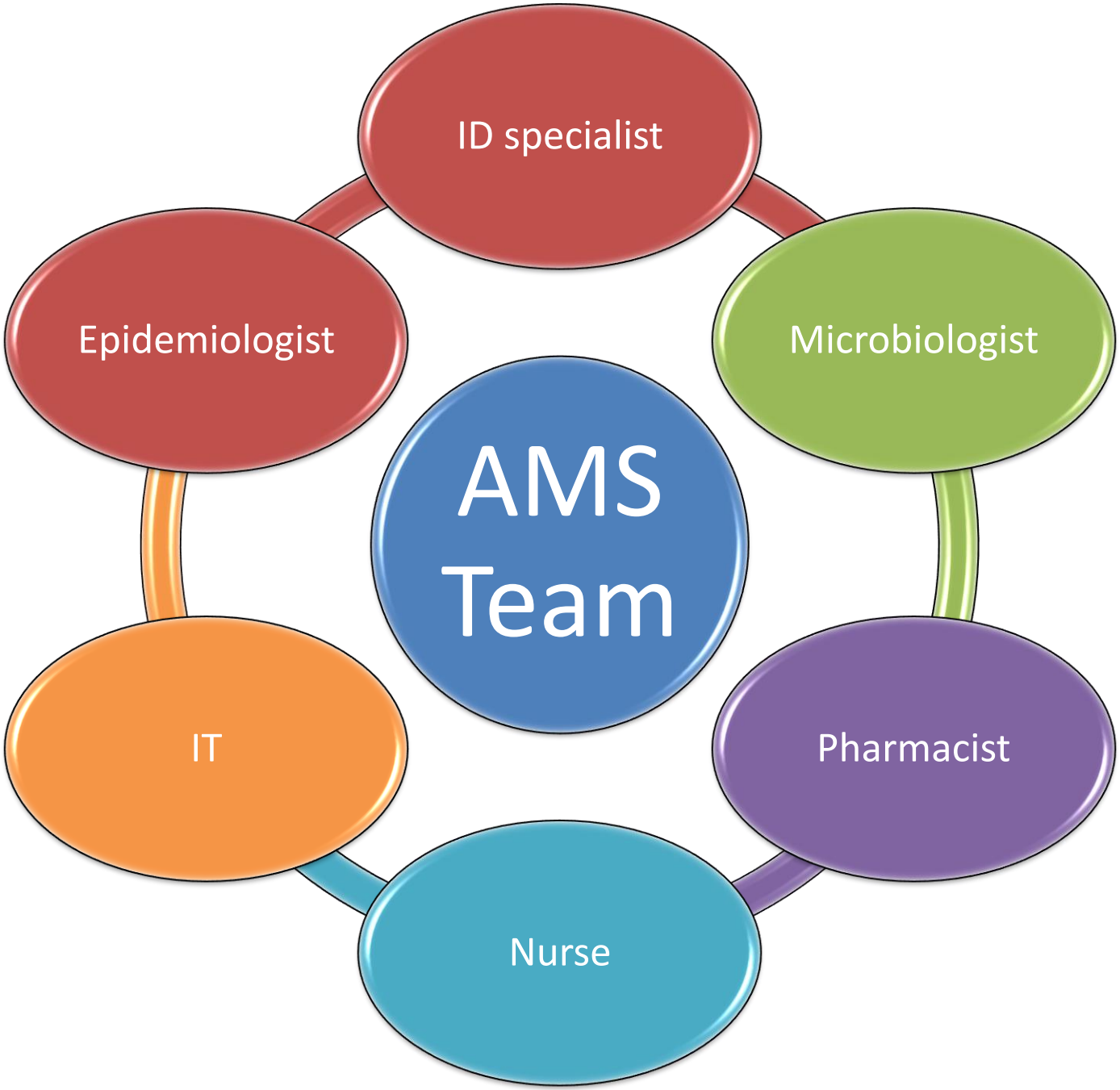
Antimicrobial Stewardship in Remote Areas

Marc Mendelson
Professor of Infectious Diseases & HIV Medicine
University of Cape Town


ID specialist
Epidemiologist
Microbiologist
AMS Team
IT
Pharmacist
Nurse

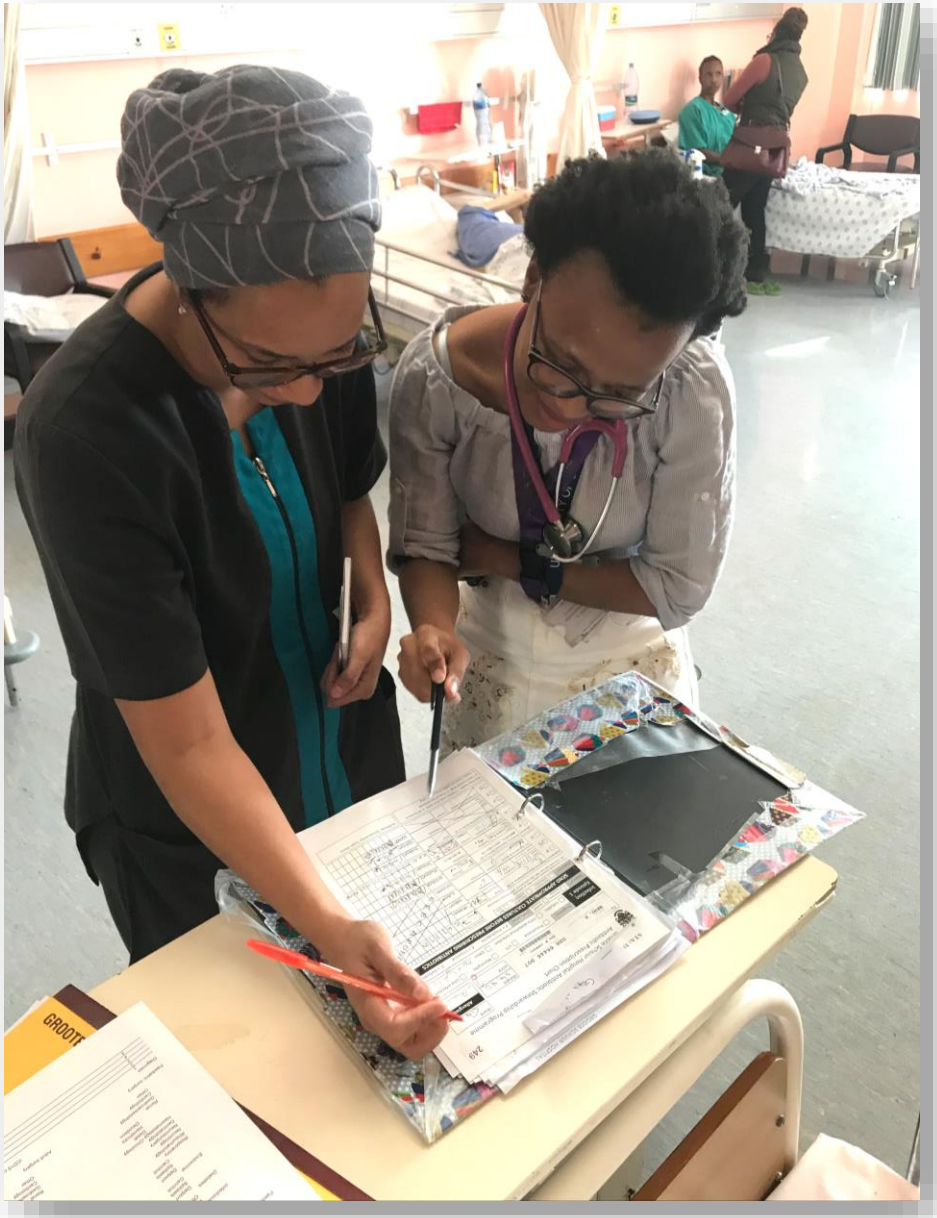
Comparison of adult ID specialists in South Africa and the USA

	South Africa[1]	USA[2]
Population	56.7 million	328 million
Number of ID Specialists	41	9136
Ratio ID specialists to population	1 : 1 350 000	1 : 35 901
Number of ID trainees	7	406

[1]Health Professions Council of South Africa, 2018 [2]Husseini SMQ. Lancet Infect Dis, 2020

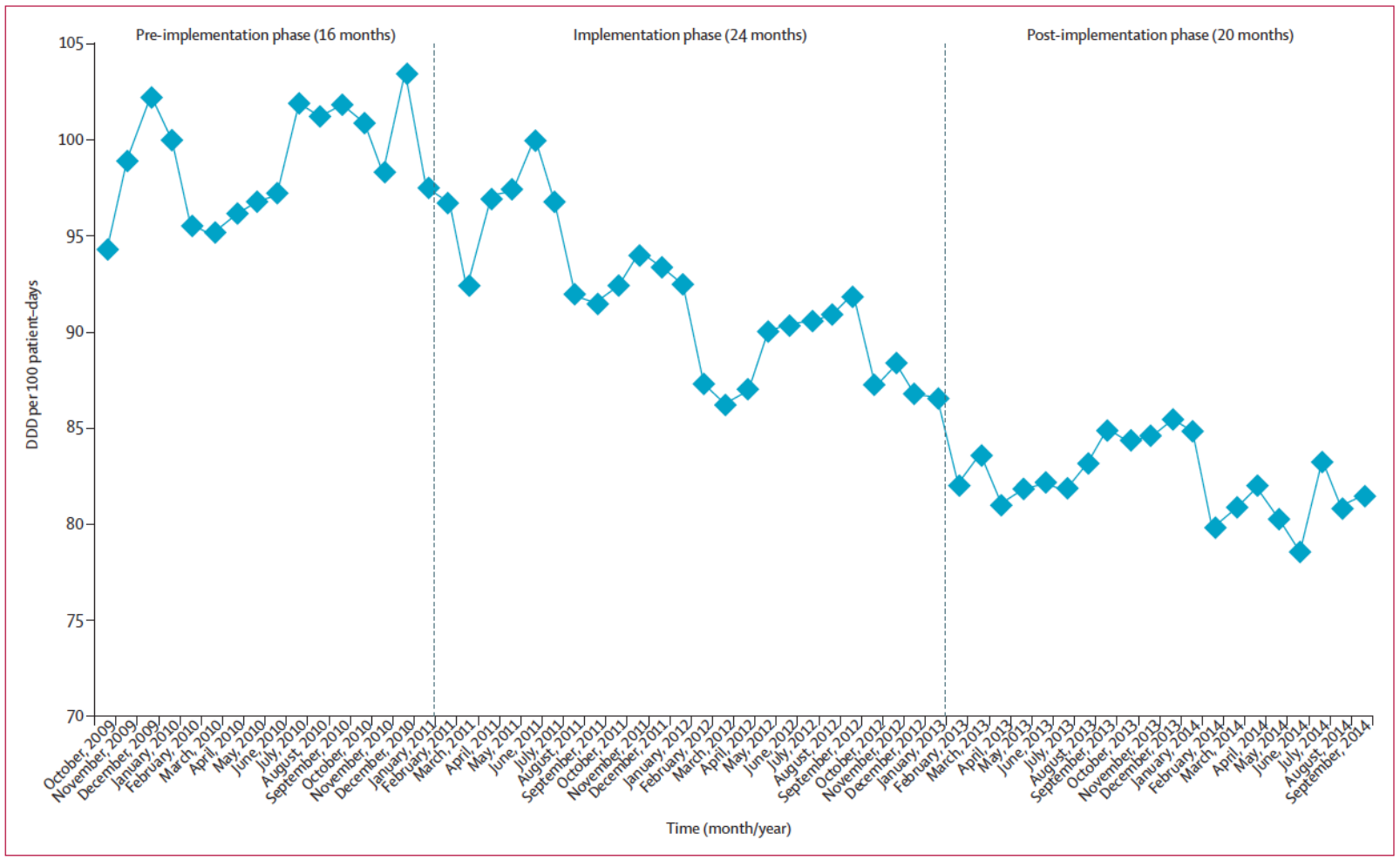
A commoner sight
in South Africa:

Non-specialist Pharmacist
+
Non-specialist physician
±
Infection prevention nurse



Antimicrobial stewardship across 47 South African hospitals: an implementation study

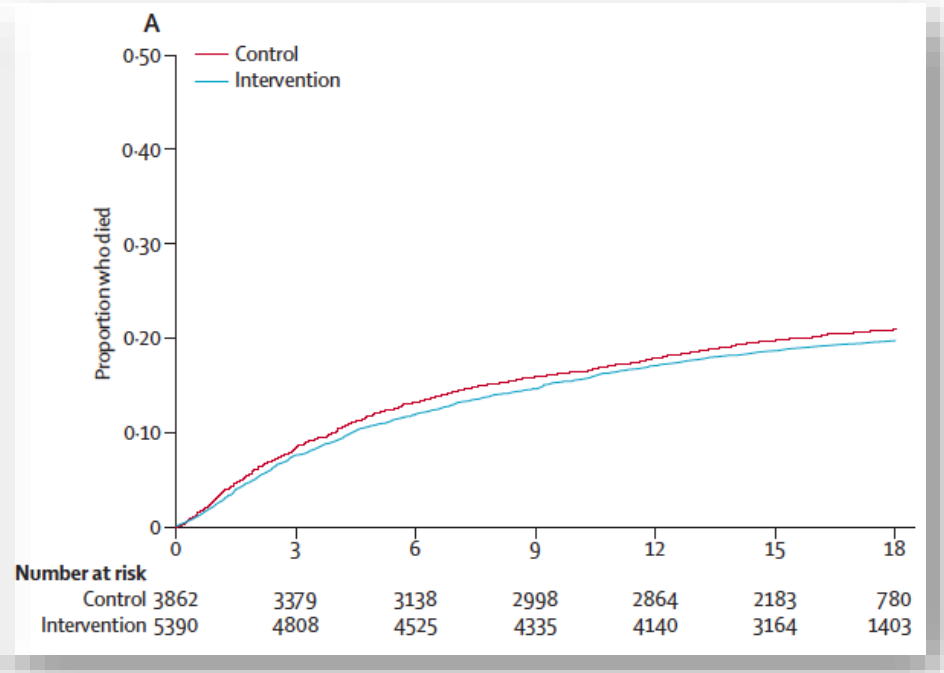
*Adrian J Brink, Angeliki P Messina, Charles Feldman, Guy A Richards, Piet J Becker, Debra A Goff, Karri A Bauer, Dilip Nathwani, Dena van den Bergh, on behalf of the Netcare Antimicrobial Stewardship Study Alliance**



Lancet Infect Dis. 2016 Sep;16(9):1017-1025

Nurses have long since been integral stewards for the DOTS-TB and antiretroviral programs

Task shifting of antiretroviral treatment from doctors to primary-care nurses in South Africa (STRETCH): a pragmatic, parallel, cluster-randomised trial



Fairall et al. Lancet. 2012 Sep 8;380(9845):889-98

Improving antimicrobial use among health workers in first-level facilities: results from the Multi-Country Evaluation of the Integrated Management of Childhood Illness strategy

Eleanor Gouws,[1] Jennifer Bryce,[1] Jean-Pierre Habicht,[2] João Amaral,[3] George Pariyo,[4] Joanna Armstrong Schellenberg,[5] & Olivier Fontaine[1]

	United Republic of Tanzania			Uganda			Brazil			Pooled country data		
	IMCI trained[a]	Not trained[a]	OR[b]	IMCI trained	Not trained	OR	IMCI trained	Not trained	OR	IMCI trained	Not trained	Adjusted OR
Treatment indicators												
Child needs antibiotics and receives correct prescription	77 (69)	43 (58)	4.4[d]	41 (68)	25 (83)	2.1	67 (33)	51 (35)	1.9	61 (170)	36 (176)	2.7[d](1.5–4.8)
Child does not need antibiotics and leaves without them	86 (150)	57 (117)	4.6[d]	59 (108)	38 (170)	2.4[d]	94 (261)	87 (323)	2.4[d]	84 (519)	68 (613)	2.9[d](1.9–4.2)
Child receives the first dose of treatment at the facility	84 (179)	1 (145)	369[d]	21 (153)	3 (231)	8.5[d]	27 (33)	0 (35)	*P*= 0.028[e]			

Bulletin of the World Health Organization 2004;82:509-515

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Community Case Management of Fever Due to Malaria and Pneumonia in Children Under Five in Zambia: A Cluster Randomized Controlled Trial

Kojo Yeboah-Antwi[1]*, Portipher Pilingana[2], William B. Macleod[1], Katherine Semrau[1], Kazungu Siazeele[2], Penelope Kalesha[3], Busiku Hamainza[4], Phil Seidenberg[1,5], Arthur Mazimba[5], Lora Sabin[1], Karen Kamholz[6], Donald M. Thea[1], Davidson H. Hamer[1,7]

- Availability of malaria RDT used by **community health workers** at community health posts led to
  - 4-fold reduction in inappropriate antimalarial therapy
  - 5-fold increase in appropriate and timely antibiotic delivery for pneumonia

PLoS Med 7(9): e1000340. doi:10.1371/journal.pmed.1000340

BMJ

RESEARCH

Effect of training traditional birth attendants on neonatal mortality (Lufwanyama Neonatal Survival Project): randomised controlled study

Christopher J Gill, assistant professor of international health,[1] Grace Phiri-Mazala, national programmes

- Modified neonatal resuscitation, + single dose amoxicillin & referral if features of neonatal sepsis
- Primary outcome was 28 day mortality
- 45% reduction in death in the intervention arm

BMJ 2011;342:d346 doi:10.1136/bmj.d346

Village women trained in neonatal care & sepsis management

- Gentamicin + cotrimoxazole for 7 days for parents unwilling to be referred
- One death averted for every 18 neonates cared for

Management	Cases	Deaths	Case fatality (%)
Before training in sepsis management*	163	27	16·6
After training†			
Treated by VHW	71	2	2·8
Not treated (missed by VHW)	19	5	26·3
Parents refused treatment	14	2	14·3
Hospital treatment	7	1	14·3

Table 3: **Home-based case management of suspected neonatal sepsis and outcome (1995–98)**

Bang et al. Lancet 1999; 354: 1955–61


GOD'S LIGHT
DRUG
SHOP
DRUG
SHOP


DUKA LA DAWA MUHIMU


Mobilize Against Malaria

Antibiotic access without prescription in community pharmacies and drug shops

- Community pharmacies in 3 urban areas of China using simulated clients[1]
  - 259 pharmacies sampled for antibiotics without prescription
  - 55.9% paediatric diarrhoea & 77.7% adult respiratory infection
- Ugandan survey of 170 drug shops[2]
  - 93.5% were 'prescribing' antibiotics
  - 30% reported antibiotics as first line treatment for diarrhoea over OHS
  - The lower the cadre of HCW, the greater the over-prescription rate
- Eritrean study of 49 community pharmacies & 39 drug shops using simulated clients[3]
  - 87.6% dispensed antibiotics – ciprofloxacin & co-trimoxazole common
  - Private pharmacies (AOR 7.68) and drug shops (10.65) more likely to dispense antibiotics than government community pharmacies

[1]J Antimicrob Chemother 2017; 72: 1235–1242 [2]BMJ Open 2016;6:e010632 [3]PLoS ONE 15(1): e0228013

Invisible medicine sellers and their use of antibiotics: a qualitative study in Cambodia

- Interviewed 21 'Invisible Medicine Sellers' identified through community focus group discussions and engagement with village leaders & government HCWs
- Community members knew several IMS nearby
- Major factors driving their use
  - Effectiveness of medicines provided – usually multiple with antibiotics
  - Convenience – out-of-hours access, delayed payment, selling human antibiotics for animal use

BMJ Global Health2019;4:e001787. doi:10.1136/bmjgh-2019-001787

Interventions to improve antibiotic practices in ambulatory care (Review)

4/39 studies from LMICs

Intervention	Effect
Printed educational materials or audit and feedback alone	No change
Educational outreach visits and physician reminders	Mixed results
Delayed prescriptions	Reduced antibiotic use with no excess morbidity
Multi-faceted interventions combining physician, patient & public education in various venues and formats - most successful in reducing inappropriate antibiotic prescribing	
Interactive educational meetings - more effective than didactic lectures	
Only ¼ of the 39 studies demonstrated sustained reduction in the incidence of antibiotic-resistant bacteria associated with the intervention	

Arnold & Strauss. Cochrane Database Syst Rev. 2005 Oct 19;(4):CD003539

Common infections in the community that could be safely treated without antibiotics in mild cases

Infection	Treat safely without Abx?	Comment
Bronchitis	Yes	Nearly all are viral
Pharyngitis*	Yes, in most cases	Nearly all are viral
Otitis media	Yes, in most cases	Most non-severe cases, especially in >2y olds
Sinusitis	Yes, in most cases	Watch & wait in mild-to-moderate cases
COPD exacerbations	Yes, in most cases	Most not triggered by bacterial infection
Lower UTI	Selected patients with no risk factors for complications	Young, non-pregnant women with a delayed prescription
Acute diarrhoea	Yes, in most cases	Exception being dysentery or significant immunosuppression
SSTI (mild)	Selected patients	Low-risk animal bites and wounds at low-risk of becoming infected

*Except in children in rheumatic fever endemic settings

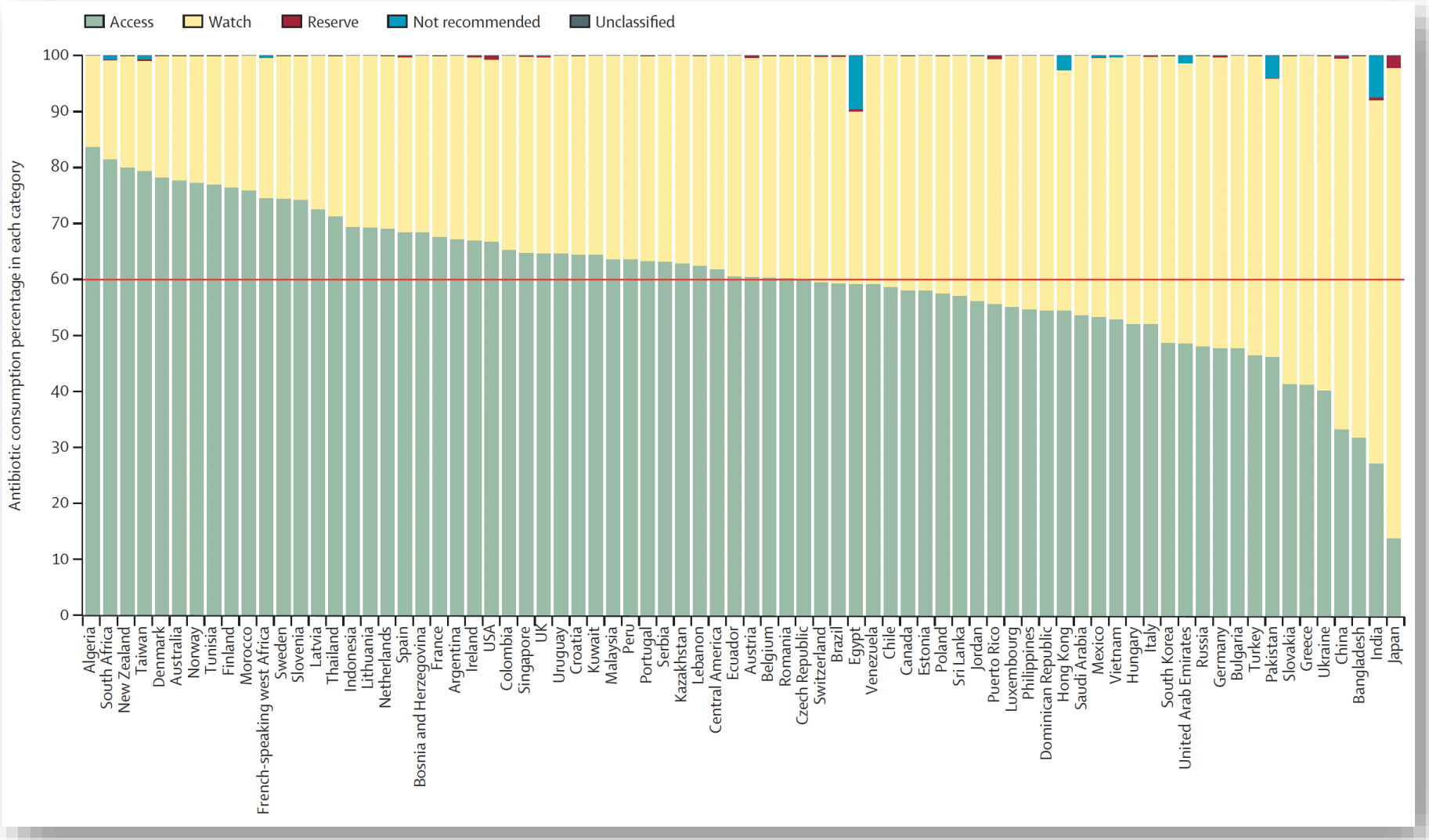
Slide Courtesy of WHO Antibiotic Working Group

The WHO AWaRe Index

Access	Watch	Reserve
Amikacin	Azithromycin	Aztreonam
Amoxicillin	Cefepime	Ceftaroline fosamil
Amoxicillin-clavulanic Acid	Cefixime	Ceftazidime-avibactam
Ampicillin	Cefotaxime	Ceftobiprole medocaril
Benazathine benzylpenicillin	Ceftazidime	Ceftolozane-tazobactam
Benzylpenicillin	Ceftriaxone	Colistin
Cefalexin	Ciprofloxacin	Dalbavancin
Chloramphenicol	Clarithromycin	Dalfopristin-quinupristin
Clinidamycin	Ertapenem	Daptomycin
Cloxacillin	Fosfomycin (oral)	Eravacycline
Doxycycline	Fusidic Acid	Faropenem
Flucloxacillin	Imipenem	Fosfomycin (IV)
Gentamicin	Kanamycin	Linezolid
Metronidazole	Levofloxacin	Meropenem-vaborbactam
Nitorofurantion	Meropenem	Minocycline (IV)
Phenoxymethylpenicillin	Moxifloxacin	Omadacycline
Procaine benzylpenicillin	Piperacillin/tazobactam	Oritavancin
Cotrimoxaxzole	Rifampicin	Plazomicin
Tetracycline	Teicoplanin	Polymyxin B
Trimethoprim	Tobramycin	Tedizolid
	Vancomycin (IV or Oral)	Telavancin
		Tigecycline

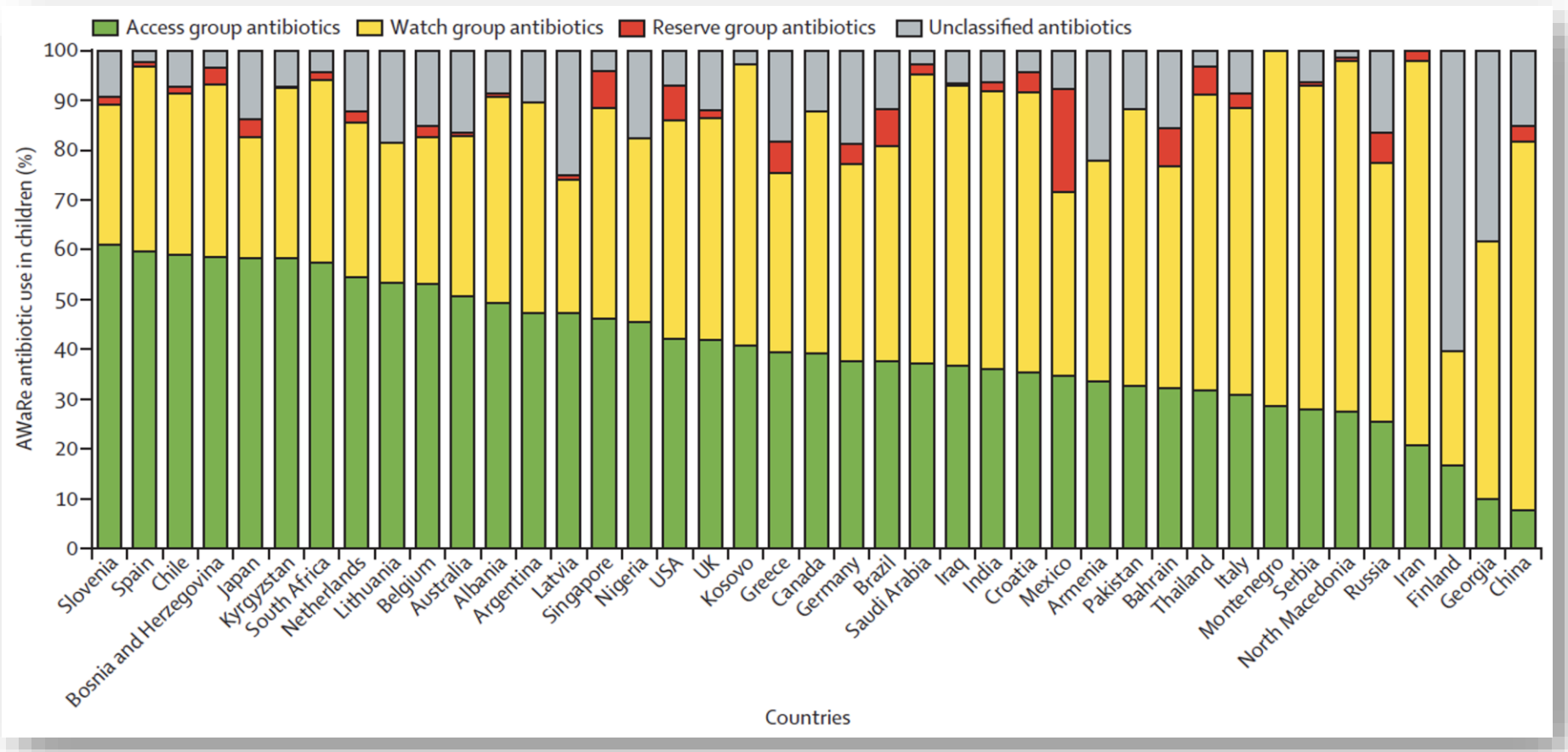
https://adoptaware.org

Use of AWaRe Index to set national targets



Klein et al. Lancet Infect Dis 2020;21:107-15

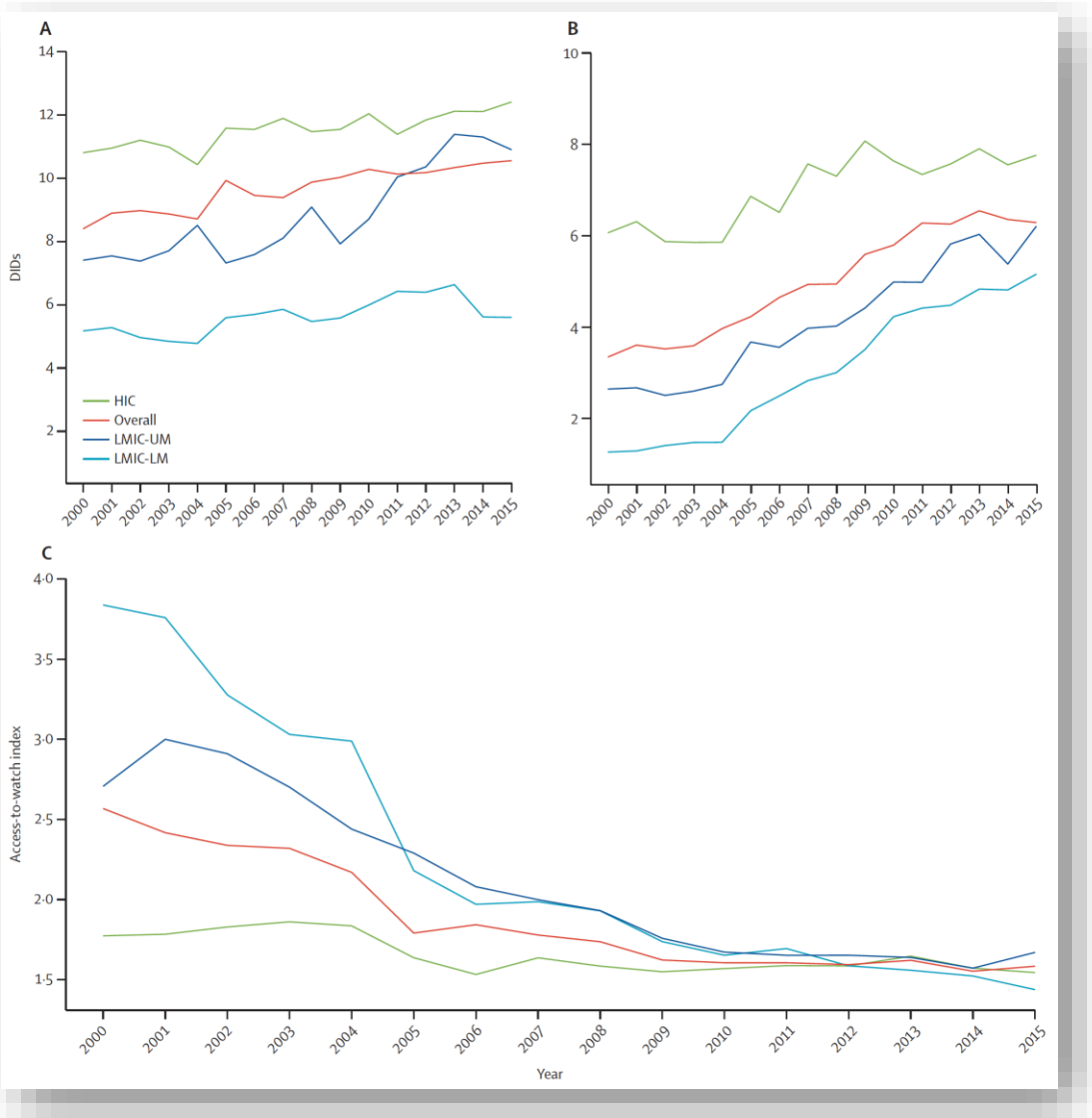
Primary Care AWaRe antibiotic use in children



Hsia et al. Lancet Infect Dis 2019 Jan;19(1):67-75

Global reduction in Access : Watch index driven by increase in use of Watch antibiotics

Access antibiotics grew by 45% in LMICs c/f
14.8% in HICs



Watch antibiotics grew by 165% in LMICs c/f
27.9% in HICs

Klein et al. Lancet Infect Dis 2020;21:107-15

Common infections in the community that could be safely treated without antibiotics in mild cases

Infection	1st choice antibiotic	Access or Watch
Pharyngitis	Phenoxymethylpenicillin or amoxicillin	Access
Otitis media	Amoxicillin or amoxicillin-clavulanate	Access
Sinusitis	Amoxicillin or amoxicillin-clavulanate	Access
COPD exacerbation	Amoxicillin or doxycycline	Access
CAP (mild)	Phenoxymethylpenicillin or amoxicillin or amoxicillin-clavulanate or doxycyline	Access
Lower UTI	Nitrofurantoin or co-trimoxazole or trimethoprim or amoxicillin or amoxicillin-clavulanate	Access
SSTI (mild)	Cloxacillin or amoxicillin-clavulanate	Access
Acute bacterial diarrhea	Ciprofloxacin or azithromycin or cefixime or co-trimoxazole	Watch

Slide Courtesy of WHO Antibiotic Working Group

Summary

- Stewardship models in ’remote’ places must be adapted to the practicalities of the health workforce, brining in underused cadres
- Antibiotics are not necessary for 10 most common mild community acquired infections
- ‘Access’ group antibiotics should be prioritized for infections that do require treatment and more ambitious targets for the AWaRe Index in community prescribing should be set