



UvA-DARE (Digital Academic Repository)

Antimicrobial drug resistance at the human-animal interface in Vietnam

Nguyen, V.T.

[Link to publication](#)

Citation for published version (APA):

Nguyen, V. T. (2017). Antimicrobial drug resistance at the human-animal interface in Vietnam

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <http://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

**ANTIMICROBIAL DRUG RESISTANCE
AT THE HUMAN – ANIMAL INTERFACE IN VIETNAM**



Nguyen Vinh Trung

**ANTIMICROBIAL DRUG RESISTANCE
AT THE HUMAN – ANIMAL INTERFACE IN VIETNAM**

Nguyen Vinh Trung

ANTIMICROBIAL DRUG RESISTANCE

AT THE HUMAN - ANIMAL INTERFACE IN VIETNAM

Thesis, University of Amsterdam, the Netherlands

Copyright © 2017, Nguyen Vinh Trung, Ho Chi Minh City, Vietnam

No part of this thesis may be reproduced, stored or transmitted in any form or by any means,
without prior permission from the author.

Printing: Ipskamp Drukkers B.V., Enschede, the Netherlands

Cover design: A Vietnamese farmer and his chickens by Nguyen Ngoc Minh Thy and Nguyen Vinh Trung

The studies included in this thesis were initiated from the Oxford University Clinical Research Unit
in Ho Chi Minh City, Vietnam; the Department of Medical Microbiology; the Department of Global Health and
Amsterdam Institute for Global Health and Development, Academic Medical Center, University
of Amsterdam, the Netherlands.

Funding was from The Netherlands Organisation for Health Research and Development/

The Netherlands Organisation for Scientific Research (grant number 205100012)

and The Wellcome Trust, UK (grant number 089276/Z/09/Z)

**ANTIMICROBIAL DRUG RESISTANCE
AT THE HUMAN - ANIMAL INTERFACE IN VIETNAM**

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor

aan de Universiteit van Amsterdam

op gezag van de Rector Magnificus

prof. dr. ir. K.I.J Maex

ten overstaan van een door het College voor Promoties ingestelde commissie,

in het openbaar te verdedigen in de Aula

op 13 september 2017, te 13.00 uur

door Nguyễn Vĩnh Trung

geboren te Dong Thap, Vietnam

Promotiecommissie:

Promotor(es):	prof. dr. C. Schultsz	AMC – UvA
	prof. dr. J.A. Wagenaar	Universiteit Utrecht
Copromotor(es):	dr. N.T. Hoa	Oxford University
Overige leden:	prof. dr. B.H. ter Kuile	Universiteit van Amsterdam
	prof. dr. C.M.J.E. Vandenbroucke-Grauls	Vrije Universiteit Amsterdam
	prof. dr. H.F.L. Wertheim	Radboud Universiteit Nijmegen
	prof. dr. D.J. Mevius	Universiteit Utrecht
	prof. dr. F.G.J. Cobelens	AMC – UvA
	prof. dr. J.M. Prins	AMC – UvA

Faculteit der Geneeskunde

TABLE OF CONTENTS

CHAPTER 1: Introduction	1
CHAPTER 2: Antimicrobial usage in chicken production in the Mekong Delta of Vietnam	13
CHAPTER 3: Non-typhoidal <i>Salmonella</i> colonization in chickens and humans in the Mekong Delta of Vietnam	29
CHAPTER 4: Prevalence and risk factors for carriage of antimicrobial resistant <i>Escherichia coli</i> on household and small-scale chicken farms in the Mekong Delta of Vietnam	41
CHAPTER 5: Colonization of Enteroaggregative <i>Escherichia coli</i> and Shiga Toxin-producing <i>Escherichia coli</i> in chickens and humans in southern Vietnam	73
CHAPTER 6: Contribution of non-intensive chicken farming to extended-spectrum Beta-lactamase producing <i>Escherichia coli</i> colonization in humans in southern Vietnam.....	87
CHAPTER 7: Zoonotic transmission of the <i>mcr-1</i> colistin resistance gene from non-intensive poultry farms in Vietnam.....	113
CHAPTER 8: Discussion	127
Thesis summary	137
Appendix.....	145