

Supplementary Table 1 Summary of selected biologics available in IQVIA database

Modes of action classification	Molecule name	Target
Tumour necrosis factor (TNF), N = 5	etanercept	
	infliximab	
	adalimumab	TNF- α
	certolizumab pegol	
	golimumab	
Interleukin/interleukin receptor (IL), N = 17	daclizumab	CD25
	basiliximab	CD25
	rilonacept	IL-1
	ustekinumab	IL-12/IL-23
	tocilizumab	IL-6R
	canakinumab	IL-1
	secukinumab	IL-17A
	siltuximab	IL-6
	brodalumab	IL-17RA
	ixekizumab	IL-17A
	sarilumab	IL-6R
	guselkumab	IL-23
	tildrakizumab	IL-23
	risankizumab	IL-23
	reslizumab	IL5
	mepolizumab	IL-5
	benralizumab	IL-5R
Lymphocyte/adhesion molecules, N = 21	alefacept	CD2
	natalizumab	α 4 integrin
	abatacept	CD80/CD86
	belimumab	B cell activating factor (BAFF)
	vedolizumab	α 4 β 7 integrin
	alemtuzumab	CD52
	ocrelizumab	CD20
	emapalumab	interferon-gamma (IFN γ)
	rituximab	CD20
	Rituximab + hyaluronidase alfa	
	gemtuzumab ozogamicin	CD33

	catumaxomab	EpCAM, CD3
	ofatumumab	CD20
	brentuximab vedotin	TNFRSF8
	obinutuzumab	CD20
	blinatumomab	CD19, CD3
	elotuzumab	CD319
	daratumumab	CD38
	Daratumumab + hyaluronidase alfa	
	mogamulizumab	CCR4
	inotuzumab ozogamicin	CD22
Check point inhibitors, N = 7	ipilimumab	CTLA-4
	atezolizumab	PD-L1
	avelumab	PD-L1
	durvalumab	PD-L1
	cemiplimab	PD-1
	nivolumab	PD-1
	pembrolizumab	PD-1
growth factor/tumour cell target, N = 17	trastuzumab	HER2
	Trastuzumab + hyaluronidase alfa	
	cetuximab	EGFR
	bevacizumab	VEGF
	panitumumab	EGFR
	pertuzumab	HER2
	Pertuzumab + trastuzumab	
	Pertuzumab + trastuzumab + hyaluronidase alfa	
	trastuzumab emtansine	HER2
	dinutuximab beta	GD2 disialoganglioside
	ramucirumab	VEGF-2
	necitumumab	EGFR
	olaratumab	Platelet-derived growth factor receptor alpha
	aflibercept	VEGF
	ranibizumab	VEGF A
	brolocizumab	VEGF A
	burosumab	fibroblast growth factor (FGF)

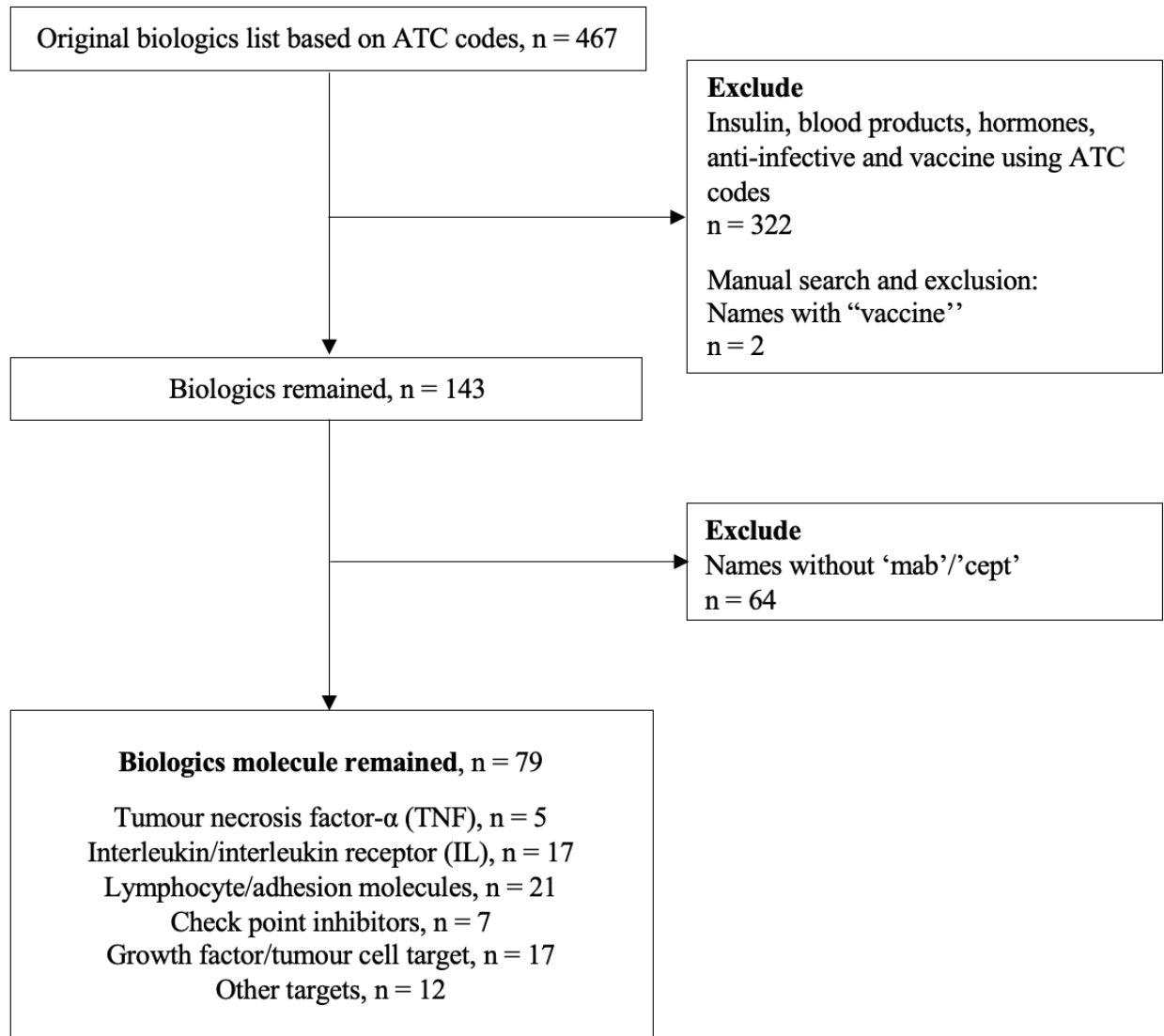
	caplacizumab	von Willebrand factor
	luspatercept	TGF- β superfamily
	evolocumab	proprotein convertase subtilisin/kexin type 9 (PCSK9)
	alirocumab	
	eculizumab	Complement C5
	ravulizumab	Complement C5
Other targets, N = 12	denosumab	Receptor activator of nuclear factor kappa-B ligand (RANKL)
	romosozumab	sclerostin
	erenumab	
	galcanezumab	calcitonin gene-related peptide (CGRP)
	fremanezumab	
	omalizumab	IgE

CTLA-4: cytotoxic T-lymphocyte-associated protein 4; CCR4: C-C chemokine receptor type 4; EpCAM: Epithelial cell adhesion molecule; HER2: human epidermal growth factor receptor 2; TNFRSF: tumour necrosis factor receptor superfamily; VEGF: vascular endothelial growth factor; TGF- β superfamily: transforming growth factor beta superfamily

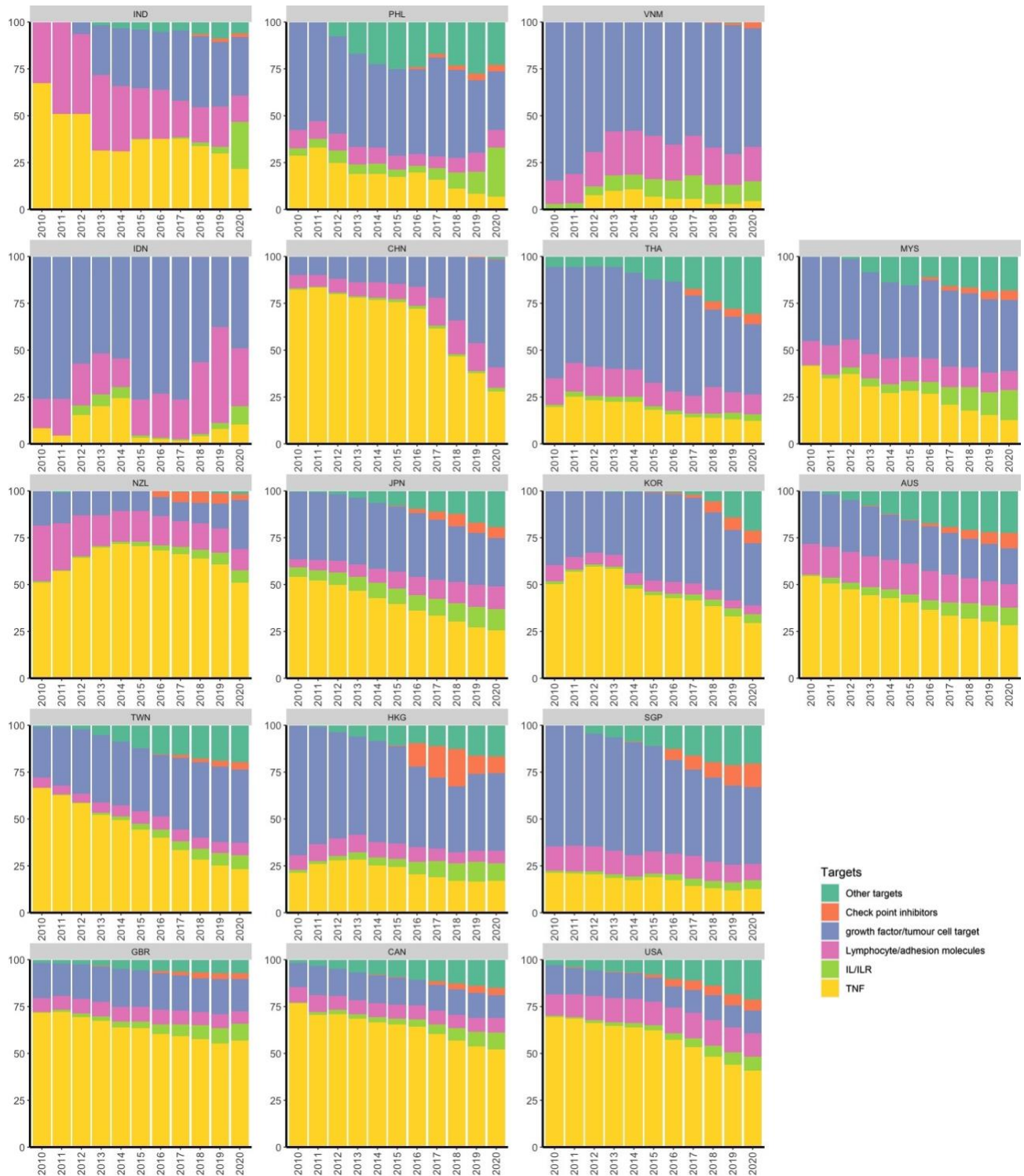
Supplementary Table 2 Latest available year of health indicators

Indicators	Latest available year	Health indication
Gross domestic productivity	2020	The standard measure of the value added created through the production of goods and services in a country during a certain period. ¹
Human development index	2019	Three dimensions comprehensive indicator and often used when two countries have similar economic level but with different development performance ²
Percentage of health expenditure in total general expenditure	2014	A core indicator of health financing systems. It contributes to understand the weight of public spending on health within the total value of public sector operations. Health may not regarded as priority when a government attributes proportionately less of its total expenditure on health. ³
Life expectance at birth	2019	Overall indicator for health including living standards, lifestyle, education and access to quality health service ⁴
Service coverage index (SCI)	2019	The major indicator for universal health coverage that focuses on assessment on essential health services ^{5,6}
Doctor density	2010	An indicator of health systems resources – health workforce, which is one target of WHO sustainable development ^{7,8}

Supplementary Figure 1 Biologics selection flow



Supplementary Figure 2 Proportion of biologics by mode of action for each country



Abbreviation: TNF: targeting on tumour necrosis factor; IL/ILR: targeting on interleukins/interleukin receptors; IND: India, PHL: Philippines, VNM: Vietnam, IDN: Indonesia, CHN: China, THA: Thailand, MYS: Malaysia, NZL: New Zealand, JPN: Japan, KOR: Korea, AUS: Australia, TWN: Taiwan, HKG: Hong Kong, SGP: Singapore, GBR: United Kingdom, CAN: Canada, US: United States.

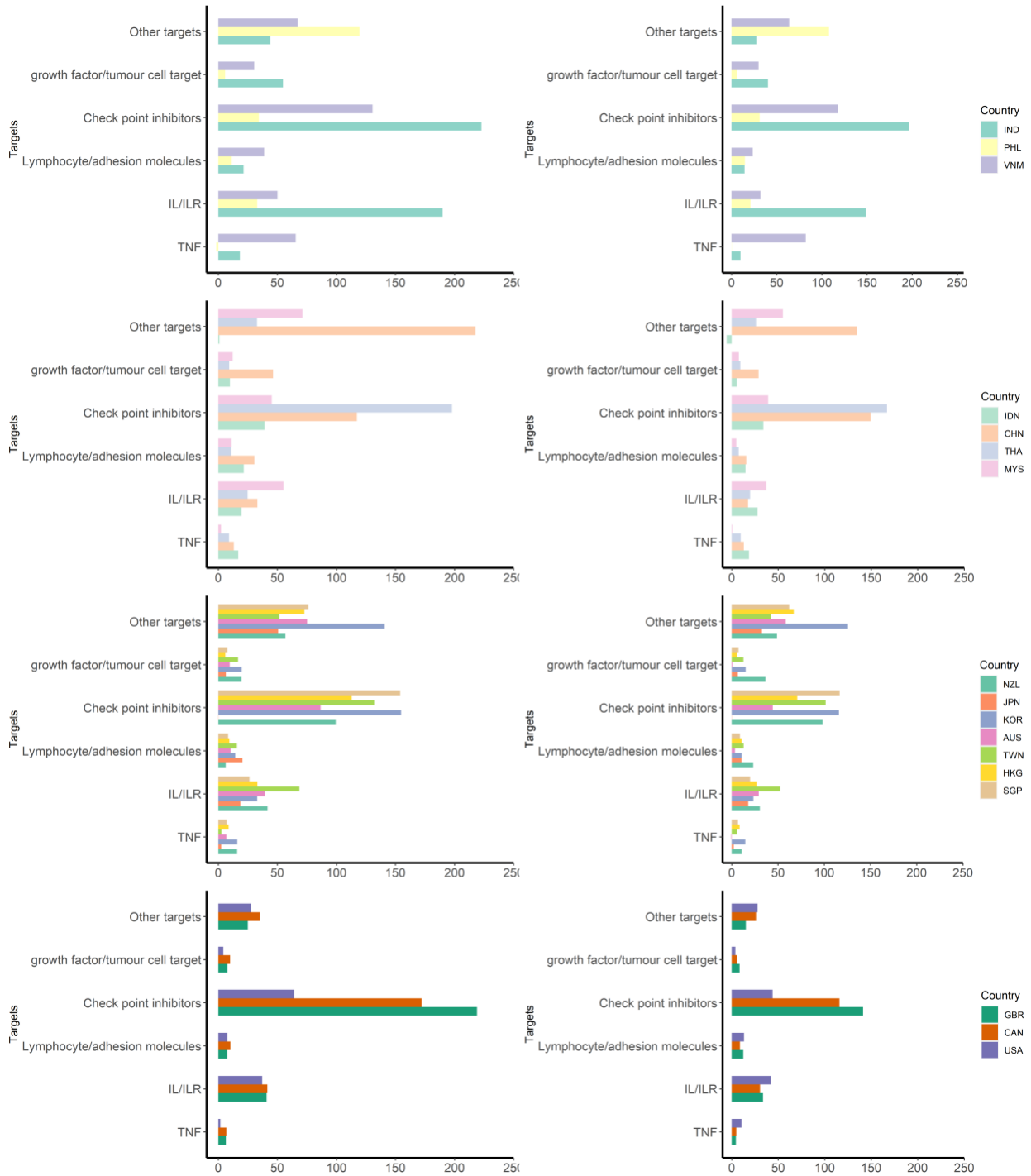
Supplementary Figure 3. Yearly bio-originators and biosimilars consumption (Standard Units/1000 population) by country/region



Notes: x axis represents for Standard Units/1000 population; y axis represents for year; labels by bar represents for percentage of biosimilar.

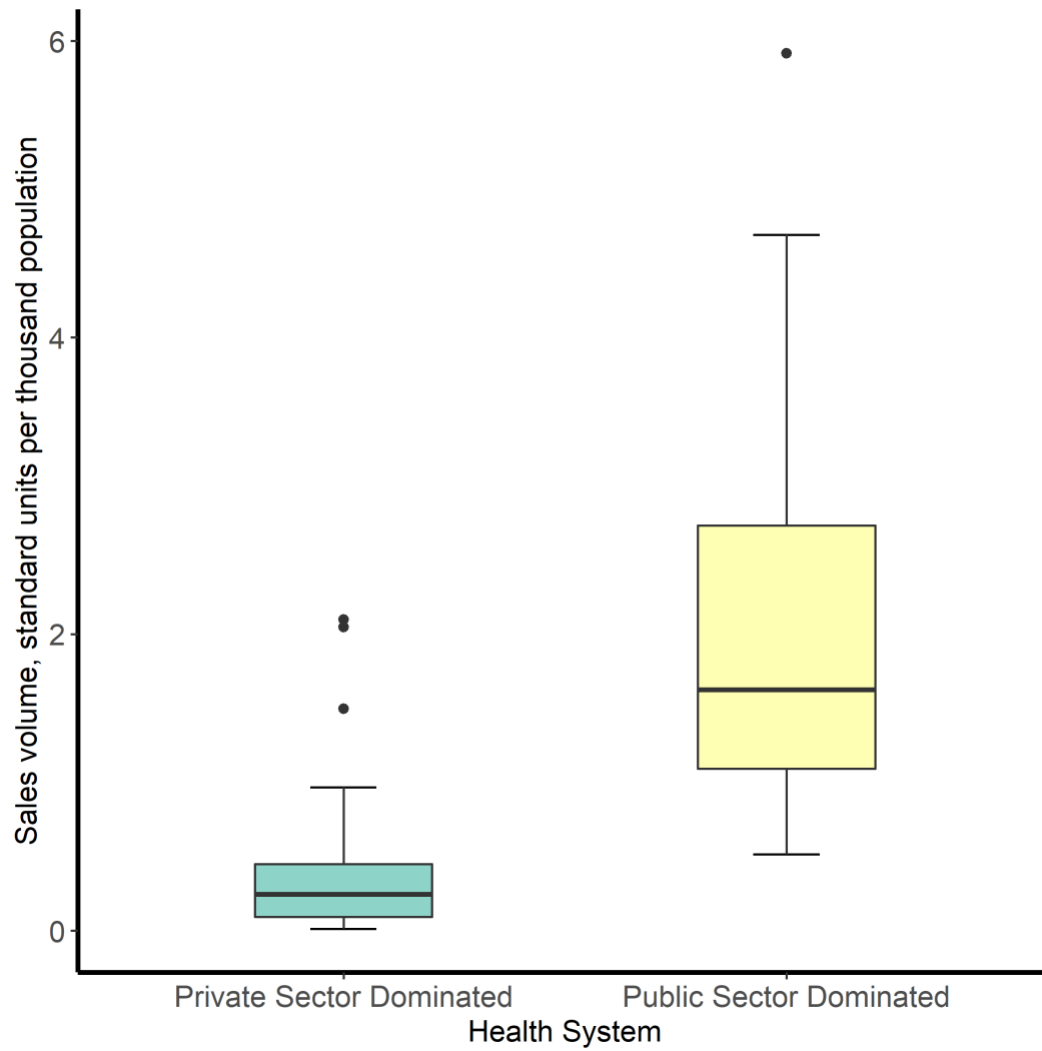
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Supplementary Figure 4. Annual growth rate of consumption and expenditure by MOA



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Supplementary Figure 5 Sales volumes of biological medicine in different health systems among middle-income economies



Countries with private sector dominated health system: India, Philippines, Vietnam, and Indonesia.
Countries/Regions with public sector dominated health system: China, Thailand and Malaysia.

References:

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