empowerment du patient connecté. *J Gest d'Économie Médicales* 2017; **35**: 137–58.

10 Patients & Web. A la Recherche du ePatient. Les Français et l'Internet Santé: Maladie Chronique et Numérique Attitude. 2013. http://www.patientsandweb.com/wp-content/uploads/2013/04/A-la-recherche-du-ePatient-externe.pdf.

11 IPSOS. Usages et Attentes des Français à l'Égard du Digital en Matière d'Information sur leur Santé. 2016. https://www.ipsos.com/fr-fr/usages-et-attentes-des-francais-legard-du-digital-en-matiere-dinformation-sur-leur-sante.

12 Santé Publique France. Consommation d'Antibiotiques en Secteur de Ville en France de 2009 à 2018. Synthèse des Indicateurs mis en ligne sur Géodes. Novembre 2019. https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/infections-associees-aux-soins/documents/rapport-synthese/consommation-d-antibiotiques-en-secteur-de-ville-en-france-de-2009-a-2018.-synthese-des-indicateurs-mis-en-ligne-sur-geodes.

13 Ministère des Solidarités et de la Santé. Base de Données Publique des Médicaments. http://base-donnees-publique.medicaments.gouv.fr/.

14 Antibioclic. Antibioclic: Antibiothéraphie Rationnelle en Soins Primaires. https://antibioclic.com/.

15 Haute Autorité de Santé. Portail HAS Professionnels. https://www.has-sante.fr/jcms/fc_2873790/fr/professionnels.

16 Ameli. Les Thèmes de Santé. https://www.ameli.fr/assure/themes-de-sante/a.

17 Assurance Maladie. Fiche d'Information de Non Prescription. 2015. https://www.ameli.fr/sites/default/files/Documents/4074/document/information-antibiotiques-non-prescrits_assurance-maladie.pdf.

18 Ministère des Solidarités et de la Santé. Antibio'Malin. https://solidarites-sante.gouv.fr/prevention-en-sante/les-antibiotiques-des-medicaments-essentiels-a-preserver/des-antibiotiques-a-l-antibioresistance/article/antibio-malin.

19 Méadel C, Akrich M. Internet, tiers nébuleux de la relation patient-médecin. *Les Trib la Santé Sève* 2010; **2**: 41–8.

20 Experton B. L'information est l'avenir des patients et des systèmes de santé. *Trib la Sante* 2017; **54**: 55–9.

21 Duffaud S, Liébart S. Comment les médecins généralistes limitent-ils leurs prescriptions? Étude qualitative par entretiens collectifs. *Sante Publique (Paris)* 2014; **26**: 323–30.

22 Ancillotti M, Eriksson S, Veldwijk J *et al*. Public awareness and individual responsibility needed for judicious use of antibiotics: a qualitative study of public beliefs and perceptions. *BMC Public Health* 2018; **18**: 1153.

23 Carter RR, Sun J, Jump RLP. A survey and analysis of the American public's perceptions and knowledge about antibiotic resistance. *Open Forum Infect Dis* 2016; **3**: ofw112.

24 Farajallah M, Le Goff-Pronost M, Penard T *et al*. Quoi de neuf docteur? Une étude économétrique sur la recherche en ligne d'informations médicales par les patients. *J Gest d'Économie Médicales* 2015; **33**: 231.

25 Paxson H, Helmreich S. The perils and promises of microbial abundance: novel natures and model ecosystems, from artisanal cheese to alien seas. *Soc Stud Sci* 2014; **44**: 165–93.

26 Wellcome Trust. Reframing Resistance. 2019. https://wellcome.ac.uk/reports/reframing-antimicrobial-resistance-antibiotic-resistance.

27 Les Antibiotiques: des Médicaments Essentiels à Préserver - Ministère des Solidarités et de la Santé. 2019. https://solidarites-sante.gouv.fr/prevention-en-sante/les-antibiotiques-des-medicaments-essentiels-a-preserver/.

28 Rosman S. Les pratiques de prescription des médecins généralistes. Une étude sociologique comparative entre la France et les Pays-Bas. In: *Singuliers Généralistes. Sociologie de la Médecine Générale*. Presses de l'EHESP, 2010; 117–32.

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29 Mangione-Smith R, McGlynn EA, Elliott MN *et al.* Parent expectations for antibiotics, physician-parent communication, and satisfaction. *Arch Pediatr Adolesc Med* 2001; **155**: 800–6.

30 Wellcome Trust. Exploring the Consumer Perspective on Antimicrobial Resistance. 2015. https://wellcome.org/sites/default/files/exploring-consumer-perspective-on-antimicrobial-resistance-jun15.pdf.

31 Cabral C, Ingram J, Lucas PJ *et al.* Influence of clinical communication on parents' antibiotic expectations for children with respiratory tract infections. *Ann Fam Med* 2016; **14**: 141–7.

32 ANSM. Agence Nationale de Sécurité du Medicament. Liste des Antibiotiques Critiques. 2016. http://ansm.sante.fr/content/download/85395/1077521/version/1/file/ATBC-antibiotiques-critiques-actualisation2015.pdf.

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Supplementary data

Appendix S1. Online survey

Preamble

Question 1: Did you test the Antibio'Malin site during the last two weeks?

- ☐ Yes
- ☐ No

The survey ends if the person chooses "no" as an answer.

Communication/attractivity section

Question	Strongly disbelieve	Disbelieve	Believe	Strongly believe
The site is enjoyable				
There are enough pictures or illustrations				
There are enough concrete examples				

Question 5: What should be modified to make the site more enjoyable to visit?

Maniability

Question	Strongly disbelieve	Disbelieve	Believe	Strongly believe
The site is easy to use				
I quickly found the sections (or information) that interested me				

Question 8: Did you find everything you were looking for?

- ☐ Yes
- ☐ No

If 'no':

⇒ Question 9: What information were you looking for?

Question 10: What should be modified to make the site easier to use?

Chapitre 4

Information

Question 11: Did you understand all the information you read?

- ☐ Yes
- ☐ No

If 'no':

⇒ Question 12: What did you not understand?

Question 13: Did you find the information useful?

- ☐ Strongly disbelieve
- ☐ Disbelieve
- ☐ Believe
- ☐ Strongly believe

Question 14: Did the information on the site answer your questions?

- ☐ Yes
- ☐ No

If 'no':

⇒ Question 15: What kind of information did you not find?

Sociodemographic data

Sex:

Age:

Domicile:

Marital status:

- ☐ Married
- ☐ Single
- ☐ Divorced
- ☐ Widowed

Number of minor children:

Level of education:

- ☐ None
- ☐ Diploma of Higher Education
- ☐ A level
- ☐ Bachelor
- ☐ Master

- PhD

Employment status:

- Unemployed
- Retired
- Student
- Employed

Estimated state of health:

- Very good
- Good
- Poor
- Very poor

Chronic health problem:

Thank you for answering this survey.

Question 16 (only for retired people and parents): Would you be interested in participating in an interview with one of our project managers?

It will be a collective interview held in Nancy in August. A project manager will contact you by phone to propose one or more dates, and to inform you about the exact place and modalities of the interview. The aim of the interview will be to explore further specific issues such as the topic of antibiotic resistance and the possible evolution of your perception of antibiotics.

Your participation would be very valuable to us: it would allow us to adapt the content of the site before its launch in November by the Ministry of Solidarity and Health.

If the answer is 'yes':

Thank you for your interest in this study. Please leave us a phone number. We will get back to you as soon as possible.

Appendix S2. Public's interview guide

1/ What did you expect from Antibio'Malin? In what way were your expectations satisfied or not satisfied?

2/ According to you, for whom and in what context could Antibio'Malin be useful?

3/ To whom and for what reasons could you recommend Antibio'Malin?

4/ Before consulting Antibio'Malin, were you aware of the risks of using antibiotics? What do you think the risks are? What has Antibio'Malin taught you about those risks? Why are you possibly concerned

about those risks?

5/ Have you ever heard of antibiotic resistance? What do you think antibiotic resistance is?

6/ In your opinion, how can we avoid the development of antibiotic resistance? In your opinion, what is your responsibility, and the responsibility of others, for antibiotic resistance?

7/ Do you now perceive antibiotics differently? If so, how?

8/ What behaviours would you change regarding antibiotics use? For what reasons? How do you plan to use antibiotics in the future?

9/ Do you plan to further discuss your antibiotic prescriptions with your doctor, pharmacist, or any other health professional? If so, why?

10/ What do you think should be done to improve Antibio'Malin?

Appendix S3. Health professional's interview guide

1/ What did you think of Antibio'Malin?

2/ Did you find the site " agreable "?

- Pleasant to consult
- Clear/educational content
- Well-illustrated

3/ Did Antibio'Malin seem easy to use to you?

4/ Were you satisfied with the information found?

- Quality
- Suitable for the public
- No significant deficiencies

5/ Do you think some information should be added? Which ones?

- On Adverse Reactions
- On antibiotic resistance

6/ For what type of situation or patients does Antibio'Malin seem useful to you?

7/ What should be improved to make Antibio'Malin useful to the patients or situations that need it the most?

8/ Do you think Antibio'Malin can be a good complement to your own explanations? Why?

9/ Do you think Antibio'Malin can help you in your practice?

- Less prescribing
- Negotiating with patients
- Doing pedagogy

10/ Do you think that Antibio'Malin can be an effective tool to promote a better use of antibiotics?

11/ Have you found that certain explanations could mislead patients? Make them overly wary of antibiotics and conventional medicine?

12/ What do you think we should modify in priority to improve Antibio'Malin?

Chapitre 5

Impact of a public commitment charter associated with patient information leaflets on antibiotics prescribed by General Practitioners: a randomised controlled interrupted time series study

Anaïs Essilini, Aurélie Bocquier, Adeline Welter, Joëlle Kivits, Amandine Luc, Gaëlle Le Dref, Nathalie Thilly, Céline Pulcini

Analyses en cours de finalisation et article scientifique en cours de rédaction

Chapitre 5

Introduction

En France, 78% des antibiotiques sont prescrits en soins primaires et les médecins généralistes sont responsables de 70% des prescriptions. Parmi les interventions mises en place pour améliorer l'usage des antibiotiques en soins primaires, les interventions éducatives ciblant les prescripteurs ont donné des résultats hétérogènes. Les attentes des patients vis-à-vis des antibiotiques ainsi que la relation médecin/patient (le besoin de satisfaire les patients et les perceptions qu'ont les médecins généralistes de leurs attentes) contribuent en partie à la décision des médecins généralistes de prescrire (ou non) des antibiotiques. Ainsi, les interventions éducatives qui ciblent à la fois les prescripteurs et les patients et facilitent la communication entre eux peuvent être intéressantes, mais restent peu évaluées.

Objectifs

Dans ce contexte, nous avons mené une étude randomisée et contrôlée (étude Antibio-Charte) pour évaluer l'impact d'une charte d'engagement au bon usage des antibiotiques, sous forme de poster affiché en salle d'attente et d'outils associés (fiches de prescription et de non-prescription remises aux patients) sur la prescription globale d'antibiotiques (tous les antibiotiques par voie générale) par les médecins généralistes dans la région Grand Est.

Les objectifs secondaires sont d'évaluer : (i) l'impact de l'intervention sur la prescription d'antibiotiques critiques (amoxicilline-acide clavulanique, céphalosporines, fluoroquinolones), (ii) l'impact sur la variation saisonnière de la consommation globale d'antibiotiques, (iii) l'adhésion des médecins généralistes à l'intervention et (iv) son acceptabilité par les médecins généralistes et les patients.

Méthode

Présentation de l'étude

Antibio-Charte est une étude pragmatique, randomisée, contrôlée, avant-après conduite dans la région Grand-Est. La période « avant » s'étendait du 1er janvier 2017 au 30 septembre 2018 et la

Antibio-Charte : impact d'une intervention éducative sur les prescriptions des médecins généralistes période « après » du 1er octobre 2018 au 30 septembre 2019.

Participants

Les critères d'inclusion des médecins étaient : (i) travailler dans la région Lorraine et (ii) être fort prescripteur selon deux indicateurs de la rémunération sur objectif de santé publique (ROSP) du médecin traitant utilisés par l'Assurance Maladie (prescrire plus de 25 antibiotiques pour 100 patients de 16 à 65 ans hors affection longue durée et avoir une proportion de patients traités par antibiotiques particulièrement générateurs d'antibiorésistance (amoxicilline-acide clavulanique, céphalosporines de 3ème et 4ème générations, fluoroquinolones) de plus de 27% des patients traités par antibiotiques). Les critères de non-inclusion étaient : (i) pratiquer exclusivement un mode d'exercice particulier (par exemple, l'homéopathie, l'acupuncture , (ii) exercer en remplacement, (iii) avoir un départ à la retraite dans les deux années suivant le début de l'intervention, (iv) ne pas avoir travaillé dans les deux années précédant l'intervention, (v) exercer en groupe lorsqu'une partie des médecins du groupe ne souhaite pas participer à l'étude et (vi) afficher une charte d'engagement promouvant le bon usage des antibiotiques, avant le début de cette étude.

Parmi les 878 médecins généralistes éligibles, 240 médecins ont été randomisés, dans le groupe témoin et 360 dans le groupe intervention avec pour objectif de recruter 120 médecins volontaires pour participer à l'étude. La randomisation était stratifiée sur le milieu d'exercice (rural/urbain) et les départements de Lorraine. Les délégués de l'Assurance Maladies ont rencontré les 360 médecins et 109 ont accepté de participer à l'intervention Antibio-Charte.

Intervention

L'intervention était composée de trois outils distribués par les délégués de l'Assurance Maladie courant septembre et utilisés par les médecins généralistes du groupe intervention du 1er octobre 2018 au 30 septembre 2019 :

(i) Une charte d'engagement publique au bon usage des antibiotiques (Annexe 1) signée par le médecin généraliste et affichée en salle d'attente sous forme de poster. Le médecin

s'engage publiquement à ne prescrire des antibiotiques que lorsqu'ils sont nécessaires.

(ii) Une ordonnance de non-prescription (Annexe 2) à distribuer au patient en cas d'infection virale. Ce document reprend les principaux symptômes de cinq infections virales courantes, leur durée, des conseils pour soulager les symptômes ainsi que des messages clés promouvant le bon usage des antibiotiques.

(iii) Une fiche support à la prescription d'antibiotiques (Annexe 3) à donner aux patients lors d'une prescription d'antibiotiques afin de les sensibiliser aux particularités des antibiotiques. Ce document complémentaire à la prescription comprend des informations sur le traitement antibiotique, les effets indésirables et des recommandations favorisant le bon usage des antibiotiques.

L'ordonnance de non-prescription a été développée par l'Assurance Maladie en 2015 mais reste peu connue des médecins généralistes. La charte d'engagement et la fiche support à la prescription ont été développées et validées par le Comité Scientifique d'Antibio-Charte. Elles ont préalablement été testées auprès de patients et de médecins.

Critères de jugement

Le critère de jugement principal était l'évolution des prescriptions antibiotiques à visée systémique (code J01 de la classification Anatomique, Thérapeutique et Chimique) exprimées en doses définies journalières (DDJ) / 1 000 consultations / mois calculée pour chaque médecin puis agrégée pour chaque groupe. Les critères de jugement secondaires étaient : (i) l'évolution des prescriptions d'antibiotiques particulièrement générateurs d'antibiorésistance (amoxicilline-acide clavulanique, céphalosporines, fluoroquinolones) en DDJ / 1 000 consultations / mois ; (ii) le ratio de la variation saisonnière de tous les antibiotiques et des quinolones : [nombre de prescriptions pendant la période hivernale (janvier-mars et octobre-décembre) / nombre de prescriptions pendant la période estivale (avril-septembre)] – 1 x 100, (iii) l'utilisation effective des trois outils par une vérification de l'affichage de la charte à 12 mois et le nombre de blocs d'ordonnance de non-prescription et de fiche support à la prescription commandés auprès de l'Assurance Maladie (les documents étaient distribués par les

délégués de l'Assurance Maladie) et (iv) le ressenti des médecins généralistes et des patients après un an d'intervention au travers d'entretiens semi-dirigés.

Les données utilisées proviennent du Système National des Données de Santé qui contient des données individualisées, anonymes et associables pour la quasi-totalité de la population française (67 millions d'habitants).

Principales analyses

Analyse des séries chronologiques

Un modèle ARIMA (auto regressive moving-average model) saisonnier a été réalisé pour évaluer l'impact de l'intervention sur la prescription d'antibiotiques et d'antibiotiques critiques. Trois effets ont été testés : un changement de niveau, un changement de pente et un effet transitoire de l'intervention.

Variation saisonnière

Un test de Kruskal-Wallis a été utilisé pour comparer la différence (après - avant) du ratio de la variation saisonnière d'antibiotiques et de quinolones entre les deux groupes.

Toutes les analyses ont été réalisées avec le logiciel SAS Enterprise Guide (V7.15, SAS Institute Inc., Cary, NC, USA). Une valeur $p < 0,05$ a été considérée comme significative.

Adhésion

La charte était considérée comme : visible, si elle était affichée en format A3 sans aucune (ou peu d'autres) affiche autour ; moyennement visible, si elle était affichée en format A3 ou A4 avec beaucoup d'autres affiches autour ; ou pas visible, si elle était recouverte par d'autres affiches, quelle que soit sa taille.

L'utilisation de l'ordonnance de non-prescription et de la fiche support à la prescription a été évaluée par les commandes de blocs auprès des caisses de l'Assurance Maladie.

Chapitre 5

Résultats descriptifs

Les caractéristiques des groupes sont présentées dans le tableau 1. Le groupe intervention avait plus de médecins dans le milieu rural et de médecins qui exercent en groupe que le groupe témoin. Les médecins du groupe intervention avaient aussi en moyenne plus de patients en 2019. Les tableaux 2 et 3 présentent l'évolution des deux indicateurs de la ROSP. Entre la période avant (de janvier 2017 à septembre 2018) et la période après (octobre 2018 à septembre 2019), il y a une tendance à la baisse des prescriptions d'antibiotiques dans les deux groupes (Figure 1). Les données de l'utilisation des outils sont présentées dans le tableau 4. Les résultats de l'acceptabilité de l'intervention par les médecins généralistes et les patients sont présentés dans le chapitre 6.

Tableau 1. Caractéristiques des groupes

	Témoin (N = 236)		Intervention (N = 109)		Différence Standardisée
Médecins généralistes					
Type de pratique (n, %)					
Individuelle	199	(84,3)	87	(79,8)	11,8% **
Groupe	37	(15,7)	22	(20,2)	
Environnement (n, %)					
Rural	41	(17,4)	26	(23,9)	16,1% **
Urbain	195	(82,6)	83	(76,2)	
Nombre de patients par an (m, std)					
2017	1107	(485)	1094	(454)	2,8% *
2018	1135	(510)	1159	(478)	4,8% *
2019	1089	(514)	1173	(488)	16,8%*
Patients					
Sexe (n, %)					
Homme	89 902	(39,8)	39 851	(39,6)	0,2%**
Femme	135 735	(60,2)	60 727	(60,4)	
Affection longue durée (n, %)	98 130	(43,5)	46 270	(46)	5,6%**
Age (n, %)					
< 18	19 958	(8,7)	9 462	(9,4)	1,5%**
[18-65]	149 405	(66,2)	64 579	(64,2)	4%**
> 65	56 247	(24,9)	26 537	(26,4)	3,4%**

* Différence Standardisée = $\frac{100\ (x\ \ intervention - x\ control)}{\sqrt{\frac{s^2\ intervention + s^2\ control)}{2}}}$

** Différence Standardisée = $\frac{100\ (P\ intervention - P\ control)}{\sqrt{\frac{P\ intervention\ (1 - P\ intervention) + P\ control\ (1 - P\ control)}{2}}}$

Tableau 2. Indicateur ROSP du nombre de traitements par antibiotiques pour 100 patients médecin-traitant de 16 à 65 ans et hors ALD

	Témoin (N = 236)				Intervention (N = 109)			
	Objectif cible (≤20%)		Objectif intermédiaire (≤45%)		Objectif cible (≤20%)		Objectif intermédiaire (≤45%)	
1er Trimestre (Oct-Déc 17)	2	(0,9)	106	(44,9)	1	(0,9)	55	(50,5)
2ème Trimestre (Jan-Mar 18)	4	(1,7)	110	(46,6)	2	(1,8)	60	(55,1)
3ème Trimestre (Avr-Juin 18)	4	(1,7)	112	(47,5)	2	(1,8)	61	(56)
4ème Trimestre (Juil-Sep 18)	7	(3)	110	(46,6)	5	(4,6)	64	(58,7)
5ème Trimestre (Oct-Déc 18)	8	(3,4)	115	(48,7)	5	(4,6)	68	(62,4)
6ème Trimestre (Jan-Mar 19)	16	(6,8)	126	(53,4)	10	(9,2)	76	(69,7)
7ème Trimestre (Avr-Juin 19)	19	(8,1)	129	(54,7)	11	(10,1)	75	(68,8)
8ème Trimestre (Juil-Sep 19)	22	(9,3)	132	(55,9)	14	(12,8)	76	(69,7)

Tableau 3. Indicateur ROSP de la part des patients médecin-traitant traités par antibiotiques particulièrement générateurs d'antibiorésistances (amoxicilline + acide clavulanique ; céphalosporine de 3e et 4e générations ; fluoroquinolones)

	Témoin (N = 236)				Intervention (N = 109)			
	Objectif cible (≤32%)		Objectif intermédiaire (≤52%)		Objectif cible (≤32%)		Objectif intermédiaire (≤52%)	
1er Trimestre (Oct-Déc 17)	46	(19,5)	179	(75,9)	34	(31,2)	98	(89,9)
2ème Trimestre (Jan-Mar 18)	76	(32,2)	191	(80,9)	43	(39,5)	99	(90,8)
3ème Trimestre (Avr-Juin 18)	77	(32,6)	190	(80,5)	50	(45,9)	98	(89,9)
4ème Trimestre (Juil-Sep 18)	81	(34,3)	192	(81,4)	53	(48,6)	99	(90,8)
5ème Trimestre (Oct-Déc 18)	86	(36,4)	200	(84,8)	55	(50,5)	99	(90,8)
6ème Trimestre (Jan-Mar 19)	88	(37,3)	198	(83,9)	61	(56)	99	(90,8)
7ème Trimestre (Avr-Juin 19)	93	(39,4)	197	(83,5)	63	(57,8)	101	(92,7)
8ème Trimestre (Juil-Sep 19)	98	(41,5)	200	(84,8)	66	(60,6)	100	(91,7)

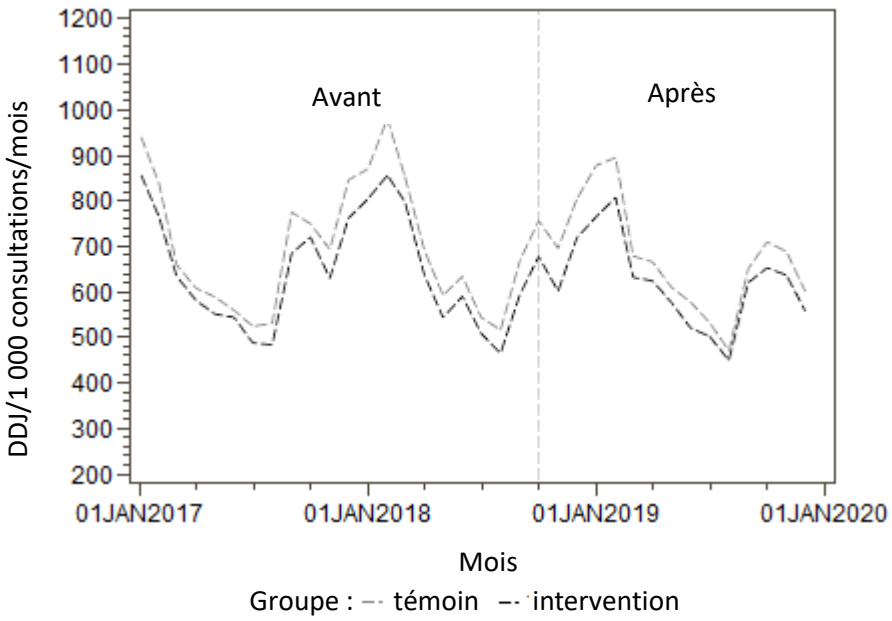


Figure 1. Evolution des prescriptions antibiotiques à visée systémique exprimées en DDJ/1 000 consultations/mois calculées pour chaque médecin puis agrégées pour chaque groupe entre la période avant et la période après

Tableau 4. Utilisation des outils

	N
Affichage de la charte d'engagement	
Visible	54
Moyennement visible	17
Pas visible	3
Pas affichée	35
Commande de blocs d'ordonnance de non-prescriptions	33
Commande de blocs de fiche support à la prescription	27

Contribution des auteurs

La mise en place de l'intervention et le suivi de l'intervention ont été réalisée par N.T (pharmacien spécialiste en santé publique), C.P (médecin infectiologue), A.E (doctorante en santé publique), A.W (économiste de la santé, cellule de coordination régionale de la gestion du risque, caisse primaire

Antibio-Charte : impact d'une intervention éducative sur les prescriptions des médecins généralistes d'Assurance Maladie du Bas-Rhin) et les délégués de l'Assurance Maladie. La vérification de l'affichage de l'affiche à 12 mois a été faite par A.E et G.L-D (épistémologiste). Le data management et l'analyse des données à partir de l'extraction fournie par l'Assurance Maladie ont été conduit par A.E sous la supervision de N.T, A.L (biostatisticienne) et C.P. Les guides d'entretiens ont été développés par G.L-D, A.E, J.K (sociologue), N.T et C.P. Les entretiens ont été conduits par A.E et G.L-D, enregistrés après l'accord oral des participants et retranscrits mot pour mot par A.E. Une analyse thématique des entretiens a été réalisée par A.E et G.L-D. Deux grilles d'analyses ont été élaborées par A.E et G.L-D et validées par N.T et C.P. Chaque entretien a été ensuite codé par A.E en utilisant le logiciel Nvivo 11®.

Annexes

Annexe 1. Charte d'engagement publique

Les antibiotiques sont efficaces seulement sur les infections dues à des bactéries. Si vos symptômes sont dus à un virus, ils ne serviront à rien, vous risquez juste d'avoir des effets indésirables liés au traitement.

Le rhume (rhinopharyngite), la grippe, la bronchite aiguë et la plupart des otites et des angines guérissent donc sans antibiotiques.

Pourquoi prendre un antibiotique seulement quand c'est indispensable ?

- **Les bactéries présentes dans votre corps (peau, intestins)** peuvent s'adapter et survivre avec les antibiotiques.
- **Plus vous prenez des antibiotiques, plus elles risquent de devenir résistantes.**
- **Les bactéries résistantes aux antibiotiques, que vous pouvez transmettre à votre entourage, peuvent causer des infections difficiles à guérir.**

Comment faire ?

Suivez scrupuleusement les recommandations de votre médecin. Il vous expliquera si vous avez ou pas besoin d'un traitement antibiotique.



Votre médecin s'engage à vous prescrire un antibiotique uniquement s'il est nécessaire dans votre situation.

Cachet et signature du / des médecin(s)

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Annexe 2. Ordonnance de non-prescription

Aujourd'hui, je vous ai diagnostiqué une infection qui ne nécessite pas d'antibiotiques.

DATE : ..... / ..... / .....

NOM DU PATIENT : .....

CACHET MÉDECIN

Pourquoi n'avez-vous pas besoin d'un antibiotique aujourd'hui ?

Le rhume (rhinopharyngite), la grippe, la bronchite aiguë et la plupart des otites et des angines sont de nature virale et guérissent donc sans antibiotiques.

Avec ou sans antibiotiques, vous ne guérirez pas plus vite. Le tableau ci-dessous vous indique la durée habituelle des symptômes de ces maladies (avec ou sans antibiotiques).

	MALADIE	DURÉE HABITUELLE DES PRINCIPAUX SYMPTÔMES
☐	 **RHINOPHARYNGITE (RHUME)** • *Toujours virale.*	• Fièvre : 2-3 jours. • Nez qui coule (sécrétions de couleur blanche, jaune ou verte), nez bouché : 7-12 jours. • Toux : 1 à 3 semaines.
☐	 **GRIPPE** • *Infection virale.*	• Fièvre, courbatures : 2-4 jours. • Toux : 2-3 semaines. • Fatigue : plusieurs semaines.
☐	 **ANGINE VIRALE**	• Fièvre : 2-3 jours. • Mal à la gorge : 7 jours.
☐	 **BRONCHITE AIGUË** • *Quasiment toujours virale.* • *Les toux grasses avec les sécrétions jaunes ou verdâtres font partie de l'évolution naturelle de la maladie.*	• Fièvre : 2-3 jours. • Toux : 2-3 semaines.
☐	 **OTITE AIGUË** • *Après l'âge de 2 ans, guérit le plus souvent sans antibiotiques*	• Fièvre, douleur : 3-4 jours.

CE QUE VOUS POUVEZ FAIRE POUR SOULAGER VOS SYMPTÔMES

- Buvez suffisamment : vous ne devez pas avoir soif.
- Adaptez votre activité physique, cela aide votre corps à guérir.
- Il existe des médicaments contre la fièvre ou la douleur. Suivez la prescription de votre médecin ou demandez conseil à votre pharmacien.

Si vous avez de la fièvre (température ≥ 38,5°C) durant plus de 3 jours, ou si d'autres symptômes apparaissent, ou que votre état de santé ne s'améliore pas, vous devez reconsulter votre médecin.

Pourquoi faut-il prendre un antibiotique seulement quand c'est nécessaire ?

- Les antibiotiques peuvent être responsables d'effets indésirables, comme les allergies ou la diarrhée.
- Les bactéries peuvent s'adapter et survivre en présence d'antibiotiques. Ainsi, plus vous prenez des antibiotiques, plus les bactéries présentes dans votre corps (peau, intestin) risquent de devenir résistantes.
- Les bactéries résistantes aux antibiotiques peuvent être la cause d'infections difficiles à guérir, et vous pouvez aussi les transmettre à vos proches.

En prenant un antibiotique uniquement lorsque c'est indispensable, vous contribuez à prévenir l'apparition de bactéries résistantes aux antibiotiques.

Ce document est adapté à votre cas. Ne le donnez pas à quelqu'un d'autre, même en cas de symptômes identiques.

Avec ou sans antibiotiques, vous ne guérirez pas plus vite.

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Annexe 3. Fiche support à la prescription d'antibiotique

Aujourd'hui, je vous ai diagnostiqué une infection qui nécessite un traitement antibiotique.

DATE : ..... / ..... / .....

NOM DU PATIENT : .....

CACHET MÉDECIN

Nom de l'antibiotique : .....

.....

(Dénomination Commune Internationale (DCI) + nom commercial le cas échéant)

Dose : ..... à prendre toutes les ..... heures

Durée de traitement : ..... jours

☑ **Ne partagez pas vos antibiotiques avec d'autres personnes, et ne les réutilisez pas pour vous-même (pas d'automédication)**

Votre traitement est adapté uniquement à votre infection bactérienne actuelle.

☑ **Après la fin de votre traitement, rapportez les antibiotiques restants à votre pharmacien, pour qu'ils soient détruits** correctement et qu'ils ne polluent pas l'environnement. Ne les jetez surtout pas dans la poubelle ou les toilettes, par exemple.

Pourquoi faut-il prendre un antibiotique seulement quand c'est nécessaire ?

- Les antibiotiques peuvent être responsables d'effets indésirables, comme les allergies ou la diarrhée.
- Les bactéries peuvent s'adapter et survivre en présence d'antibiotiques. Ainsi, plus vous prenez des antibiotiques, plus les bactéries présentes dans votre corps (peau, intestin) risquent de devenir résistantes.
- Les bactéries résistantes aux antibiotiques peuvent être la cause d'infections difficiles à guérir, et vous pouvez aussi les transmettre à vos proches.

En prenant un antibiotique uniquement lorsque c'est indispensable, vous contribuez à prévenir l'apparition de bactéries résistantes aux antibiotiques.

ⓘ Ce document est adapté à votre cas. Ne le donnez pas à quelqu'un d'autre, même en cas de symptômes identiques.

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Imp-002-Expérimentation antibiotiques Grand Est - mai 2018

Chapitre 6

French general practitioners' and patients' acceptability of a public commitment charter and patient information leaflets targeting unnecessary antibiotic use: a qualitative study

Anaïs Essilini*, Gaëlle Le Dref*, Aurélie Bocquier, Joëlle Kivits, Adeline Welter, Céline Pulcini, Nathalie Thilly

* Co-premier auteur

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Résumé

Introduction

Antibio-Charte est une étude randomisée et contrôlée visant à évaluer l'impact d'une intervention associant une charte d'engagement au bon usage des antibiotiques et de fiches de prescription et de non-prescription remises aux patients sur les prescriptions d'antibiotiques de médecins généralistes forts prescripteurs.

Objectif

L'objectif de la présente investigation était d'évaluer l'adhésion des médecins généralistes à l'intervention mise en œuvre dans l'étude Antibio-Charte et son acceptabilité par les patients et les médecins.

Méthode

Une étude qualitative a été menée auprès des médecins généralistes du groupe intervention de l'étude Antibio-Charte tirés au sort et certains de leurs patients entre juillet 2019 et mai 2020 après une période d'un an d'utilisation des différents documents. L'adhésion des médecins généralistes à la charte a été évaluée par des observations directes de son affichage à 12 mois d'utilisation par A.E (doctorante de santé publique) ; l'adhésion des médecins généralistes aux autres outils et l'acceptabilité des médecins généralistes et des patients ont été évaluées par des entretiens individuels semi-directifs. Deux guides d'entretiens (un médecin et un patient) ont été développés par G.L-D (épistémologiste), A.E, J.K (sociologue), N.T (pharmacien spécialiste de santé publique) et C.P (médecin infectiologue). Les entretiens ont été conduits par A.E et G.L-D, enregistrés après l'accord oral des participants et retranscrits mot pour mot par A.E. Une analyse thématique des entretiens a été réalisée. Deux grilles d'analyses ont été élaborées par A.E et G.L-D et validées par N.T et C.P. Chaque entretien a été ensuite codé par A.E en utilisant le logiciel Nvivo 11®.

Résultats

Vingt-sept médecins généralistes et 14 patients ont été interrogés. L'adhésion des médecins

Antibio-Charte : acceptabilité de l'intervention par les médecins généralistes et les patients généralistes variait en fonction de l'outil : la charte était clairement affichée dans la plupart des salles d'attente ; l'ordonnance de non-prescription avait été utilisée pendant toute la période d'intervention par la plupart des médecins généralistes, tandis que la fiche de prescription avait été utilisée par un nombre plus restreint de médecins généralistes. Les généralistes et les patients trouvaient le contenu et la forme de la charte pertinents, mais peu de généralistes s'étaient sentis publiquement engagés. Les médecins généralistes et les patients avaient apprécié l'ordonnance de non-prescription. Les médecins pensaient qu'elle pouvait les aider à améliorer leurs pratiques alors que certains patients craignaient qu'elle incite les médecins à ne pas prescrire d'antibiotiques. Contrairement aux médecins généralistes, qui considéraient que la fiche de prescription était redondante avec les informations données lors de la consultation, les patients l'avaient trouvé utile.

Conclusion

L'intervention a été bien acceptée par les médecins généralistes et les patients. La charte d'engagement public n'a pas été perçue comme engageante par les médecins généralistes. L'ordonnance de non-prescription était l'outil le plus apprécié, à la fois par les médecins généralistes et par les patients. La fiche de prescription pourrait contribuer à améliorer les connaissances et les pratiques des patients, mais son acceptation par les médecins généralistes était limitée.

Abstract

Background: The 'AntibioCharte' randomised controlled study aimed at assessing the impact of a multifaceted antibiotic stewardship intervention targeting French general practitioners with higher-than-average antibiotic use. The intervention included a public commitment charter signed by the general practitioner, a non-prescription pad, and a patient information leaflet.

Objectives: We conducted a qualitative study to evaluate general practitioners' adherence to the intervention and its acceptability by patients and general practitioners.

Methods: This investigation was performed in northeastern France from July 2019 to May 2020, among the AntibioCharte intervention group after a one-year implementation period. General practitioners' adherence to the charter was assessed by direct observations; general practitioners' adherence to the other tools, and acceptability of both general practitioners and patients were assessed through semi-structured face-to-face individual interviews.

Results: Twenty-seven general practitioners and 14 patients participated. General practitioners' adherence varied according to the tool: the charter was clearly displayed in most waiting rooms; the non-prescription pad was used throughout the intervention period by most general practitioners while the leaflet was used by fewer general practitioners. Both general practitioners and patients found the charter's content and form relevant, but few general practitioners felt themselves publicly engaged. The waiting room may not be appropriate to display the charter as some general practitioners forgot it and patients did not always read the displayed documents. General practitioners appreciated the pad and found that it could help them change their practices. It was perceived as a good tool to educate patients and manage their expectations for antibiotics. Patients appreciated the pad too, especially information on the infections' symptoms and their duration. Still, some patients feared that it could encourage doctors not to prescribe antibiotics. Unlike general practitioners, who considered the leaflet redundant with the information given during the consultation, patients found it useful to raise awareness on antibiotics' specificities and risks, and remind them of good practices.

Conclusions: The AntibioCharte intervention was overall well accepted by general practitioners and

Antibio-Charte : acceptabilité de l'intervention par les médecins généralistes et les patients patients. The non-prescription pad was the best perceived tool.

Trial registration number. ClinicalTrials.gov: NCT04562571

Keywords: primary care; antibiotic resistance; general practitioner; qualitative study; education; antimicrobial stewardship; patient; intervention; commitment charter; non-prescription pad

Background

Over the last two decades, antibiotic resistance has become a major global public health threat.[1] Reducing unnecessary antibiotic use is essential to tackle this.[2–5] Most antibiotics are prescribed in primary care (78% in 2019 in France),[6] especially by general practitioners (GPs) who are responsible for 70% of those prescriptions.[7]

Among antibiotic stewardship interventions, many educational interventions targeting prescribers have been studied, with heterogeneous results and a relatively low quality of evidence.[8] As patients may exert pressure on prescribers to get antibiotics, education should target not only prescribers but also patients.[9–12] However, few interventions targeting both of them have been conducted, with contradictory findings.[5,13,14]

In this context, we conducted a randomised controlled study (AntibioCharte study) to assess the impact of an educational intervention targeting both GPs and patients on antibiotics prescribed by French GPs, as compared with no intervention. The intervention relied on three tools, used together, delivered by the GP to his/her patient, which aimed at engaging GPs, at facilitating the doctor/patient communication and at decreasing patients' expectations for antibiotics: (i) a charter displaying the public commitment of the GP in promoting antibiotic stewardship (called thereafter 'charter'), focussing on reducing unnecessary antibiotic use; (ii) a non-prescription pad ('pad') to be used when an antibiotic is not recommended (e.g. for viral infections); and (iii) a patient information leaflet ('leaflet') to be used when antibiotics are prescribed.

As part of the secondary objectives of the AntibioCharte study, we evaluated the adherence of GPs (belonging to the intervention group) regarding the intervention and its acceptability by patients and

GPs; this manuscript focuses on these objectives.

Methods

We performed a qualitative study nested within the randomised controlled study, using observations and semi-structured face-to-face individual interviews. Adherence evaluated the way GPs implemented the intervention by using the three tools in daily practice and acceptability evaluated the perceptions of these tools and their interest for antibiotic stewardship by GPs and patients. Adherence and acceptability were evaluated in the group of GPs and patients who benefited from the intervention, one year after its launch (1st October 2018).

GPs' adherence to the intervention was assessed: (i) for the charter, by direct observation by a member of the research team, who visually checked the display of the charter in the practice waiting room; (ii) for the pad and the leaflet, by open-ended questions to GPs during the individual interviews.

GPs' and patients' acceptability of the intervention were assessed by open-ended questions during the individual interviews.

This investigation follows the COREQ reporting guidelines (see Table S1 available as Supplementary data).[15]

Participants and setting

The AntibioCharte study was carried out in Lorraine, a region in the northeast of France, with the support of the regional Health Insurance, the regional health agency and the regional antibiotic stewardship network (AntibioEst). It targeted GPs with higher-than-average antibiotic use in the second quarter of 2017, based on two pay-for-performance indicators routinely used by the National Health Insurance[16] (>25 antibiotics/100 patients 16 – 65 years old and without chronic illness and broad-spectrum antibiotics (co-amoxiclav, fluoroquinolones and third and fourth-generation cephalosporins) prescribed in more than 27% of cases).

GPs interviewed for this qualitative study were randomly selected among the 109 GPs included in the intervention group. Randomisation was stratified by the type of practice (solo or group), with a planned final sample target of 30 GPs. When they initially accepted to participate in the AntibioCharte

study, GPs agreed that they could be randomly selected for a qualitative interview one year after the start of the intervention.

Patients were recruited among patients of GPs who: (i) participated in this qualitative study; (ii) declared having regularly used the tools; and (iii) accepted to invite some of their patients to participate or accepted that the research team directly recruits patients in their waiting room. Patients may have been in contact or not with the tools. A final sample of 15 patients was targeted, depending on data saturation.

Intervention

The intervention was in place from 1st October 2018 to 30th September 2019 and was based on three tools which targeted both GPs and patients with the objective of reducing unnecessary antibiotic use:

i) A public commitment charter promoting antibiotic stewardship, signed by the GP and displayed in the practice waiting room. In this charter, the GP committed him(her)self publicly to prescribe antibiotics only when necessary, e.g., not to prescribe antibiotics for suspected viral infections;

ii) A non-prescription pad to be used by the GP during the consultation to educate his/her patient in situations when an antibiotic is not needed, e.g., for viral infections. This document includes the main symptoms of five common viral infections (common cold, flu, sore throat, bronchitis and otitis) and their duration, safety-netting recommendations and key messages promoting antibiotic stewardship (e.g., adverse events of antibiotics, including bacterial resistance);

iii) A patient information leaflet to be used by the GP when antibiotics are prescribed, to raise patients' awareness regarding the specificities of antibiotics. This document, complementary to the prescribing order, includes details on the antibiotic treatment (molecule, dose, and duration), recommendations promoting appropriate use of antibiotics (including discouraging self-medication) and information on adverse events.

The charter and leaflet have been developed and validated by the AntibioCharte scientific committee,

based on previous studies using comparable tools,[13,17] and have been pilot-tested among GPs and patients. The pad was developed by the French National Health Insurance in 2015 but is still now largely unknown among GPs.[18–20]

Data collection

Observation of the display of the charter in the waiting room was performed by AE or GLD before the GP's interview, without the latter being previously informed. The charter was considered either: clearly visible, if displayed in A3 format without any (or only few other posters) around; moderately visible, if displayed in A3 or A4 format with a lot of other posters around; or hardly visible, if covered by other posters, whatever its size.

To conduct the semi-structured interviews, two interview guides (one for GPs, one for patients) were elaborated by a multidisciplinary team composed of two public health specialists (one junior, one senior) with expertise in qualitative studies (AE, NT), an epistemologist (GLD), a sociologist (JK), and an infectious diseases specialist (CP). For GPs, the guide (Document S1) explored: (i) their use (e.g., the reported adherence) and perceptions of the tools (e.g., attractiveness, usefulness, suggestions to improve tools); (ii) their perceptions of patients' acceptability of the tools; (iii) the impact of the intervention on their practice. For patients, the guide (Document S2) explored: (i) their perception of the tools; (ii) the impact they perceived on their medical care; and (iii) the impact on their views on antibiotics and their individual responsibility regarding antibiotic resistance. The tools were shown to patients before the beginning of the interview to discuss them.

GPs were interviewed from July to October 2019 at their practice; patients were interviewed from January to May 2020 at the GP's practice or at home. After an oral consent, the interviews were recorded and transcribed. Participation was voluntary and not compensated.

GPs' sociodemographic and professional characteristics were collected at their inclusion in the AntibioCharte study, and patients' characteristics at the end of the interview.

Analysis

Each transcript was analysed independently by GLD and AE. A thematic analysis was conducted using QSR International's NVivo 11 software. Two analysis grids (one for GPs, one for patients) were designed by GLD and AE and validated by the senior public health and infectious disease specialists. Each theme and subtheme were discussed until a consensus was reached between AE and GLD. Each interview was then coded by AE according to the corresponding analysis grid. Only the themes and subthemes that address the study objectives are presented in the results.

Results

Out of the 30 contacted GPs, one GP was unavailable during the interview period and could not be interviewed; 29 GPs were interviewed, and 27 interviews were finally included in the analysis as two interviews could not be transcribed due to technical problems with the recordings (mean duration of the interview: 20 ± 10 min). More than half of participants were men, older than 50 years and practiced in a rural area (Table 1). Out of 25 patients invited to participate, 14 agreed to be interviewed (mean duration of the interview: 29 ± 10 min). They were mostly from rural areas (Table 2).

Table 1. General practitioners' characteristics (n = 27)

Characteristics	**N**	**(%)**
Age (years)		
<40	3	(11)
[40-50]	8	(30)
>50	16	(59)
Sex		
Male	17	(63)
Female	10	(37)
Practice's location		
Rural	19	(70)
Suburban	3	(11)
Urban	5	(19)
Type of practice		
Solo	16	(59)
Group	11	(41)
Supervisor of general practitioner trainees	8	(30)
Recent[a] training in infectious diseases	2	(7)
Participation to a group of peers	4	(15)

[a] Training during the year prior to the intervention.

Table 2. Patients' characteristics (n = 14)

Characteristics	N	(%)
Age (years)		
<40	3	(21)
[40-50[	1	(7)
[50-60[	4	(29)
[60-70[	1	(7)
≥70	5	(36)
Sex		
Male	5	(36)
Female	9	(64)
Educational level[a]		
Primary	1	(7)
Secondary	8	(57)
High-school diploma	2	(14)
> High-school diploma	2	(14)
Occupational status		
Unemployed	1	(7)
Employed	8	(57)
Retired	5	(36)
Personal experience of antibiotic resistance	3	(21)
General practitioner practice's location		
Rural	11	(79)
Suburban	0	(0)
Urban	3	(21)

[a] One participant did not answer.

GPs' adherence to the intervention

At the end of the one-year intervention period, the charter was displayed in the waiting room in almost all practices (n = 22). It was clearly visible in most cases (n = 16), sometimes only moderately visible (n = 5), and in one case hardly visible.

Most GPs (n = 16) reported a systematic or quasi systematic use of the pad with concerned patients throughout the intervention period. A few (n = 3) reported having used it only at the beginning of the study, corresponding to the cold season when viral infections are more frequent. Other GPs reported either an occasional use (n = 5), or no use at all (n = 3) throughout the year. When GPs used the pad during the consultation, they often took the time to explain it to the concerned patients and less frequently gave it and let patients read it at home.

About half of the GPs (n = 12) reported a systematic or quasi systematic use of the leaflet throughout the intervention period. Others reported having used it just during the first months of the study (n =

8), or no use at all (n = 7).

Finally, about half of the GPs (n = 12) used all three tools throughout the intervention period, and three GPs did not use any tool. GPs found it difficult to use systematically the pad and the leaflet for all concerned patients, as planned in the intervention, and preferred using them as convenient, i.e., when they felt it was useful for the patient understanding.

GPs' acceptability of the intervention (Table 3)

AntibioCharte: an intervention well appreciated by GPs

Most GPs welcomed the intervention, which was perceived as a reminder of other antibiotic stewardship actions (e.g., those from the Health Insurance). Even GPs who rarely used the tools approved the principle of the intervention (Quote 1). Indeed, most participants were aware of the relationship between antibiotics' overprescription in primary care and antibiotic resistance and considered GPs to be the "key players" to tackle this issue (Quote 2). Moreover, many admitted feeling often powerless when faced to patients' pressure to be prescribed antibiotics (Quote 3).

However, a majority of GPs reported some barriers to use the tools routinely, such as: (i) the time required to explain the pad or the leaflet; (ii) the redundancy between what they say to patients during the consultation and the content of the documents; and (iii) the practical organisation induced by the tools' use (e.g., enough space on their desk to put the documents). Half of the GPs wished to continue using the tools after the end of the study (8 all three tools, and 6 the pad only).

Most GPs thought that the intervention and tools were well accepted and useful for patients (Quote 4), although some of them expressed reservations about their effectiveness among some patients (e.g., with a low educational or health literacy level, or reluctant to the non-prescription of antibiotics).

Concerning the impact of the intervention on their prescribing practices, half of the GPs perceived an improvement (Quote 5). The other half considered themselves to prescribe less antibiotics than average, and thus that they have no possibility to further improve their practices (Quote 6). Few participants feared a risk of under-prescription due to antibiotic stewardship interventions like

Table 3. Selection of the most illustrative verbatims from general practitioners' interviews

Subtheme	Quote	Interview number	Verbatim
Antibiotic stewardship interventions / AntibioCharte	1	GP 21	*"What is important, indeed, is to continue to receive any kind of intervention […] on antibiotic prescriptions"*
	2	GP 11	*"We are always in the first line. So, it's up to us to be careful."*
	3	GP 2	*"You know when you have one [patient] coming, if he/she is just coughing, you know he/she is going to have his/her antibiotics, period! It is not even possible to discuss, it's not even possible to try to discuss!"*
	4	GP 14	*"I think it's useful for most people, the pad is well explained, it details the different infections for which antibiotics should not be prescribed […] it gives explanation [on the non-prescription]."*
	5	GP 20	*"Yes, I think my statistics [prescription rate of total and broad-spectrum antibiotics] were better last time: antibiotics, [I prescribed] less… it's thanks to the intervention!"*
	6	GP 13	*"Generally, I use the antibiotics [very well], and have done so for a very long time, even if my statistics are discordant […] I obtained other data and I use a quarter of what my colleagues use, and that is rather consistent with my practice."*
Commitment charter	7	GP 24	*"I think it [the charter] is unnoticed, I don't think people read much [the posters in the waiting room]."*
	8	GP 21	*"I must admit about the charter: I don't go in the waiting room. Well, I display it, but then I don't necessarily think about it."*
Non-prescription pad	9	GP 18	*The discussion [with patients] is easier with the pad: 'it [the infection] doesn't need antibiotics'."*
	10	GP 16	*"Again, the pad helped me a lot, it allowed me to sort out two or three complicated situations."*
	11	GP 13	*"I had to stop [using the tools], because people… I don't know what happened in the town… […] they weren't happy, I had to stop [give the pad and the leaflet] … […] They spread the news, so I had to stop. I didn't want them to say in the town that…"*
	12	GP 19	*"It obliges us to be clear in our head. Because if we give the pad [to patients] and think the opposite… it's not consistent"*
Patient information leaflet	13	GP 1	*"[…] it's something additional but it's still redundant with the prescription, it's more the information at the bottom [information on adverse events and antibiotic resistance] that seems important to me"*

Antibio-Charte : acceptabilité de l'intervention par les médecins généralistes et les patients AntibioCharte.

The charter: a relevant message but limited effects on patient-GP communication and GPs' commitment

All GPs who displayed the commitment charter considered the message of the charter to be clear and relevant.

However, almost all GPs were doubtful whether the charter had any effect among patients (Quote 7); some GPs even believed that patients did not read documents displayed in the waiting room. A few GPs thought that the charter was beneficial for patients because it prepared them for a non-prescription of antibiotics and opened the discussion on antibiotic resistance with the doctor.

Few GPs reported feeling themselves publicly engaged by the commitment charter and few others even acknowledged that they had forgotten it (Quote 8).

The non-prescription pad: the most valued tool

The pad was the most appreciated tool; the majority of GPs who used it considered that it was a good tool to educate patients. GPs found it helpful to communicate and negotiate with their patients, especially to manage pressure to obtain antibiotics (Quotes 9-10). They also considered it as a reassuring tool that allowed them to justify a non-prescription of antibiotic and to persist in their decision.

Half reported that their patients appreciated the pad (particularly information on symptoms' durations) and understood it. Few others, particularly those located in rural areas, had experienced hostility from their patients and had sometimes been forced to stop using it (Quote 11). Some GPs thought that the pad could deter patients from coming back a few days later seeking antibiotics.

Many GPs found that the pad could help them change their antibiotic prescribing practices both by reducing unnecessary use and improving the choice of the antibiotic (Quote 5). The information about the possibility of disease progression which might require a new consultation comforted them in their position without fearing that patients would wonder about an incorrect diagnosis or a superinfection. Finally, some GPs also mentioned that the use of the pad forced them to clarify their diagnosis and to

be consistent with it in their prescribing (Quote 12).

The patient information leaflet: a redundant tool

About half of the GPs appreciated the educational information of the leaflet but found it redundant with their prescribing order and the explanations they used to give to patients (Quote 13). Filling it was considered fastidious and time-consuming by some GPs and others perceived the leaflet's objective to be a way -not useful- to convince the patient of the need for an antibiotic treatment. No GP had any idea about the acceptability of the leaflet by patients.

Patients' acceptability of the intervention (Table 4)

Appreciation of the intervention and its tools

Almost all patients were in favour of the intervention and only a minority expressed doubts about its effectiveness. Many recognized their GP's medical authority and trusted him/her, considering that it was his/her responsibility to implement antibiotic stewardship interventions like AntibioCharte (Quote 14). The other patients considered that the GP was not the most

appropriate individual/way to educate patients, citing their lack of time to discuss and their lack of authority (Quote 15). They thought that TV campaigns are more effective to convey such messages.

The charter was appreciated by almost all patients, with a content perceived to be clear and understandable (Quote 16). However, most patients acknowledged not having the time or opportunity to read documents in the waiting room.

Most patients appreciated the pad in its form and content. Eleven patients effectively received the pad during the study, and six of them stored it and still have it. All patients considered the pad as a reference document in case of infections for themselves or their relatives (Quote 17). However, some of them expressed doubts about its usefulness if the document is distributed by the GP without explanation.

The leaflet was praised by almost all patients. It was considered useful to make people aware about the specificities of antibiotics and their risks, and to remind them of good practices (Quote 18).

Table 4. Selection of the most illustrative verbatims from patients' interviews

Subtheme	Quote	Interview number	Verbatim
Appreciation of the intervention and its tools	14	P 10	*"I think both are important. I think it is important to have general information. Through the media, or through I don't know, public health organisations. You need to confirm with the GP [...] It's especially for people who are resistant to information [...] people still trust their GP even if they are stubborn."*
	15	P 6	*"They are overbooked […] There are some patients who don't have a connection with their GP, they just consult him/her to obtain their prescription."*
	16	P 10	*"Yes, I think it's [the charter] for any audience. […] It's quite understandable."*
	17	P 2	*"Yes, every time they [patients] complain and ask for an antibiotic, with the document they would understand. […] I kept it [the pad] and I even made my children read it"*
	18	P 7	*"I think it's [the leaflet] clear, 'don't share your antibiotics', it's a reflex that people often have. […] It's explicit, the antibiotic, the doses to be taken, the duration of the treatment, I think it's a very well-done document. It also provides information such as the fact that you can return the antibiotics to the pharmacy, honestly I wouldn't have done that if they were already started, I'd have thrown them in the bin. So it gives me information that I think is necessary."*
Perceived impacts on medical care and on their own views towards antibiotics	19	P 2	*"People would not go to the GP for a yes or a no, they would understand [the importance of preserving antibiotics] when they see this [the tools]"*
	20	P 4	*"I think he/she [patient] would not try to say 'Doctor, I have a flu, give me an antibiotic'."*
	21	P 3	*"We've all heard about it 'Antibiotics are not automatic'."*
	22	P 4	*"These bacteria [resistant], you can transmit them by saliva, by spitting, by anything, by sneezing. [...] And they (my children) are at risk of getting sick because of these bacteria [...] I understand it (the information on the pad) like that"*

GP: general practitioner

Appreciation of the intervention and its tools

Almost all patients were in favour of the intervention and only a minority expressed doubts about its effectiveness. Many recognized their GP's medical authority and trusted him/her, considering that it was his/her responsibility to implement antibiotic stewardship interventions like AntibioCharte (Quote 14). The other patients considered that the GP was not the most

appropriate individual/way to educate patients, citing their lack of time to discuss and their lack of

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The leaflet was praised by almost all patients. It was considered useful to make people aware about the specificities of antibiotics and their risks, and to remind them of good practices (Quote 18).

Perceived impacts on medical care and on their own views towards antibiotics

Most patients felt that the use of the tools did not impair the quality of care provided by their GP. Only a minority feared that it could encourage doctors to under-prescribe antibiotics, especially the pad. Most patients believed that the tools (especially the pad and the leaflet) could improve the appropriate use of antibiotics by patients (e.g., by limiting self-medication) (Quotes 19-20).

Patients stated that the intervention confirmed the knowledge about antibiotics they had acquired from previous awareness campaigns (e.g., antibiotics are only needed in case of bacterial infections, could have adverse reactions), and made them aware that viral infections were not always mild (information on symptoms and their duration on the pad) (Quote 21). Even if the majority were aware of the issue of antibiotic resistance before the study, most of them realised thanks to the tools that they had an individual responsibility about it (Quote 22).

Discussion

Both GPs and patients found the commitment charter's content and form relevant, but few GPs felt themselves publicly engaged by the charter. Its location in the waiting room may not be appropriate as patients did not always read the displayed documents, and GPs may forget it. GPs appreciated the

non-prescription pad and found that it could help them change their practices. Patients also appreciated it, even if some of them feared than it could encourage doctors not to prescribe antibiotics. Unlike GPs, who considered the patient information leaflet useless and redundant with the information given during the consultation, patients appreciated it.

Few studies evaluated the effectiveness of a commitment charter on physicians' antibiotic prescribing practices in primary care and they showed contradictory results. Displaying a commitment poster promoting antibiotic stewardship in examination rooms led to a 20% reduction in unnecessary prescriptions for acute respiratory infections in the US,[17] but had no effect on antibiotic prescribing in the UK.[21] Our results suggest that the commitment charter of the AntibioCharte study did not fully meet its objectives (i.e., engage GPs in practice improvement and inform patients), perhaps partly because it was displayed in the waiting room. Due to organisational and cultural factors, French physicians are however used to display educational documents/leaflets in the waiting room, where patients generally spend more time than in the examination room. Our results also suggest that mechanisms underlying the public commitment charter's intended impact (e.g., high value placed on consistency, identification of the prompted behaviour with one's self-image)[17] may vary according to the socio-cultural context.[22]

Patients often do not distinguish between viral and bacterial infections, and believe that the perceived severity of an infection justifies an antibiotic treatment.[9,11,23,24] Besides, patients' demand for antibiotics (real and/or perceived by doctors) is a well-known reason for unnecessary antibiotic prescribing, especially for respiratory tract infections.[10,25,26] Studies from the UK and New Zealand showed that a non-prescription pad may be a useful tool for GPs to educate patients on how to deal with viral infections' symptoms,[27] and can be effective in reducing patients' expectations to receive antibiotics for colds or flu.[14] In our study, the pad was well appreciated by both GPs and patients. It made patients aware that viral infections can have annoying symptoms (e.g., high fever and long symptoms' duration), and allowed GPs to fulfil patients' expectations while avoiding unnecessary

antibiotic use. In France, prescription often represents the outcome/end of the consultation, and both patients and physicians value its symbolic.[28] For patients, it shows that the physician listened to her/him, was concerned about her/him, and chose the treatment based on a specific diagnosis. The pad may sometimes represent an alternative to the antibiotic prescription.

To the best of our knowledge, no previous study in primary care has assessed the acceptability or effectiveness on antibiotic use of a document similar to the leaflet. Such a tool, well perceived by patients, may be useful to reduce inappropriate practices concerning antibiotics,[29] and may improve knowledge.[30] However, its acceptability by GPs was limited, because they found it redundant with their own prescribing order, and found it time-consuming to complete both documents. An electronic version of the leaflet, automatically produced by the GP's software, might improve acceptability.

Surprisingly, about half of the interviewed GPs did not perceive themselves as being higher-than-average prescribers of antibiotics, and thus believed that the intervention could only have a limited impact on their practices. Strategies to reduce GPs' misperceptions about their own practices should be also explored, as they might enhance the impact of antibiotic stewardship interventions.

The AntibioCharte study tested an innovative intervention, relying on three complementary tools targeting both GPs and their patients. This qualitative study explored both GPs' and patients' perceptions of the intervention. The random selection of 30 GPs allowed the collection of a variety of opinions and uses of the tools. Evaluation of the GPs' adherence to the intervention will help interpreting the results to come assessing the impact of the intervention on antibiotics prescribed by GPs. Data on acceptability of the intervention by the target populations are essential information to decide on the generalisation (or not) of the intervention at regional or national levels in case of significant results. This study has however some limitations. GPs who agreed to participate in the AntibioCharte study, and thus in this qualitative investigation, were probably more interested in antibiotic stewardship and more willing to accept the evaluated tools than those who declined. Patients were mostly recruited by their GP, and lots of them were already concerned about antibiotic

resistance. So, caution is needed in extrapolating these results to all French GPs and patients. Finally, we used tools which comply with the French national guidelines and their content may need to be adapted to other national recommendations if applicable.

Conclusion

The AntibioCharte intervention was well accepted by GPs and patients. The public commitment charter was not really perceived as engaging by GPs. The non-prescription pad showed the most potential for both GPs and patients. The patient information leaflet may improve patient's knowledge and behaviours about antibiotics, but GPs' acceptability was limited.

Abbreviations

GPs: general practitioners

Declarations

Ethics approval and consent to participate

The AntibioCharte study – including the qualitative part - was conducted according to the principles of the Declaration of Helsinki and has been approved by French national ethics' committees (Comité d'Expertise pour les Recherches, les Etudes et les Evaluations dans le domaine de la Santé [TPS 37763] and Commission Nationale de l'Informatique et des Libertés [Décision DR-2018-199]). All GPs provided a written consent and patients an oral consent.

Consent for publication

Not applicable.

Availability of data and materials

No data are available.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

NT and CP conceived the study. AE and AW coordinated the project. AE, NT, GLD, JK and CP developed the interview guides. AE and GLD collected the data, elaborated the analysis grid and coded the interviews. GLD, AE, AB, CP and NT interpreted the results. AE, GLD and AB drafted the first version of the manuscript, which was reviewed and approved by all authors.

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References

1. World Health Organization. Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report. 2021. https://www.who.int/publications/i/item/9789240027336. Accessed 15 Sep 2021.

2. Drekonja DM, Filice GA, Greer N, Olson A, MacDonald R, Rutks I, et al. Antimicrobial stewardship in outpatient settings: a systematic review. Infect Control Hosp Epidemiol. 2015;36:142–52.

3. Dyar OJ, Beović B, Vlahović-Palčevski V, Verheij T, Pulcini C. How can we improve antibiotic prescribing in primary care? Expert Rev Anti Infect Ther. 2016;14:403–13.

4. Wang S, Pulcini C, Rabaud C, Boivin J-M, Birgé J. Inventory of antibiotic stewardship programs in general practice in France and abroad. Med Mal Infect. 2015;45:111–23.

5. King LM, Fleming-Dutra KE, Hicks LA. Advances in optimizing the prescription of antibiotics in outpatient settings. BMJ. 2018;363:k3047.

6. Santé Publique France. Antibiotiques et résistance bactérienne : une infection virale respiratoire

Antibio-Charte : acceptabilité de l'intervention par les médecins généralistes et les patients évitée, c'est un antibiotique préservé ! In: Infection liées aux soins et résistance aux antibiotiques. 2020. https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-associees-aux-soins-et-resistance-aux-antibiotiques/infections-associees-aux-soins/documents/rapport-synthese/antibiotiques-et-resistance-bacterienne-une-infection-virale-respiratoire-evitee-c-est-un-antibiotique-preserve. Accessed 15 Sep 2021.

7. Agence nationale de sécurité du médicament et des produits de santé. Evolution des consommations d'antibiotiques en France entre 2000 et 2015 - Point d'Information. 2017. https://www.omedit-grand-est.ars.sante.fr/system/files/2017-08/ANSM-rapport-antibio_2016_bd2.pdf. Accessed 15 Sep 2021.

8. Tonkin-Crine SKG, Tan PS, van Hecke O, Wang K, Roberts NW, Mccullough A, et al. Clinician-targeted interventions to influence antibiotic prescribing behaviour for acute respiratory infections in primary care: An overview of systematic reviews. Cochrane Database Syst. Rev. 2017.

9. Essilini A, Kivits J, Caron F, Boivin J-M, Thilly N, Pulcini C. 'I don't know if we can really, really change that': a qualitative exploration of public perception towards antibiotic resistance in France. JAC-Antimicrobial Resist. 2020;2:dlaa073.

10. Lucas PJ, Cabral C, Hay AD, Horwood J. A systematic review of parent and clinician views and perceptions that influence prescribing decisions in relation to acute childhood infections in primary care. Scand J Prim Health Care. 2015;33:11–20.

11. Cabral C, Ingram J, Lucas PJ, Redmond NM, Kai J, Hay AD, et al. Influence of clinical communication on parents' antibiotic expectations for children with respiratory tract infections. Ann Fam Med. 2016;14:141–7.

12. Mangione-Smith R, McGlynn EA, Elliott MN, McDonald L, Franz CE, Kravitz RL. Parent expectations for antibiotics, physician-parent communication, and satisfaction. Arch Pediatr Adolesc Med. 2001;155:800–6.

13. de Bont EGPM, Alink M, Falkenberg FCJ, Dinant G-J, Cals JWL. Patient information leaflets to reduce antibiotic use and reconsultation rates in general practice: a systematic review. BMJ Open.

2015;5:e007612.

14. Ritchie SR, Rakhmanova L, Out-O'Reilly E, Reay S, Thomas MG, Sajtos L. The use of a poster to reduce expectations to receive antibiotics for a common cold. Eur J Clin Microbiol Infect Dis Off Publ Eur Soc Clin Microbiol. 2019;38:1463–9.

15. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. Int J Qual Heal Care. 2007;19:349–57.

16. Ameli. Rémunération sur objectifs : Médecin traitant de l'adulte. In: Ameli.fr. 2021. https://www.ameli.fr/medecin/exercice-liberal/remuneration/remuneration-objectifs/medecin-traitant-adulte#text_65526. Accessed 15 Sep 2021.

17. Meeker D, Knight TK, Friedberg MW, Linder JA, Goldstein NJ, Fox CR, et al. Nudging Guideline-Concordant Antibiotic Prescribing. JAMA Intern Med. 2014;174:425–31.

18. Giry M, Pulcini C, Rabaud C, Boivin JM, Mauffrey V, Birgé J. Acceptability of antibiotic stewardship measures in primary care. Med Mal Infect. 2016;46:276–84.

19. Mauffrey V, Kivits J, Pulcini C, Boivin JM. Perception of acceptable antibiotic stewardship strategies in outpatient settings. Med Mal Infect. 2016;46:285–93.

20. Assurance Maladie. Fiche de non-prescription. In: Ameli.fr. https://www.ameli.fr/sites/default/files/Documents/4074/document/information-antibiotiques-non-prescrits_assurance-maladie.pdf. Accessed 15 Sep 2021.

21. Sallis A, Bondaronek P, Sanders JG, Yu L-M, Harris V, Vlaev I, et al. Prescriber Commitment Posters to Increase Prudent Antibiotic Prescribing in English General Practice: A Cluster Randomized Controlled Trial. Antibiotics. 2020;9:490.

22. Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M, et al. Developing and evaluating complex interventions: the new Medical Research Council guidance. BMJ. 2008;337:a1655.

23. Wellcome Trust. Exploring the consumer perspective on antimicrobial resistance. 2015.

24. Van Hecke O, Butler CC, Wang K, Tonkin-Crine S. Parents' perceptions of antibiotic use and antibiotic resistance (PAUSE): a qualitative interview study. J Antimicrob Chemother. 2019;74:1741–7.

25. Dempsey PP, Businger AC, Whaley LE, Gagne JJ, Linder JA. Primary care clinicians perceptions about antibiotic prescribing for acute bronchitis: A qualitative study. BMC Fam Pract. 2014; doi.org/10.1186/s12875-014-0194-5.

26. Coenen S, Francis N, Kelly M, Hood K, Nuttall J, Little P, et al. Are Patient Views about Antibiotics Related to Clinician Perceptions, Management and Outcome? A Multi-Country Study in Outpatients with Acute Cough. PLoS One. 2013;8:e76691.

27. Lee C, Jafari M, Brownbridge R, Phillips C, Vanstone JR. The viral prescription pad - A mixed methods study to determine the need for and utility of an educational tool for antimicrobial stewardship in primary health care. BMC Fam Pract. 2020;21:1–12.

28. Fainzang S. Médicaments et société. Le patient, le médecin et l'ordonnance. Paris: Presses Universitaires de France; 2001.

29. Demoré B, Mangin L, Tebano G, Pulcini C, Thilly N. Public knowledge and behaviours concerning antibiotic use and resistance in France: a cross-sectional survey. Infection. 2017;45:513–20.

30. Eurobarometer. Special Eurobarometer 478: Antimicrobial Resistance. In: data.europa.eu. 2018. https://data.europa.eu/euodp/en/data/dataset/S2190_90_1_478_ENG. Accessed 15 Sep 2021.

Supplementary data

Document S1. General practitioners' interview guide

1. **Did you use the documents? Which ones?**

Follow-up question:
- If yes, how often? How did you use it?
- If not, or if they stopped, why?

2. **What did you think of the documents?**

Follow-up question:
- Pedagogical and clear? If not, which tool and why?
- Negotiating tool?

3. **Do you have examples when they have been particularly useful?**

4. **Did you have any constraint while using the tools? What kind? Did they prevent you using the tools?**

Follow-up question:
- Time constraint?
- Organisational constraint, too energy consuming
- Require too much involvement, new responsibilities

5. **How your patients reacted to the tools?**

Follow-up question:
- Questions, request for explanation
- Astonishment
- Criticism, anger, aggressiveness
- How did you handle those reactions?
- Were they easy to handle?

6. **Do you feel that you have prescribed differently and/or noticed a change in the patients' demand for antibiotics?**

Follow-up question:
- Do you think you have prescribed less antibiotics?
- Do you feel that patient expectations of antibiotics have improved?
- If so, which aspect of the intervention do you think has had the most impact on the evolution of patients' demand? Which type(s) of patients do you think were particularly impacted? For which infection? If not, why?

7. **Do you feel that the tools have had an impact on the quality of care?**

Follow-up question:

- Do you think that the implementation of the intervention improved the quality of care you delivered?
- Have you been able to treat patients more appropriately for the infections they had?
- Do you think you were encouraged to under-prescribe antibiotics? Did you ever regret not prescribing antibiotics? Have you been blamed for this?

8. Do you feel that the tools are useful to raise awareness and/or accountability for both GPs and the patients?

Follow-up question:

- Did you feel (even more) engaged by the display of the charter and/or the use of tools?
- Do you feel that patients behave more responsibly when prescribing antibiotics? What makes you think so (discussion, remarks, questions from patients)?
- In your opinion, which of the components of the intervention seemed to be the most decisive in creating a sense of responsibility in patients?

Document S2. Patients' interview guide

1. **What do you think of the appearance of the three documents?**

Follow-up question:
- Is the Charter visible in the waiting room and does it make you want to read it?
- Images of the non-prescription pad?
- Presentation of the leaflets?

2. **What do you think these documents are for?**

Follow-up question:
- In your opinion, what was the purpose of these documents?

3. **Which document did he/she use with you?**

Follow-up question:
- In which circumstances?
- In your opinion, why?
- What did you feel?
- Did you do anything differently?
- Did you take your antibiotics differently?

4. **How do you feel about your doctor not prescribing or refusing you an antibiotic?**

5. **What do you think of antibiotics?**

Follow-up question:
- In which cases do you think they are necessary?
- In which cases do you think they are not useful?
- Is it a harmless/risk-free treatment, in your opinion?

6. **Have you ever heard of antibiotic resistance?**

Follow-up question:
- If so, what is antibiotic resistance, in your own words?
- Does it worry you? Why or why not?

7. **In your opinion, should measures be taken against antibiotic resistance?**

8. **Did you perceive antibiotics differently after reading the documents?**

9. **Do you think you need to change your behaviour/the way you use antibiotics?**

Follow-up question:
- Why or why not?

- For you and your family?
- What do you plan to do (or not to do)?

10. Do you think it is necessary to reduce the prescription of antibiotics in general?

Follow-up question:

- Do you feel personally involved?

11. Do you think the study/documents have had an impact on the quality of care?

12. What do you think should be done to improve the effectiveness of the documents?

Chapitre 7

Discussion

Principaux résultats

Dans un premier temps, nous avons exploré les connaissances et les pratiques des usagers vis-à-vis des antibiotiques. Les études qualitatives présentées dans les chapitres 2, 4 et 6 ont permis de montrer que les usagers avaient des connaissances partielles voire erronées sur l'antibiorésistance, les antibiotiques et leur utilisation. Si lors du diagnostic d'une infection virale, la non-prescription d'antibiotiques est aujourd'hui admise, ils s'attendaient tout de même à une alternative médicamenteuse aussi efficace de la part de leur médecin. Dans une culture de l'efficacité, où être malade n'est pas acceptable et l'arrêt maladie mal perçu, les patients déclaraient mettre tout en œuvre pour guérir plus vite. Dans le cadre d'infections aigues, les antibiotiques étaient perçus comme le traitement miraculeux et poussaient les patients à de mauvais comportements (pression sur le médecin, automédication…). La perception des antibiotiques par les patients de même que leurs comportements étaient en accord avec les propos tenus par les pharmaciens d'officine et les médecins généralistes interrogés dans les chapitres 3 et 6.

Depuis 2009, les pharmaciens d'officine sont encouragés à réaliser des missions de santé publique, notamment de prévention, de dépistage, d'éducation et des TROD. Lors des entretiens, les pharmaciens déclaraient être fiers de leur rôle de « gardiens du bon usage des médicaments » mais dénonçaient un manque de reconnaissance de leur profession en tant que professionnels de santé et non que comme simples vendeurs. Dans un contexte de l'évolution constante de leur profession, les pharmaciens d'officine souhaitaient, en plus de l'éducation aux patients et de l'identification d'interactions ou de contre-indications médicamenteuses sur les ordonnances, étendre leurs missions en réalisant plus de TROD, en encourageant le retour des antibiotiques par les patients à la pharmacie et en agissant autour de la prescription (modification de la durée du traitement, adaptation du dosage en fonction des caractéristiques du patient, changement de molécule pour un antibiotique de première intention ou à la suite d'un antibiogramme, etc…). En revanche, ils étaient majoritairement contre la dispensation à l'unité des antibiotiques jugée inutile, chronophage et difficile à mettre en

place. La plupart des pharmaciens n'étaient pas favorables à l'initiation de prescription, craignant une banalisation de l'antibiothérapie, un retard au diagnostic, un risque de surprescription, un conflit d'intérêt (le pharmacien serait à la fois prescripteur et vendeur) mais aussi le vagabondage des patients allant de pharmacie en pharmacie pour obtenir des antibiotiques. La relation, parfois conflictuelle, avec les médecins généralistes de proximité était une des barrières principales à la réalisation de nouvelles missions. En effet, les pharmaciens exprimaient des difficultés à communiquer avec les médecins, les médecins se percevant supérieurs aux pharmaciens.

Dans la deuxième partie de ce manuscrit, nous avons mis en place et évalué deux interventions visant à promouvoir le bon usage des antibiotiques. Nous avons montré dans le chapitre 4, qu'Antibio'Malin répondait à un besoin dans le domaine de la e-santé. Le site était apprécié à la fois par les usagers et les professionnels de santé. S'il avait été conçu pour sensibiliser, informer le grand public sur les antibiotiques et les infections courantes et faciliter la discussion avec les professionnels de santé, il était aussi perçu comme une source d'information par certains professionnels de santé et un moyen d'actualiser leurs connaissances.

Les chapitres 5 et 6 évaluent une intervention visant à réduire les prescriptions inutiles d'antibiotiques en éduquant les patients au bon usage des antibiotiques et en facilitant la communication entre les médecins généralistes et leurs patients. La majorité des médecins avaient affiché visiblement la charte, et l'ordonnance de non-prescription et la fiche support à la prescription avaient été utilisées. Même si le contenu et la forme de la charte d'engagement avaient été jugé pertinents, peu de médecins généralistes s'étaient sentis publiquement engagés par elle. Les médecins généralistes interrogés avaient particulièrement apprécié l'ordonnance de non-prescription et pensaient qu'elle pourrait les aider à améliorer leurs pratiques. Elle était également appréciée des patients pour ses informations sur les symptômes et leur durée. Contrairement aux médecins généralistes, qui considéraient la fiche support à la prescription comme inutile et redondante avec les informations données lors de la consultation, les patients avaient jugé que le document était un bon outil pour sensibiliser à

l'importance du bon usage des antibiotiques.

Forces et limites

Les deux interventions présentées dans ce travail s'inscrivent dans le cadre des actions recommandées pour lutter contre l'antibiorésistance tant au niveau national qu'international. En effet, Antibio'Malin répond au premier objectif du plan d'action mondial de l'OMS visant à améliorer la sensibilisation et la compréhension de la résistance aux antimicrobiens du grand public et répond aux recommandations du *Wellcome Trust* sur la manière de communiquer efficacement sur l'antibiorésistance.[1,2] Le projet Antibio-Charte évalue quant à lui des outils préconisés par le Comité Interministériel dans sa feuille de route de 2016.[3]

Une autre force de ce travail est l'utilisation des méthodes qualitatives en complément des évaluations quantitatives. Les méthodes qualitatives, utilisées seules, permettent d'étudier en détail les perceptions, attitudes et motivations des participants. En complément d'études quantitatives, elles autorisent un niveau d'analyse supplémentaire pour expliquer ou approfondir des résultats quantitatifs. Elles nous ont par exemple permis dans le projet Antibio-Charte (chapitre 6) d'évaluer l'usage et la compréhension des outils par les médecins généralistes. Les résultats des différentes études qualitatives ont ouvert de nouvelles pistes de recherche. Un projet de recherche est né de nos résultats dont les objectifs sont d'étudier : (i) la relation médecin-patient, (ii) le changement de pratiques des médecins généralistes et (iii) des problématiques inattendues telles que le partage des croyances des patients par les médecins, comme l'utilisation de l'antibiotique en prévention de la surinfection, et la ruralité, souvent lieu de déserts médicaux, où les derniers médecins encore présents doivent faire face « au droit » des patients à être soignés et donc à recevoir des antibiotiques.

Enfin, l'analyse de séries chronologiques est la méthode d'analyse la plus adaptée à des designs avant-après (contrôlés ou non) dans les domaines où il y a une saisonnalité des pathologies ou de l'usage des médicaments, comme celui de l'antibiothérapie. La comparaison à une série contrôle, non affectée par l'intervention, a permis de s'assurer que l'effet évalué est bien celui de l'intervention et pas d'autres

évènements intercurrents.[4] La tendance à la baisse des consommations d'antibiotiques entre les périodes de l'intervention en souligne l'importance.

Ce travail présente toutefois certaines limites. Le biais de sélection ne peut être exclu de nos études puisque tous les participants (professionnels de santé ou usagers) étaient volontaires pour participer aux études et donc probablement plus intéressés par le problème de l'antibiorésistance que ceux qui ne l'étaient pas. Sur les 360 médecins ciblés par l'intervention Antibio-Charte, seuls 109 ont accepté de participer. De plus, le processus de sélection du groupe témoin diffère de celui du groupe intervention puisque les médecins n'étaient pas informés de leur participation à l'intervention. Si nous avions obtenu leur accord de participation, les médecins auraient été informés qu'ils participaient à une étude sur les prescriptions d'antibiotiques et cela aurait pu induire chez eux un changement de pratiques. Les usagers ayant accepté les entretiens avaient tendance à avoir un niveau de littératie élevé, des expériences personnelles de la résistance aux antibiotiques et des problèmes de santé.

Finalement, le format papier de l'ordonnance de non-prescription et de la fiche support à la prescription avait été identifié comme un frein à leurs utilisations. Pour évaluer l'utilisation des outils pendant l'intervention, nous avions décidé de nous fournir les documents que sous-forme de blocs papier mais l'ordonnance de non-prescription est téléchargeable en PDF sur le site ameli.fr. La fiche support à la prescription pourrait être intégrée à l'ordonnance du médecin pour éviter l'impression de redondance ou ses messages intégrés à cette prescription, peut-être sous la forme d'une ordonnance dédiée aux antibiotiques, comme recommandé dans la feuille de route interministérielle de 2016 pour la maîtrise de l'antibiorésistance. Pour des raisons de faisabilité, nous avions décidé d'évaluer la fiche support à la prescription comme alternative à l'ordonnance dédiée.

Chapitre 7

Le don-contre don : la symbolique de la prescription

L'ordonnance est au cœur de la consultation médicale. Donnée à la fin de la consultation, elle finalise l'échange, le « don – contre-don », entre le patient et le médecin.[5] Pour le médecin, l'ordonnance est la contrepartie à la visite et au paiement de la consultation par le patient.[6] Souvent, le diagnostic seul ne suffit pas au médecin pour avoir le sentiment de répondre aux attentes du patient.[7,8] La perception de la satisfaction du patient est un élément clé de la relation médecin-patient, source de prescriptions inutiles, en particulier d'antibiotiques lors d'infections virales.[9–11] Pour le patient qui consulte, la prescription médicamenteuse est une reconnaissance de sa souffrance et de son état malade, de sa prise en charge (écoute et diagnostic) par le médecin et de la capacité de ce dernier à répondre à ses besoins, à savoir guérir et être entendu.[7,8] La non-prescription, de manière générale, même lorsqu'elle est expliquée d'une part, et comprise de l'autre, ne comble pas le besoin d'une alternative (médicamenteuse ou autre).

Suggestions

1. Promouvoir des stratégies de substitution à l'ordonnance médicamenteuse. L'ordonnance de non-prescription évaluée dans les chapitres 5 et 6 constitue probablement un outil dont la promotion doit être renforcée au niveau national. Elle a été, en effet, particulièrement appréciée à la fois par les médecins et par les patients. Elle a été utilisée comme un outil d'autorité ou de négociation pour convaincre le patient de l'inutilité d'une prescription d'antibiotique. Son utilisation a été bien reçue par les patients interrogés qui l'avaient souvent conservé et partagé. Une autre alternative serait une prescription de règles hygiéno-diététiques à adopter pendant la durée de l'infection.
2. Eduquer les patients sur les actions qu'ils peuvent mettre en place pour se sentir mieux. Les fiches infections d'Antibio'Malin, chapitre 4, pourraient être distribuées aux patients par les médecins ou les pharmaciens d'officine.

Perspectives de recherche

Pour éviter la prescription inutile d'antibiotiques dans le cadre d'infections virales, il semble essentiel de travailler sur la perception qu'ont les patients et les médecins de la consultation médicale. Si aujourd'hui l'ordonnance concrétise l'acte de consultation, il s'agirait de comprendre de quelle façon il serait possible de modifier cette représentation de telle sorte que le diagnostic symbolise l'échange entre le patient et le médecin.

Responsabiliser les usagers

Si lorsqu'elle est expliquée, l'antibiorésistance est une source d'inquiétude pour les usagers, elle reste méconnue ou incomprise du grand public. La plupart des usagers interrogés pensent que la résistance est « acquise par le corps », par un mécanisme d'habituation ou d'accoutumance. Dans la littérature comme dans nos résultats, à l'exception d'une étude réalisée en Suède, les usagers pensent ne prendre de risque que pour leur propre personne, ignorant que les bactéries peuvent se transmettre entre êtres vivants ou à partir de l'environnement, et transmettre leur capacité à résister aux antibiotiques à d'autres bactéries, y compris celles présentes dans l'environnement.[12–14] Mourir d'une pneumonie ou d'une infection urinaire due à une bactérie résistante est inimaginable. Cela ne constitue donc pas un risque vis-à-vis duquel il faudrait agir et être vigilant. Majoritairement, ils n'ont aucune conscience de la menace que représente l'antibiorésistance pour la médecine moderne. La nécessité de recourir aux antibiotiques dans le cadre de la réanimation, de la chirurgie ou encore de la chimiothérapie anti-cancéreuse, est une donnée inconnue du grand public.

Durant les entretiens, les usagers exprimaient une frustration à ne pas recevoir d'antibiotiques lorsqu'ils se sentaient malades. Ces propos ont été confirmés par les médecins généralistes lors des entretiens de l'étude Antibio-Charte. Ils rapportaient la réaction vive de certains patients, « donc je suis pas malade », lorsque la prescription d'antibiotiques leur était refusée. Avant la Covid, les infections qui ne nécessitent pas d'antibiotiques tendaient à être considérées comme moins graves que celles qui en nécessitent. Des symptômes sévères ou prolongés signalaient immanquablement, pour les patients, l'origine bactérienne de la maladie et donc justifiaient une prescription

d'antibiotique. La prescription était alors perçue comme une reconnaissance de la souffrance et une validation de la maladie.[12,15,16] Nos études montrent que la plupart des usagers ont conscience que les antibiotiques ne sont efficaces que contre les infections bactériennes, notamment grâce à la campagne de l'Assurance Maladie « les antibiotiques, c'est pas automatique » qui a marqué les esprits. Cela n'empêche pas que les antibiotiques soient jugés comme utiles en cas d'infections virales. On peut alors se demander si l'expression souvent utilisée par les patients « c'est viral, je suis pas malade » ne serait pas issue à la fois d'une mauvaise communication de l'Assurance Maladie et d'une mauvaise interprétation des spots de la campagne. Le message des spots visait à informer de l'inutilité des antibiotiques en cas d'infections virales mais la redondance du dialogue « t'es sous antibiotiques, non, donc t'es pas malade » pourrait avoir conforter les usagers dans leurs attentes vis-à-vis des antibiotiques.[17] La fin justifiant les moyens, les usagers mettent alors tout en œuvre pour se remettre au plus vite : pression exercée sur le médecin pour obtenir des antibiotiques, stockage des antibiotiques (au lieu de retourner leurs restes de traitement à la pharmacie), autodiagnostic et automédication.

Suggestions

1. Modifier la perception des infections virales. Le slogan « les antibiotiques, c'est pas automatique » reste d'actualité. La reprise de ce slogan informerait les usagers qu'une infection virale ne signifie pas que celle-ci est modérée et de courte durée mais qu'elles peuvent être sévères, évoluer et que les symptômes peuvent persister jusqu'à plusieurs semaines comme c'est le cas de la toux. Le message à associer serait que les antibiotiques ne permettent pas de réduire la durée des symptômes d'une infection virale.
2. Inciter les employeurs à mettre en place des méthodes de travail en cas d'infection aiguë. Un aménagement du cadre de travail (tel que le télétravail) ou des horaires en cas d'infection aigüe non contraignante pourraient impacter la perception des usagers concernant les antibiotiques et diminuer les demandes d'antibiotiques et d'arrêts maladie.

3. Informer les usagers sur leur consommation et leur utilisation des antibiotiques. Aujourd'hui, en France, l'accès à leur historique de soins à travers le Dossier Médical Partagé reste très méconnu des patients. De la même façon qu'il existe des initiatives pour développer des profils de prescriptions des médecins généralistes et des chirurgiens-dentistes, il serait intéressant de développer des profils individuels de la consommation patients que chacun recevrait régulièrement.
4. Responsabiliser les usagers concernant leurs pratiques vis-à-vis des antibiotiques. Une campagne de sensibilisation autour de l'importance des antibiotiques en santé humaine, vétérinaire et au niveau environnemental pourrait informer la population générale des raisons poussant à la mise en place des programmes de bon usage, de l'urgence de mieux faire et les faire réfléchir sur leurs propres comportements.

Perspectives de recherche

1. Nos travaux ont mis en évidence une pression sociale incitant les individus à repousser la prescription d'un arrêt maladie au profit d'une prescription antibiotique, perçue comme le moyen le plus efficace de mettre fin aux symptômes les plus gênants, quelle que soit la nature de l'infection. Les questions du rôle du monde du travail et des délais de rétablissement après une infection aigue sur les comportements des patients restent à étudier.
2. Les perceptions des usagers vis-à-vis de la gravité infections virales ont pu être impacter par la Covid, leurs évolutions doivent être étudier avant toutes interventions auprès des usagers.

Responsabiliser les médecins généralistes

Premiers prescripteurs en médecine humaine, les médecins généralistes sont la principale cible des programmes de bon usage en ville[18–20] mais la majorité des interventions évaluées ont un impact limité, en particulier celles visant à diminuer la prescription d'antibiotiques (moins de 25% de diminution observés).[19,21] Deux antibiotiques sur trois en ville sont prescrits pour des infections ORL et des voies respiratoires.[22] Or, si les antibiotiques présentent un intérêt évident pour traiter certaines

de ces infections dès lors qu'elles sont d'origine bactérienne, la plupart des infections respiratoires en médecine générale guérissent spontanément et ne nécessitent pas de traitements antibiotiques.[19]

Les médecins de l'intervention Antibio-Charte (chapitre 5 et 6), forts prescripteurs d'antibiotiques et ciblés par une campagne de l'Assurance Maladie, étaient souvent dans le déni de leur mauvaise pratique, la moitié d'entre eux étant convaincue de bien prescrire. Pourtant presque tous tenaient des propos impliquants qu'ils cédaient régulièrement à la pression exercée par leurs patients pour obtenir une prescription antibiotique. Ils avaient tendance à partager les mêmes croyances que les patients sur l'utilité des antibiotiques en cas d'infection aigüe pour éviter les surinfections bactériennes. En cas de doute, les bénéfices potentiels des antibiotiques surpassaient les risques liés à leur prescription. En ce qui concerne cette dernière croyance, on peut penser que celle-ci vient du fait que les médecins, s'ils ont conscience du lien entre forte prescription et augmentation de la résistance, ne se sentent pas personnellement responsables de l'antibiorésistance. Pour beaucoup, le problème de l'antibiorésistance demeure un problème hospitalier et certains n'hésitaient pas à accuser les prescripteurs hospitaliers, les éleveurs et agriculteurs ainsi que les « mauvais médecins de ville » d'en être la cause. Les facteurs de surprescription retrouvés dans la littérature sont : le contexte environnemental et les ressources (l'accès aux soins, la charge de travail et le temps attribué à chaque consultation), les croyances sur les conséquences de l'antibiorésistance (responsabilité de leurs pratiques de prescription, croyances personnelles vis-à-vis des antibiotiques), les connaissances (lien entre prescription et résistance, existence de recommandations et où les trouver), la dimension émotionnelle (satisfaction du patient, peur de la surinfection ou complication, médecine considérée comme un art) et les objectifs des médecins (soulager les symptômes, empêcher la récurrence de la maladie, maintien de la relation médecin-patient).[6]

Perspectives de recherche

1. Les interventions réalisées au niveau national auprès des médecins généralistes concernent généralement les forts prescripteurs d'antibiotiques. Pour faire évoluer les croyances et

pratiques autour des antibiotiques, il est nécessaire de s'intéresser aussi aux prescripteurs qui ont réussi à modifier leur pratique et à ceux qui ont toujours été de faibles prescripteurs pour identifier des leviers du changement de pratique et les déterminants des bonnes pratiques.

2. Des études doivent être menées pour identifier des moyens de déconstruire les croyances partagées avec les patients, notamment que les antibiotiques présentent plus d'avantages que de risques en cas de doute sur le diagnostic.

Impliquer le pharmacien d'officine

Ce travail de thèse s'est articulé autour de trois acteurs de l'utilisation des antibiotiques en ville à savoir le médecin généraliste, le pharmacien d'officine et le patient. Si la relation médecin-patient a été étudiée au travers d'interventions ciblant le médecin et le patient ou l'étude des déterminants de la prescription d'antibiotique, le pharmacien, de par son rôle et ses missions, est un acteur clé du bon usage des antibiotiques souvent oublié et peu impliqué dans les programmes de bon usage en ville bien qu'il soit impliqué dans le bon usage des antibiotiques à l'hôpital depuis longtemps. Il est responsable de l'analyse et la validation de la prescription du médecin et de la délivrance de l'antibiotique au patient, moment privilégié pour conseiller et éduquer le patient au bon usage des antibiotiques. Il est à la fois témoin des pratiques des prescripteurs et des comportements des patients. Bien que la collaboration médecin-pharmacien-patient constitue un fort enjeu dans la lutte contre l'antibiorésistance, elle reste peu étudiée.

Suggestions

1. Renforcer les messages des médecins aux patients sur l'usage des antibiotiques. L'utilisation, par les médecins et les pharmaciens, d'outils d'information similaires à destination des patients accentueraient les messages de bon usage des antibiotiques. L'ordonnance de non-prescription pourrait par exemple être modifiée pour être adaptée à un usage en officine par les pharmaciens. De plus, Antibio'Malin pourrait être un outil de référence utilisé à la fois par les médecins, les pharmaciens et les patients.

2. Améliorer la collaboration entre les médecins et les pharmaciens. Des actions transversales aux étudiants de médecine et de pharmacie ont été mises en place et font l'objet de propositions de l'Association Nationale des Etudiants en Médecine de France et de l'Association Nationale des Etudiants en Pharmacie de France.[23]
3. Développer un logiciel commun aux médecins et aux pharmaciens. L'accès au diagnostic et au dossier du patient permettrait aux pharmaciens d'évaluer la pertinence de la prescription et d'ajuster le traitement en accord avec le médecin pour respecter les recommandations nationales.

Références

1. World Health Organization. Global action plan on antimicrobial resistance. *WHO Press* 2015.

2. Wellcome Trust. *Reframing Resistance*. 2019. Disponible sur : https://wellcome.ac.uk/reports/reframing-antimicrobial-resistance-antibiotic-resistance.

3. Ministère des Solidarités et de la Santé. Feuille de route de l'antibiorésistance. Disponible sur : http://solidarites-sante.gouv.fr/IMG/pdf/feuille_de_route_antibioresistance_nov_2016.pdf.

4. Rumeau-Rouquette C, Breart G, Padieu R. *Methodes en epidemiologie : echantillonnage, investigations, analyse*. Flammarion Médecine-sciences; 1985.

5. Fainzang S. *Médicaments et société*. Presses Universitaires de France; 2001.

6. Thompson W, Tonkin-Crine S, Pavitt SH, *et al.* Factors associated with antibiotic prescribing for adults with acute conditions: an umbrella review across primary care and a systematic review focusing on primary dental care. *J Antimicrob Chemother* 2019; **74**: 2139–52.

7. Le Dref G. Ethique médicale et antibiotiques. Disponible sur : https://videos.ahp-numerique.fr/videos/watch/f137cdf0-3e55-4361-9530-976e4d928551.

8. Le Dref G. Les antibiotiques ne sont pas une panacée : enjeux épistémiques et sociétaux de l'antibiothérapie à l'heure de l'antibiorésistance. Disponible sur : https://sfhst.hypotheses.org/files/2021/08/sfhst-programme-avril-2021.pdf.

9. Lucas PJ, Cabral C, Hay AD, Horwood J. A systematic review of parent and clinician views and

perceptions that influence prescribing decisions in relation to acute childhood infections in primary care. *Scand J Prim Health Care* 2015; **33**: 11–20.

10. Mangione-Smith R, McGlynn EA, Elliott MN, McDonald L, Franz CE, Kravitz RL. Parent expectations for antibiotics, physician-parent communication, and satisfaction. *Arch Pediatr Adolesc Med* 2001; **155**: 800–6.

11. Coenen S, Francis N, Kelly M, *et al.* Are Patient Views about Antibiotics Related to Clinician Perceptions, Management and Outcome? A Multi-Country Study in Outpatients with Acute Cough. *PLoS One* 2013; **8**: e76691.

13. Ancillotti M, Eriksson S, Veldwijk J, Nihlén Fahlquist J, Andersson DI, Godskesen T. Public awareness and individual responsibility needed for judicious use of antibiotics: A qualitative study of public beliefs and perceptions 11 Medical and Health Sciences 1117 Public Health and Health Services. *BMC Public Health* 2018; **18**.

14. Hawkings NJ, Wood F, Butler CC. Public attitudes towards bacterial resistance: A qualitative study. *J Antimicrob Chemother* 2007; **59**: 1155–60.

15. Cabral C, Ingram J, Lucas PJ, *et al.* Influence of clinical communication on parents' antibiotic expectations for children with respiratory tract infections. *Ann Fam Med* 2016; **14**: 141–7.

16. Van Hecke O, Butler CC, Wang K, Tonkin-Crine S. Parents' perceptions of antibiotic use and antibiotic resistance (PAUSE): a qualitative interview study. *J Antimicrob Chemother* 2019; **74**: 1741–7.

17. Caisse Nationale d'Assurance Maladie. Publicité 'les antibiotiques, c'est pas automatique' . Disponible sur : https://www.youtube.com/watch?v=6JdRuhZnZpw&ab_channel=christophenatario.

18. Dyar OJ, Beović B, Vlahović-Palčevski V, Verheij T, Pulcini C. How can we improve antibiotic prescribing in primary care? *Expert Rev Anti Infect Ther* 2016; **14**: 403–13.

19. Tonkin-Crine SKG, Tan PS, van Hecke O, *et al.* Clinician-targeted interventions to influence antibiotic prescribing behaviour for acute respiratory infections in primary care: An overview of systematic reviews. *Cochrane Database Syst Rev* 2017; **2017**.

20. Wang S, Pulcini C, Rabaud C, Boivin J-M, Birgé J. Inventory of antibiotic stewardship programs in general practice in France and abroad. *Med Mal Infect* 2015; **45**: 111–23.

21. Del Mar CB, Scott AM, Glasziou PP, *et al.* Reducing antibiotic prescribing in Australian general practice: time for a national strategy. *Med J Aust* 2017; **207**: 401–6.

22. Agence nationale de sécurité du médicament et des produits de santé. Evolution des consommations d'antibiotiques en France entre 2000 et 2015. Disponible sur : https://www.omedit-grand-est.ars.sante.fr/system/files/2017-08/ANSM-rapport-antibio_2016_bd2.pdf.

23. ANEPF, ANEMF, INSAR-IMG. *Antibiorésistance : contribution sur l'antibiorésistance des étudiants en médecine et pharmacie*. Disponible sur : https://www.isnar-img.com/wp-content/uploads/Contrib-Antibioresistance.pdf.

Communications

Orale

Anaïs Essilini, Sophie Rodari, Gaëlle Le-Dref, Félicie Patoor, Joëlle Kivits, Nathalie Thilly, Céline Pulcini**. Antibio'Malin.** Journée régionale bon usage des antibiotiques, Nancy, France, Novembre 2019**.** https://www.antibioest.org/journee-regionale-bon-usage-des-antibiotiques/

Affichées

Anais Essilini, Joëlle Kivits, Frédéric Caron, Jean-Marc Boivin, Nathalie Thilly, Céline Pulcini. **Perceptions of antibiotic resistance by the general public: a qualitative study.** European Congress of Clinical Microbiology and Infectious Diseases, Avril 2019, Amsterdam, Pays-Bas. https://www.escmid.org/escmid_publications/escmid_elibrary/?q=essilini&tx_solr%5Bfilter%5D%5B0%5D=entry_type%253AAbstract%2Bpublication&tx_solr%5Bfilter%5D%5B1%5D=author%253AAnais%2BEssilini

Anais Essilini, Joëlle Kivits, Frédéric Caron, Jean-Marc Boivin, Nathalie Thilly, Céline Pulcini. **Perceptions of antibiotic resistance by the general public: a qualitative study.** Journée Scientifique de l'Ecole Doctorale BioSE, Nancy, France, Novembre 2019.

Anaïs Essilini, Gaëlle Le-Dref, Sophie Rodari, Joëlle Kivits, Nathalie Thilly, Céline Pulcini. **Antibio'Malin: a new information website on antibiotics for the general public.** Réunion Interdisciplinaire de Chimiothérapie Anti-Infectieuse, en ligne, Décembre 2020. https://backoffice.europa-inviteo.com/upload/compte306/Base/inscriptions_projets/supplement19/26032-ricai_antibiomalin.pdf

Abstract

Anaïs Essilini, Gaëlle Le-Dref, Joëlle Kivits, Adeline Welter, Céline Pulcini, Nathalie Thilly. **Acceptability of a public commitment charter associated with patient information leaflets on antibiotics by general practitioners.** European Congress of Clinical Microbiology and Infectious Diseases, 2020. https://markterfolg.de/ESCMID/Abstractbook2020.pdf

Résumé : L'antibiorésistance représente une grave menace pour la santé publique. D'ici 2050, la résistance des agents infectieux aux antimicrobiens, dont l'antibiorésistance, pourrait être la première cause de mortalité avec 10 millions de décès par an. La France est l'un des pays les plus consommateurs d'antibiotiques d'Europe. La majorité des antibiotiques utilisés en médecine humaine sont prescrits en ville. Les objectifs de ce travail étaient : 1) d'explorer les pratiques autour des antibiotiques et les stratégies susceptibles de les améliorer et 2) d'évaluer des interventions visant à promouvoir leur bon usage en soins primaires. Il ciblait trois acteurs incontournables de l'usage des antibiotiques en ville : le médecin généraliste qui prescrit, le pharmacien d'officine qui délivre et le patient qui utilise. L'exploration des connaissances, perceptions et pratiques des patients a montré que le concept de l'antibiorésistance était encore mal compris. Bien qu'ils aient acquis que les antibiotiques n'étaient pas efficaces en cas d'infections virales, des symptômes sévères et prolongés signalaient pour eux, immanquablement, l'origine bactérienne de la maladie et donc justifiaient une prescription d'antibiotique. La prescription était alors perçue comme une reconnaissance de la souffrance et une validation de la maladie. Les pharmaciens d'officine, eux, se considéraient comme les gardiens du bon usage des médicaments. Ils se sentaient prêts à avoir plus de responsabilités dans le cadre du bon usage des antibiotiques, la réalisation de ces nouvelles missions dépendait des relations avec les médecins généralistes de proximité. Antibio'Malin est un site internet qui a été développé pour sensibiliser et informer le grand public sur les antibiotiques, les infections courantes et faciliter la discussion avec les professionnels de santé. Le site répondait à un besoin dans le domaine de la e-santé. Il avait été perçu comme un outil de référence à la fois par les patients et les professionnels de santé. Trois outils ont enfin été testés auprès de médecins généralistes pour les aider à diminuer les prescriptions inutiles d'antibiotiques en éduquant leurs patients. La charte d'engagement a bien été affichée en salle d'attente mais a eu peu d'impact sur le médecin généraliste. Les patients pensaient que la fiche support à la prescription d'antibiotiques était un bon outil pour sensibiliser les patients au bon usage des antibiotiques mais les médecins l'avaient peu utilisé car trop redondante avec les propos tenus lors de la consultation. L'ordonnance de non-prescription a été le document le plus apprécié par les patients et les médecins. En conclusion, ces résultats soulignent l'importance du trio médecin-pharmacien-patient dans la lutte contre l'antibiorésistance. La responsabilisation de chacun de ces acteurs et l'amélioration de leur collaboration apparaissent comme essentielles pour améliorer l'usage des antibiotiques.
Mots clés : bon usage des antibiotiques, antibiorésistance, soins primaires, intervention, étude qualitative

Abstract: Antibiotic resistance is a global threat. By 2050, antimicrobial resistance could be the leading cause of death with around 10 million deaths per year. Antibiotic use in France is high as compared to other European countries, with most of antibiotics used in clinical practice prescribed in primary care. The objectives of this thesis were: 1) to explore practices around antibiotic use and identify strategies to improve them and 2) to evaluate interventions to promote antibiotic stewardship in primary care. It targeted three key players: the general practitioner who prescribes, the community pharmacist who delivers and the patient who uses antibiotics. The exploration of patients' knowledge, perceptions and practices showed that the concept of antibiotic resistance was still poorly understood. Although they were aware of the inefficacy of antibiotics for viral infections, severe and prolonged symptoms were inevitably perceived as signalling a bacterial infection and thus requiring a prescription of antibiotics. The prescription was then perceived as an acknowledgement of the suffering and a validation of the disease. Community pharmacists considered themselves as the guardians of the appropriate use of drugs. They felt they could have more missions on antibiotic stewardship, but their implementation relied on the relationship with the local general practitioners. Antibio'Malin is a website that was developed to raise awareness and inform the public about antibiotics, common infections and facilitate discussion with health professionals. The site fulfilled a gap in e-health. It was positively perceived by both patients and health professionals. Finally, three tools distributed to patients by general practitioners with the objective to reduce unnecessary antibiotic prescriptions by educating patients have been evaluated. The commitment charter was displayed in the waiting room but had little impact on the engagement of general practitioners. Patients thought that the patient information leaflet was a good tool to raise awareness on antibiotic stewardship, but general practitioners had made little use of it because it was perceived as being too redundant with their advice. The non-prescription pad was the document most appreciated by patients and doctors. In conclusion, these results highlight the importance of the doctor-pharmacist-patient alliance against antibiotic resistance. The accountability in the use of antibiotics and the improvement of the collaboration between those actors appear to be essential to promote antibiotic stewardship.
Key words: antibiotic stewardship, antibiotic resistance, primary care, intervention, qualitative study