

## Executive Summary

“Supporting the Next Stage of Germany’s Leadership in Global Health”

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Joint Study conducted by  
the Bill & Melinda Gates Foundation and Charité Global Health  
supported by Boston Consulting Group

### 1 Background of the Study

#### Global Health - A Topic of Increasing Importance

Global health is a multi-sectoral field - spanning scientific research, policymaking, civil society, and the private sector - with the aim of improving health for all people worldwide. Proven to be one of the most impactful development interventions, global health efforts have gained in importance, and today represent a central element of global development politics, e.g., to reach internationally agreed upon frameworks such as the UN Sustainable Development Goals (SDGs).

#### Strong German Commitment

Germany has shown great political commitment to global health at the highest level over the past years. During the German G7/G20 Presidency, Chancellor Angela Merkel placed global health at the top of the agenda and gave important impetus for a stronger and strategic German engagement.

In addition to the consolidation of the topic in the coalition agreement and the establishment of „Global Health Hub Germany“ by the Federal Ministry of Health in February 2019, a new “Strategie der Bundesregierung zu Globaler Gesundheit” will be developed by the end of 2019.

Considering the political challenges faced by the forerunners in the field, the US and UK, the German commitment to global health is an important and valued contribution at the global multilateral level.

#### Untapped Potential for Global Health Research & Development in Germany

In addition to its political and financial commitment, Germany is an important scientific and economic actor in the field of health and life sciences.

Germany’s excellent academic base, top-rate basic and clinical research, innovative pharma and MedTech sectors, and expertise in technical and computer sciences create opportunities for even stronger contributions by Germany to global health research and development. Independently from benefits for global health R&D, strong German investment in this holistic field would serve the wider development of the German R&D ecosystem as a whole.

In this study, Charité - Universitätsmedizin Berlin and the Bill & Melinda Gates Foundation, newly established in Berlin, with the support of Boston Consulting Group, have attempted to identify promising opportunities and to provide relevant stakeholders with specific options for action.

### 2 Guiding Hypotheses for the Study

At the outset of this study, we were guided by four hypotheses that oriented our inquiries:

**H1:** German global health R&D environments (e.g., university research, non-university research organizations) are not fully activated despite a large cross-disciplinary global health R&D potential. Furthermore, there is a need for stronger cross-sectoral coordination and collaboration among global health R&D stakeholders.

**H2:** There is a lack of clarity: Many actors deal with global health R&D topics, but these activities are not labelled as global health R&D, which disadvantages global health as a distinct research area.

**H3:** There is a translation gap from basic research to product development in German global health R&D related life sciences.

**H4:** A strong alignment of all relevant bodies is needed to improve Germany’s position as a leader in global health.

**Methodology:** We conducted more than **50 personal interviews** with national and international key stakeholders from the public and private sectors, e.g., ministries, universities, research institutions and associations, pharma and MedTech companies, as well as foundations and other actors. We analyzed diverse **primary sources** for global health data, e.g., funding flows, research capacities, and private as well as public global health landscapes. Finally, we screened international **best practice examples** and approaches for global health development and compiled a collection of models for inspiration.

### 3 Key Findings

#### Strategic Vision

The implementation of Germany's strategic vision depends on institutional alignment:

- Strong German political commitment to join the world's leaders in global health: Successful and internationally recognized determination of overall vision by the Chancellery and relevant measures by federal ministries.
- The cross-sectoral nature of the topic requires a cross-cutting mechanism to successfully align activities.

#### Cross-Sectoral and Cross-Departmental Coordination

A broad range of political, public, and scientific actors make global health contributions of different levels and kinds, but no consistent method or coordination links strategy with actions:

- Federal ministries interact, but lack a formal mechanism of cross-departmental collaboration.
- The political consistency of different contributions of federal ministries and institutions is crucial to ensure success and impact of activities.
- Formal interaction between domestic R&D efforts and delivery mechanisms is limited.

#### Research Capacity

Germany produces world-class basic and clinical research, but fails to leverage its full potential due to diluted focus and lack of cross-regional and cross-disciplinary collaboration:

- Individual institutions lack the critical mass to maximize impact of research.
- Research resources are plentiful and of high quality, but suffer from fragmentation across institutions. For example, there are over 40 German universities with global health affiliations, but few global health professorships in international comparison: 75 professors in all of Germany vs. 172 at the London School of Hygiene and Tropical Medicine alone.
- Basic research is organized in geographical and disciplinary silos with limited interdisciplinary collaboration and strategic guidance on core topics.

#### Translation Gap

Basic research in Germany is excellent, but "market-ready solutions" are scarce. This stems from a lack of mechanisms to translate basic research into actionable solutions:

- Incentives and mindset in basic research are not geared towards translating research insights into actionable solutions.
- Powerful institutions enabling and promoting translation are lacking, as are funding mechanisms.

#### Funding

Overall funding and activity of venture capital (VC)/foundations is low in international comparison:

- Germany dedicates a substantially lower percentage of GDP to global health R&D and would need to invest an additional \$237M annually to match US GDP ratio of public sector global health R&D spend.
- Venture capital, which drives translation internationally, is nearly non-existent in Germany (life science VC funding per capita 2014-2019: €1,202 in US, €462 in UK, €170 in Germany).
- The role of German foundations in funding translation is minor (2017 total German foundation health funding of €100M vs. \$824M from Wellcome Trust and \$2.8B from Gates Foundation).

In the course of this study, all our guiding hypotheses were validated.

## 4 Considerations & Options

The following section contains a top-level description of options for action, which are discussed in further detail in companion documents corresponding to each of these categories.

### Strategic Vision

**Strategic focus setting** is crucial for accelerated impact and achievement of SDG 3.

- Defining strategic priorities where Germany can provide leadership sharpens its international profile and achieves enhanced impact through focus, a vital prerequisite for achieving SDG 3 by 2030. The 2019 reworking of German global health strategy provides a timely opportunity for this approach.
- Aligning global health funding and international activities with overarching strategy ensures impact.

**Assign authority to one unit** with gravitas and clout to request action by other bodies.

- This unit should be overarching and cross-ministerial with authority to issue directives.
- All involved bodies must commit to this approach.

### Cross-Sectoral and Cross-Departmental Coordination

Coordination - supported by implementation, monitoring and advisory - is crucial to steer efforts. Monitoring progress ensures sustainable impact generation and that goals set out in strategy are met:

- **Coordination:** Cross-sectoral and interdisciplinary coordination of research, development, and enabling efforts
- **Implementation:** Implementation of strategic focus into research efforts, currently successfully implemented by (mostly) universities
- **Monitoring:** Overview of implementation efforts across institutions to ensure alignment
- **Advisory:** Specialized global health think tanks could inform, assess and support strategy, strengthen thought leadership and contribute external perspectives.

### Research Capacity

**Grow human capital** in Germany by creating mechanisms to attract and retain high-potential global health professionals.

**Develop a German center for excellence** in global health R&D to focus and accelerate impact as it breaks through organizational and disciplinary silos.

- Existing centers of excellence in Germany could act as a blueprint, e.g., the German Center for Infection Research (DZIF) and German Cancer Research Center (DKZF).
- Potentially alter current models for centers of excellence to not only be research- and BMBF-related but also open to input and inclusive to topics from other ministries and (federal) institutes (e.g. on international delivery from BMZ).

### Translation Gap

Foster and **support translation from pre-clinical to clinical stages** through a variety of initiatives to facilitate a new era in translational research and impact:

- Establish private sector institutions to drive translation, e.g., evotec.
- Create public or cross-sector initiatives to advance translation, e.g., Twincore.
- New incentives systems: Moving incentives from focus on publication to real impact achievement would guarantee long-lasting changes.
- Create possibilities to facilitate exchange between clinical and pre-clinical worlds.

### Funding

**Considerable leap in overall funding level and mechanisms** is essential to achieving excellence:


- Substantially increase the overall level of funding.
- Create focus through strategic guidance in funding system, e.g., through grant criteria, prizes.
- Create interconnectedness through diversification of the funding system.
- Develop alternative funding models to compensate for the gap in foundation/VC funding.
- Activate the potential of private sector funding.

# Supporting the Next Stage of Germany's Leadership in Global Health

Appendix to Executive Summary

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Berlin, July 2019

Supported by 

# This study uses qualitative and quantitative analyses to support Germany in unlocking its full Global Health R&D potential

## Aim of this study



Understand Germany's potential in GH R&D







Identify models of inspiration to further activate Germany's potential

## Methodology

- **> 50 personal interviews** with national and international key stakeholders from the public and private sector, e.g. ministries, universities, research institutions, Pharma and MedTech companies as well as associations and foundations
- Analysis of diverse **primary sources** for GH data, e.g. funding, research capacities and private as well as public GH landscape
- Screening of international **model approaches** for GH development to compile a library with models for inspiration

## Scope of this study:

We recognize Global Health is a wide space but focus on R&D in preventive, diagnostic, and treatment tools in NTDs<sup>1</sup> for this effort

	Research	Translation	Development	Delivery
Preventive, diagnostic and, treatment tools 	<b>Diseases</b> <ul style="list-style-type: none"><li>• Primarily endemic in LMIC</li><li>• Limited market incentives</li></ul>		<ul style="list-style-type: none"><li>• High burden Areas</li><li>• RMNCH</li><li>• FP</li></ul>	
Enabling systems e.g., UHC, HSS 		<div>Conscious decision to pick an overall relatively “narrow” scope; interviews confirm that both private as well as public sector<sup>2</sup> wish for broader focus (NCDs, One Health etc.)</div>		
Behavioral change e.g., health education 				
Contributing factors e.g., diet, hygiene 				

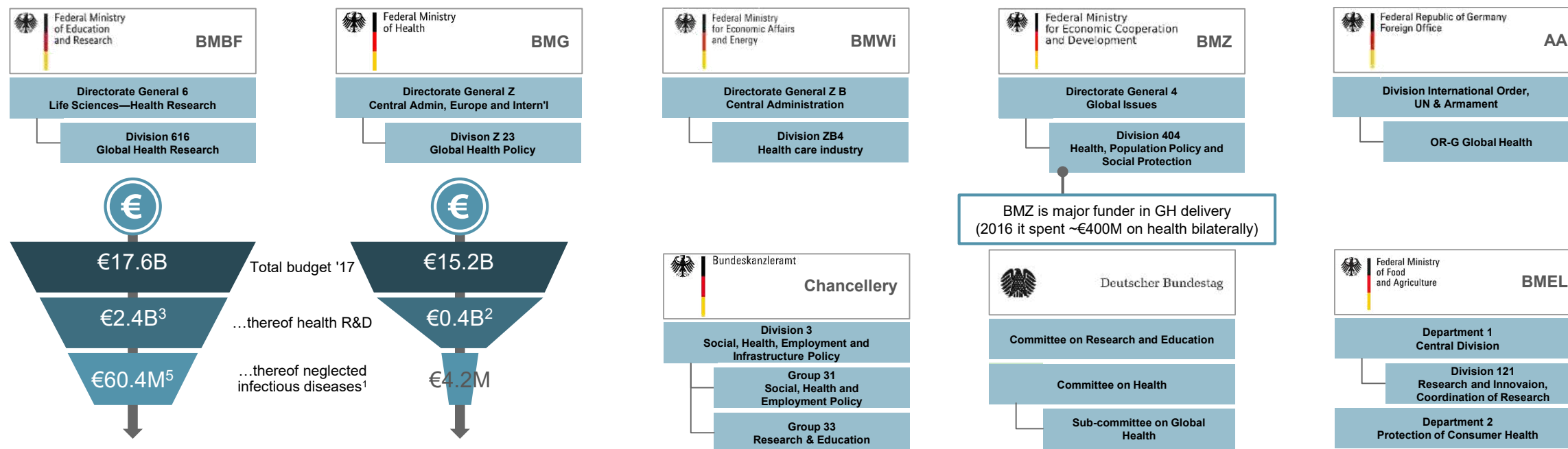
Focus of this study

1. Neglected infectious diseases include HIV, malaria, TB, diarrhoeal diseases, kinetoplastids, Dengue, bacterial pneumonia & meningitis, salmonella infections, helminth infections, hepatitis C, leprosy, cryptococcal meningitis, buruli ulcer, leptospirosis, trachoma and rheumatic fever

Note: FP = Family Planning; RMNCH = reproductive, maternal, newborn and child health; LMIC = low and middle income countries



# A wide set of public sector entities involved in Global Health R&D



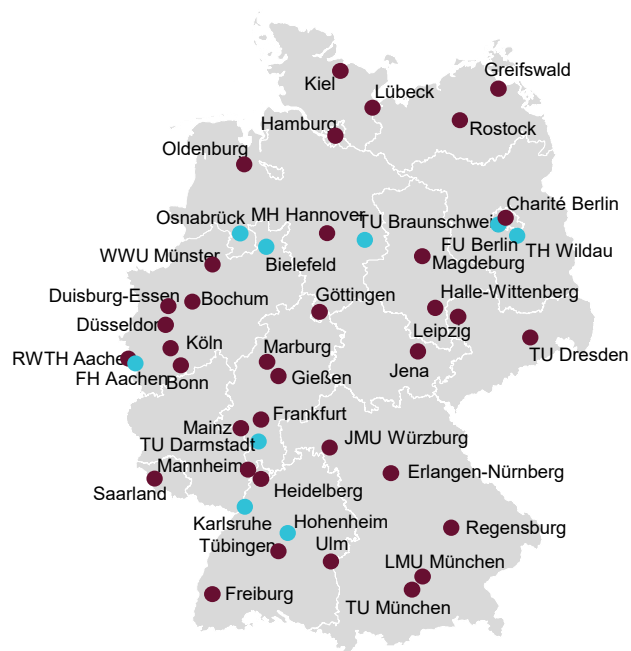
Similar structures at state-level

1) According to G-Finder Definition (minor funders EKFS Foundation, DHAW, VW Foundation constitute €0.5M and were neglected) 2) Incl. RKI, "Forschungsvorhaben und -einrichtungen", BfAM, "Internationales Gesundheitswesen", PEI 3) R&D spent for "Gesundheitsforschung und Gesundheitswirtschaft" 4) BMZ has spent 1.1M on contraceptives research via GIZ in 2017 5) Incl. funding marked as "DFG" & "Leibniz" in G-Finder  
Source: <http://www.bmwi.de>, <https://www.bmbf.de/>, <https://www.bundesgesundheitsministerium.de/>, <http://www.bmz.de/de/index.html>, <https://www.bundeshaushalt.de/#/2017/soll/ausgaben/einzelplan.html>, G-Finder, BCG analysis



# Broad set of universities active in Global Health in Germany but at limited scale

Large number of universities active in global health (medical and non-medical)



Universities active in global health (medical and non-medical)

- Medical faculties
- Non-medical faculties

Limited scale: low number of chairs in international comparison with leading institutions in global health

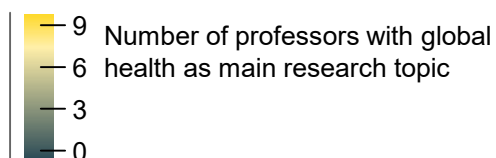
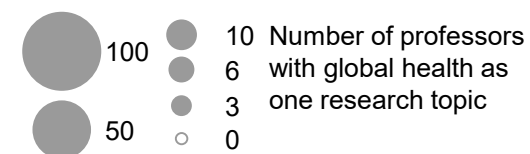


International comparison

● London School of Hygiene and Tropical Medicine, London, UK (172 full and associate GH professors)

● Department of Global Health and Population, Harvard TH Chan School of Public Health, Boston, MA, USA (52 full and associate GH professors)

● Johns Hopkins Center for Global Health, Baltimore, MD, USA (114 full and associate GH professors)



Source: <http://globale-gesundheit.de/cms>, The Lancet, Vol 391 February 17, 2018





# Thin spread of funding and resources translates in low number of publications

Number of research publications (metric measuring productivity), 2014–2018

	Leading German life science research institutions <sup>1</sup>					Leading German life science research universities							Leading international life science research universities			
	Foundation priority	Max-Planck	Helmholtz	Leibniz	Fraunhofer	RKI	Charité	Uni HD	Uni Tü	LMU	TU Mü	Uni Fr	Uni HH	JHU	LSHTM	HrvrdU
Disease	HIV	611	814	321	135	178	378	635	262	830	342	295	397	4,835	1,913	5412
	TB	178	147	72	11	47	138	88	111	158	36	40	61	878	744	916
	Malaria	117	65	44	39	30	83	201	234	79	18	18	85	625	1,269	572
	Pneumonia	39	144	43	17	36	207	136	86	186	45	92	67	617	200	973
	EDD	34	129	40	15	46	166	122	90	221	76	76	96	660	375	976
	NTDs	25	36	4	7	7	61	41	53	53	18	37	24	189	499	116
General	Polio	1	1	0	0	12	3	9	0	3	0	1	4	34	46	31
	Vaccine technology	247	526	95	95	235	274	306	286	420	127	138	154	1,339	995	1,997
	General infectious disease	79	165	81	18	112	155	147	112	211	59	76	87	539	513	804
	Malnutrition	16	21	17	1	4	53	38	13	60	23	22	12	251	196	316
	Reproductive, Maternal, Newborn and Child Health	117	321	285	21	99	841	737	455	980	273	348	506	3,552	939	6,912



Highest output in respective category

1. First four listed are the main independent public research institutions in Germany, RKI is the largest research institution under Ministry of Health

Note: Meaningful comparison of numbers only within same row; Filters for "vaccine technology" and 'general infectious diseases' least precise, Main Institutions behind Leibniz are BNITM and Borstel Research Center; Main Institution behind Helmholtz is Helmholtz Center for Infection Research; Main Institution behind Max-Planck is MPIIB

Source: Web of Science; BCG analysis





# However, high quality of research recognized by large number of citations in international comparison

Citations<sup>1</sup>/publication (metric measuring citation impact), 2014-2018

Disease	Leading German life science research institutions <sup>1</sup>					Leading German life science research universities							Leading international life science research universities			
	Foundation priority	Max-Planck	Helmholtz	Leibniz	Fraunhofer	RKI	Charité	Uni HD	Uni Tü	LMU	TU Mü	Uni Fr	Uni HH	JHU	LSHTM	HrvrdU
	HIV	12.7	20.8	24.9	10.3	8.8	33.0	22.1	7.6	15.4	8.4	12.9	10.5	10.9	13.0	13.8
	TB	16.9	24.2	27.1	9.5	16.5	29.0	30.0	8.8	22.4	7.9	19.4	17.6	12.4	13.1	17.8
	Malaria	10.1	120.0	121.2	11.6	9.0	92.2	42.5	15.4	50.8	6.8	5.7	8.5	20.1	15.2	24.6
	Pneumonia	16.8	40.2	100.0	9.9	13.6	30.0	44.1	15.9	26.8	11.2	10.7	10.3	22.7	34.6	18.6
	EDD	7.0	62.2	103.8	5.7	9.1	53.2	66.7	24.0	37.1	42.3	20.5	18.3	22.8	27.6	31.6
	NTDs	1.0	9.9	2.3	2.9	8.1	9.3	5.9	5.0	6.5	5.2	7.4	11.3	7.8	8.2	12.8
	Polio	2.0	6.0	0.0	0.0	8.5	0.3	4.1	0.0	5.0	0.0	13.0	0.8	5.8	13.3	7.0
	Vaccine technology	11.8	19.1	45.2	7.5	10.0	23.9	24.5	13.7	9.8	15.0	16.5	15.0	16.4	14.3	17.5
	General infectious disease	17.7	76.4	79.2	12.1	21.8	77.7	79.6	9.4	36.6	14.3	12.8	16.6	36.8	33.5	31.6
	Malnutrition	34.3	80.6	7.7	0.0	169.5	35.8	47.1	12.5	32.4	7.7	20.5	58.6	19.7	17.7	18.2
General	Reproductive, Maternal, Newborn and Child Health	9.1	16.6	8.8	7.0	10.7	8.0	8.8	4.6	7.1	5.5	4.8	3.6	7.2	12.8	7.0

1. Without self-citations; 2. First four listed are the main independent public research institutions in Germany, RKI is the largest research institution under Ministry of Health

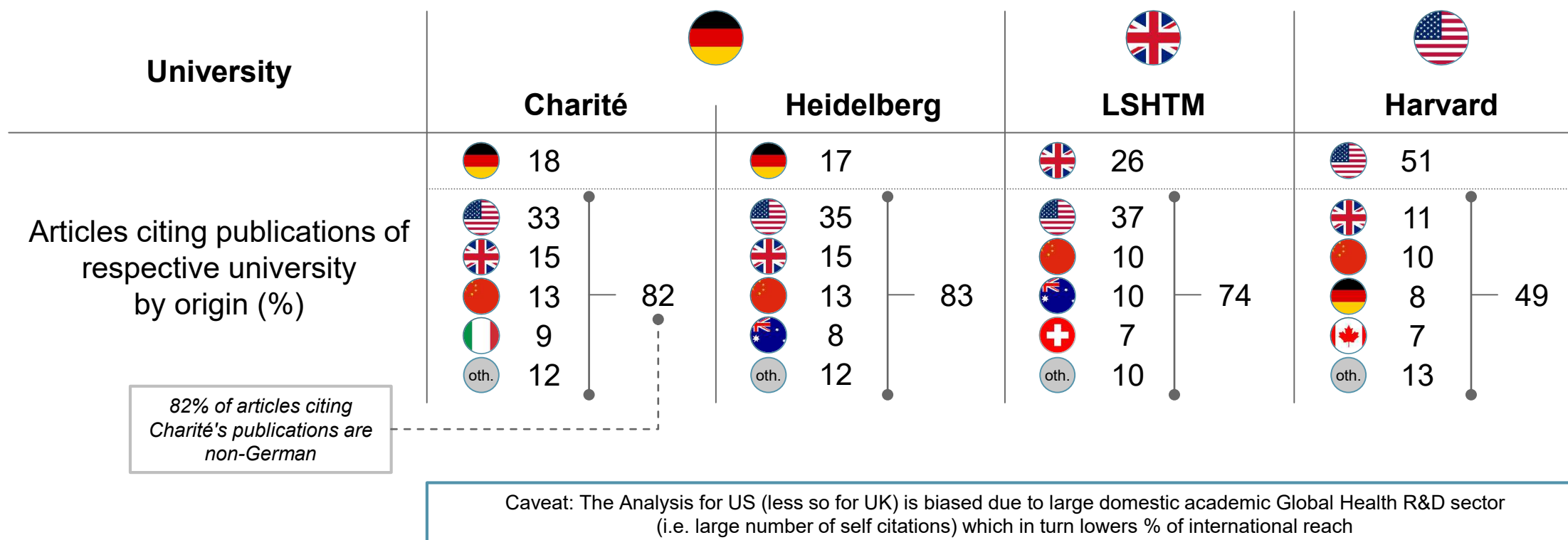
Note: Meaningful comparison of numbers only within same row; Filters for 'vaccine technology' and 'general infectious diseases' least precise, Main Institutions behind Leibniz are BNIT & Borstel Research Center; Main Institution behind Helmholtz is Helmholtz Center for Infection Research; Main Institution behind Max-Planck is MPIIB;

Source: Web of Science; BCG analysis



# In international comparison, German publications receive wider international recognition

International reach of articles and reviews on 11 publication topics combined<sup>1</sup>, 2016-2018

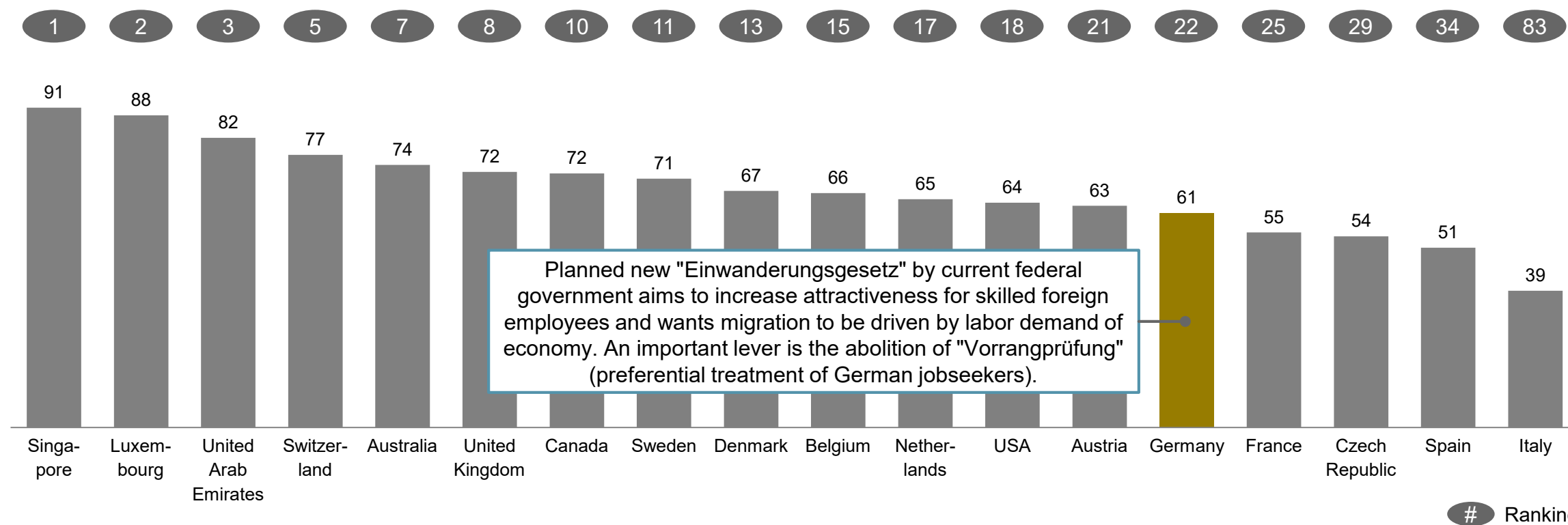


1. 11 Publication topics in scope combined: HIV, TB, Malaria, Pneumonia, EDDs, NTDs, Polio, Vaccine technology, General Infectious diseases, Malnutrition, RMNCH  
Source: World of science; BCG analysis



# Germany ranked low regarding its ability to attract foreign talent

## Global Talent Competitiveness Index – Subscore “Attract Talent”<sup>1</sup>



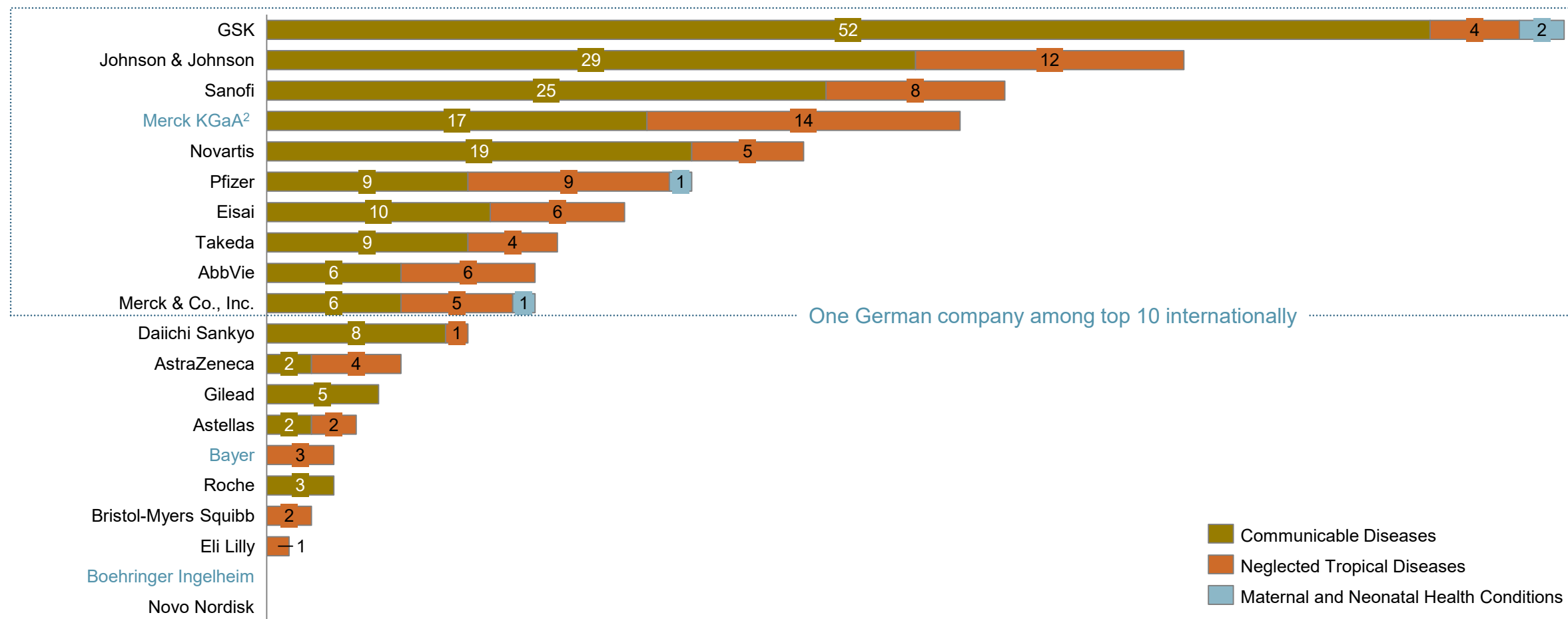
1. Selected countries

Note: Subindex based on: WEF Executive Opinion Survey 2015-2016 (FDI and technology transfer, prevalence of foreign ownership, brain gain, social mobility, leadership opportunities for women); The Social Progress Index 2016 (tolerance of minorities, immigrants); Statistical data (migrant stock, international students, female graduates, gender earnings gap)

Source: The Global Talent Competitiveness Index 2018, INSEAD

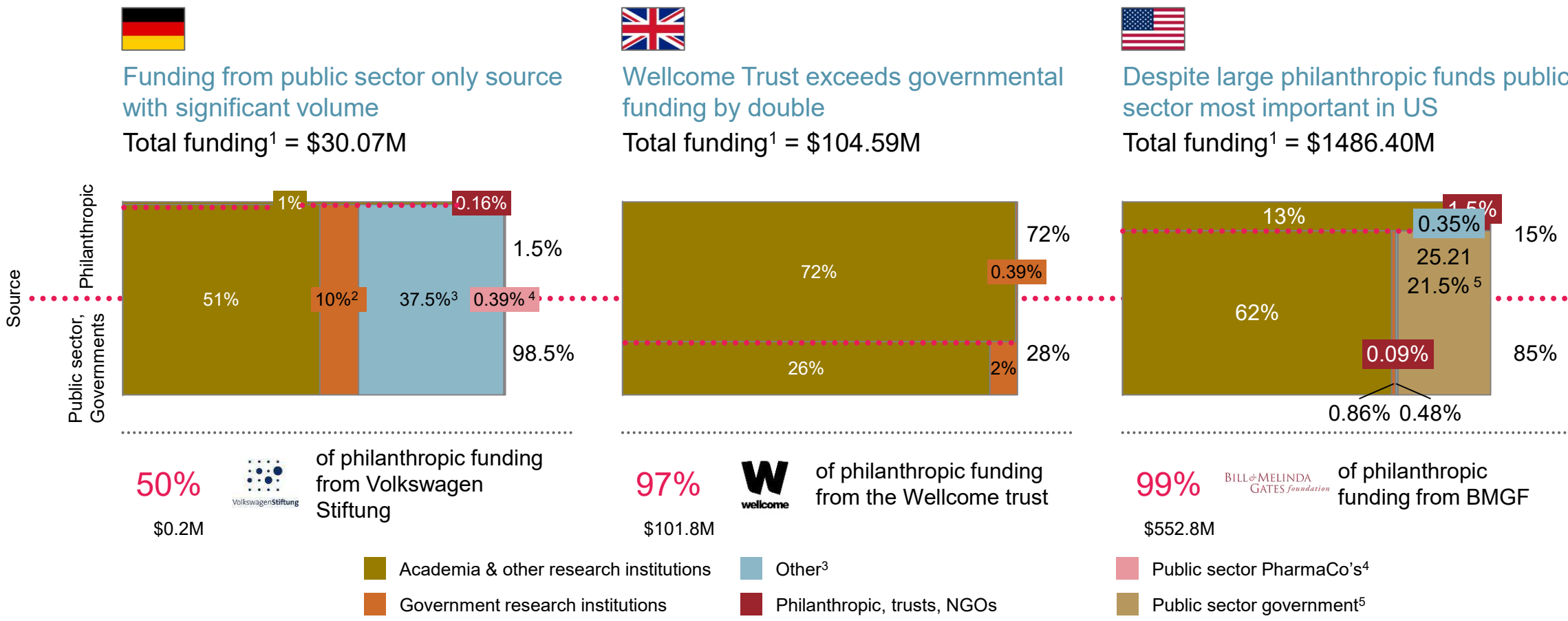


# Merck among global top 10 companies conducting Global Health “priority<sup>1</sup>” R&D



1. Access to Medicine names 45 diseases as priority diseases out of a total scope of 77 diseases which are defined according to lists by WHO & Policy Cures Research. Five diseases (Malaria, HIV/AIDS, Tuberculosis, Chagas diseases, Leishmaniasis) account for ~½ of the 272 R&D projects for priority product gaps 2. Includes one project that targets both communicable diseases and NTDs. This project was counted once for each disease category  
Source: Access to Medicine Index 2018

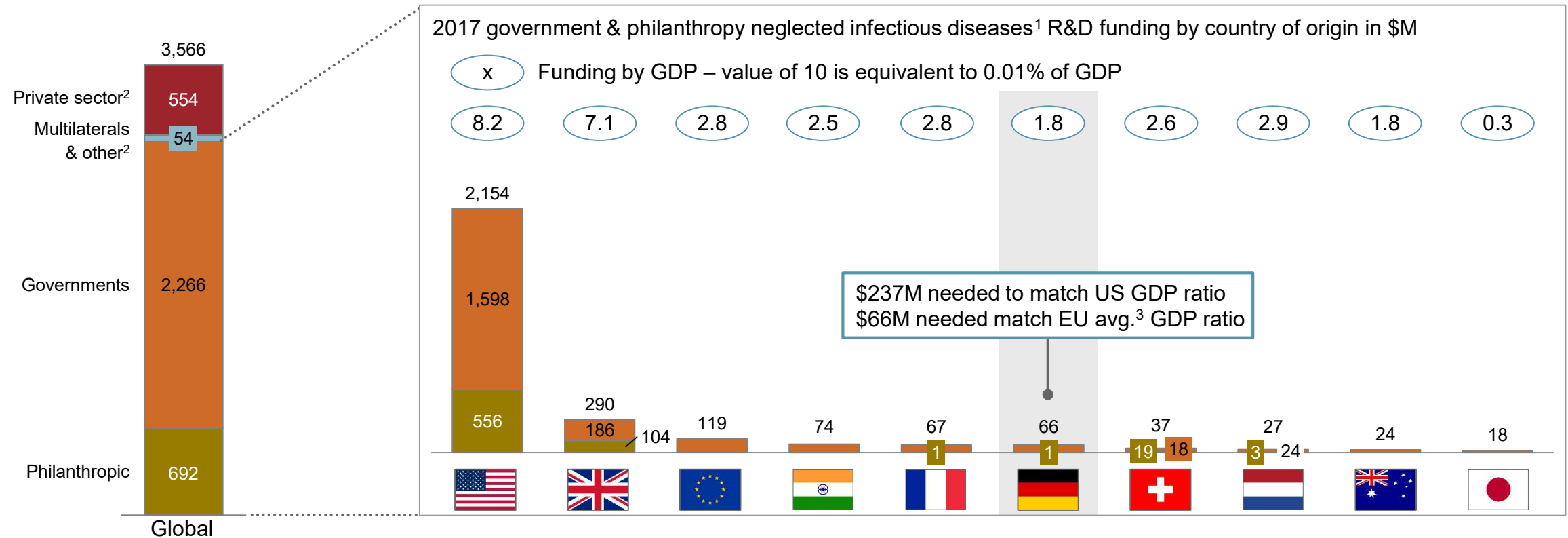
# Considerable lack of philanthropic funding in Germany



1. Total funding from domestic sources to domestic recipients 2. ~90% of which to Max Planck Society for the Advancement of Science EV, ~10% to Friedrich Loeffler Institut (German Federal Research Institute for Animal Health) 3. "Other" funding in Germany all towards German Centre for Infection Research (Deutsches Zentrums für Infektionsforschung) (DZIF), which is a network of different institutions 4. All towards Institute of Microbiology and Laboratory Medicine 5. 60% of which to US National Institutes of Health (NIH), ~30% to US Department of Defense (DOD), ~ 5% to US Centers for Disease Control and Prevention (CDC) // Source: G-Finder 2017

# Germany has a minor role in international Global Health R&D<sup>1</sup> funding

## Global 2017 neglected infectious diseases<sup>1</sup> R&D in \$M by funding sector



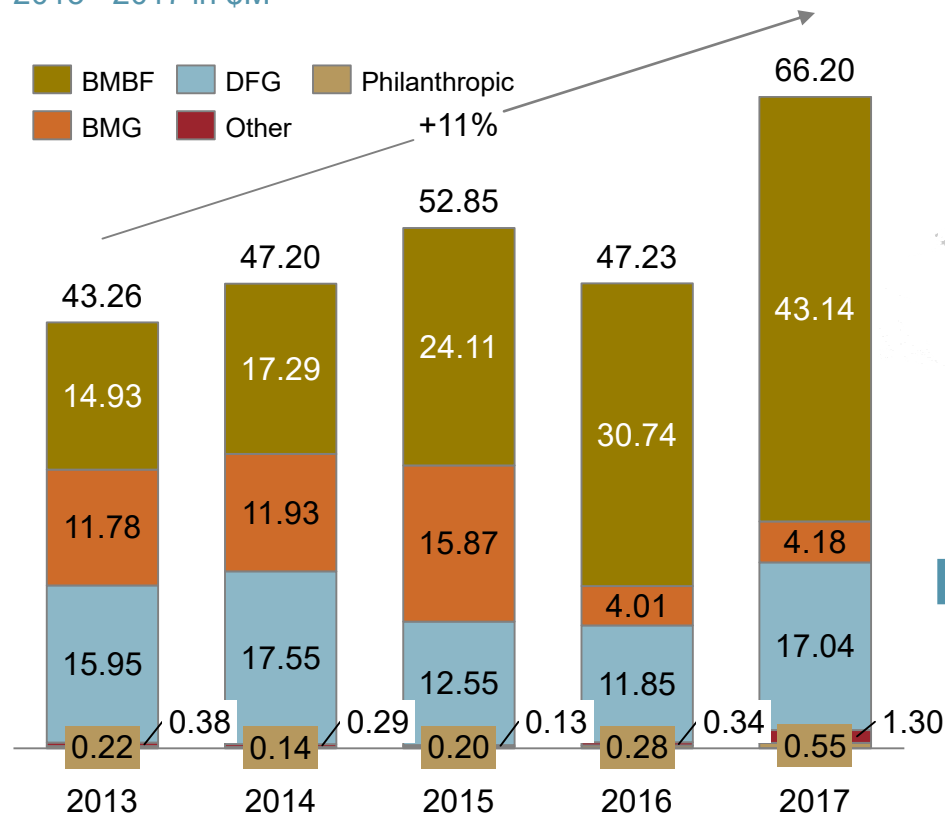
1. We use the G-Finder 2019 definition, which includes HIV, malaria, TB, diarrhoeal diseases, kinetoplastids, dengue, bacterial pneumonia & meningitis, salmonella infections, helminth infections, hepatitis C, leprosy, cryptococcal meningitis, buruli ulcer, leptospirosis, trachoma and rheumatic fever 2. Private sector, multilateral & other not differentiated by country 3. Represented by average of EU states incorporated in this graph (UK, France, Germany, Netherlands)

Source: G Finder; only RMNCH/FP/SHRH data available for 2013



# Research institutions receive bulk sum of funding – direct university funding plays a small role in Germany

German funders of GH neglected infectious diseases R&D, 2013 - 2017 in \$M



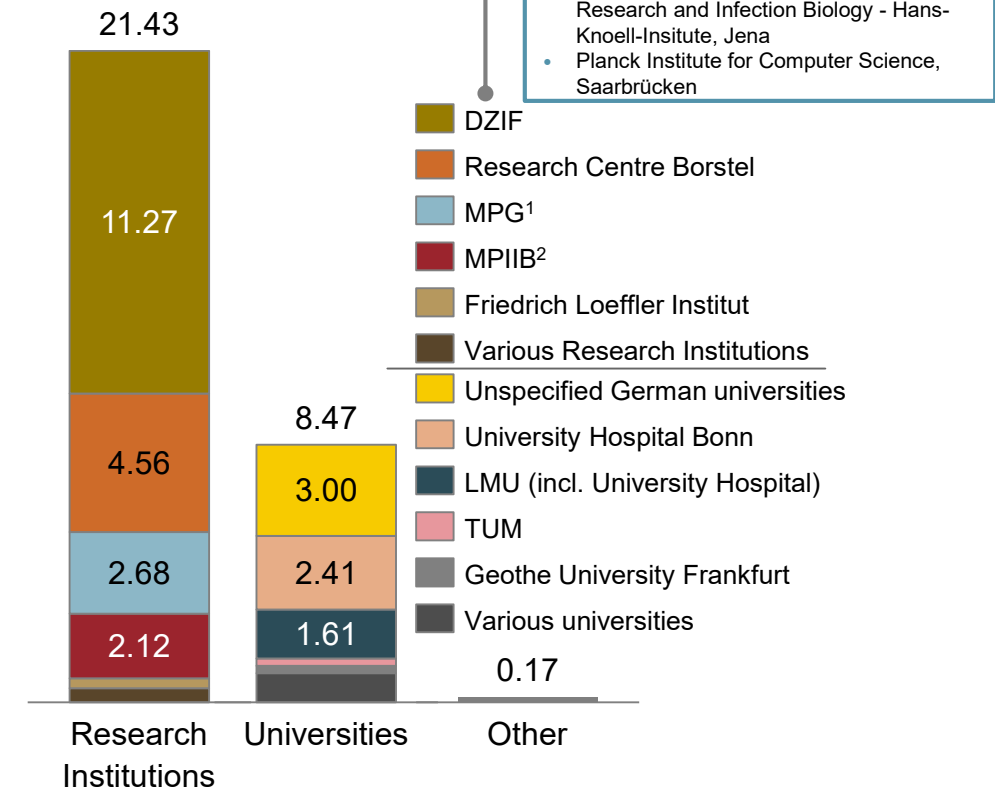
International recipients



\$36.13M

\$30.07M

Deep Dive: German recipients of German GH neglected infectious diseases R&D funding, 2017 in \$M



- DZIF: 9 associated partners**
- University of Bayreuth
  - Julius-Maximilians-University Würzburg
  - Westf. Wilhelms University Münster
  - Goethe-University Frankfurt
  - University Hospital, Freiburg
  - Charité Berlin
  - German Liver Foundation, Hannover
  - Leibniz Institute for Natural Product Research and Infection Biology - Hans-Knoell-Institute, Jena
  - Planck Institute for Computer Science, Saarbrücken

1. MPG: MPG 2. MPIIB: Max Planck Society—Max Planck Institute for Infection Biology

Note: Neglected infectious diseases include HIV, malaria, TB, diarrhoeal diseases, kinetoplastids, Dengue, bacterial pneumonia and meningitis, salmonella infections, helminth infections, hepatitis C, leprosy, cryptococcal meningitis, buruli ulcer, leptospirosis, trachoma and rheumatic fever

Source: G-Finder

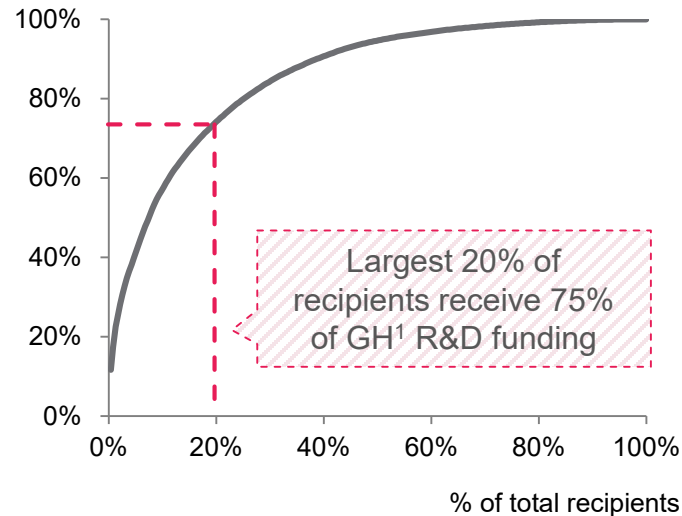




# As in other GH countries, funding highly concentrated, but only one university among top 5

## GH<sup>1</sup> R&D funding in the US is the least concentrated

% of total funding (n=235)

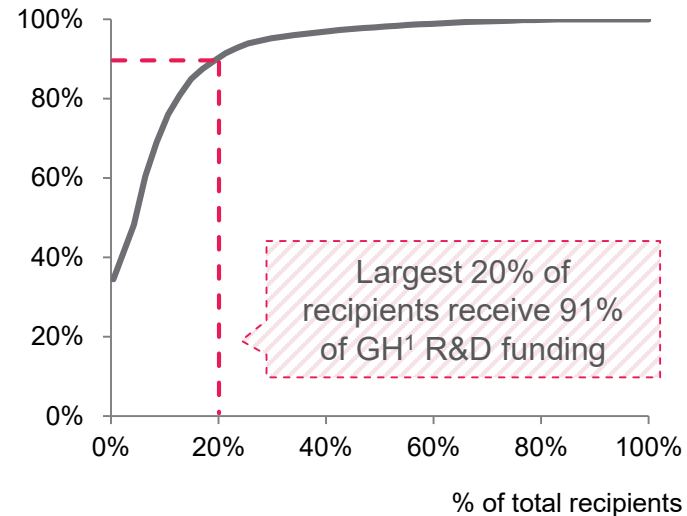


### Top five recipients (28% of funding)

- Fred Hutchinson Cancer Research Center<sup>1</sup>
- Duke University
- Johns Hopkins University
- University of Maryland, Baltimore
- The Scripps Research Institute (TSRI)

## GH<sup>1</sup> R&D funding in the UK is the most concentrated

% of total funding (n=47)

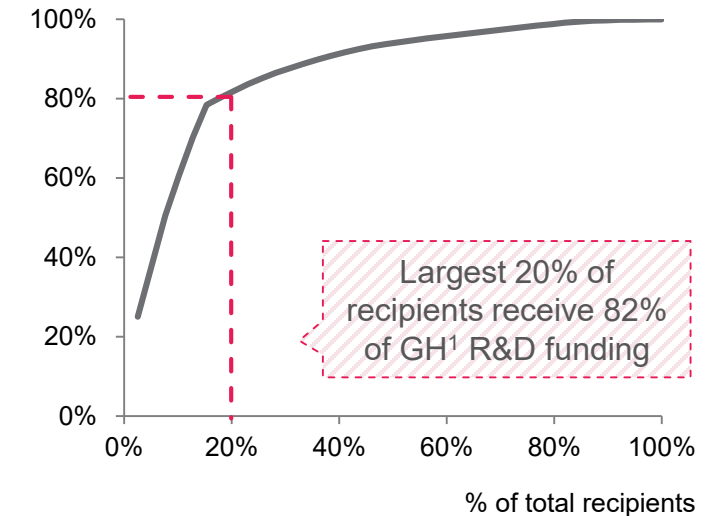


### Top five recipients (76% of funding)

- University of Oxford
- Imperial College London
- University College London (UCL)
- Liverpool School of Tropical Medicine
- LSHTM

## GH<sup>1</sup> R&D funding in Germany is very concentrated

% of total funding (n=39)



### Top five recipients (70% of funding)

- Research Centre Borstel (Leibniz Soc.)
- Max Planck Society
- Unspecified university-based recipients
- University Hospital Bonn
- Max Planck Institute for Infection Biology (MPIIB)

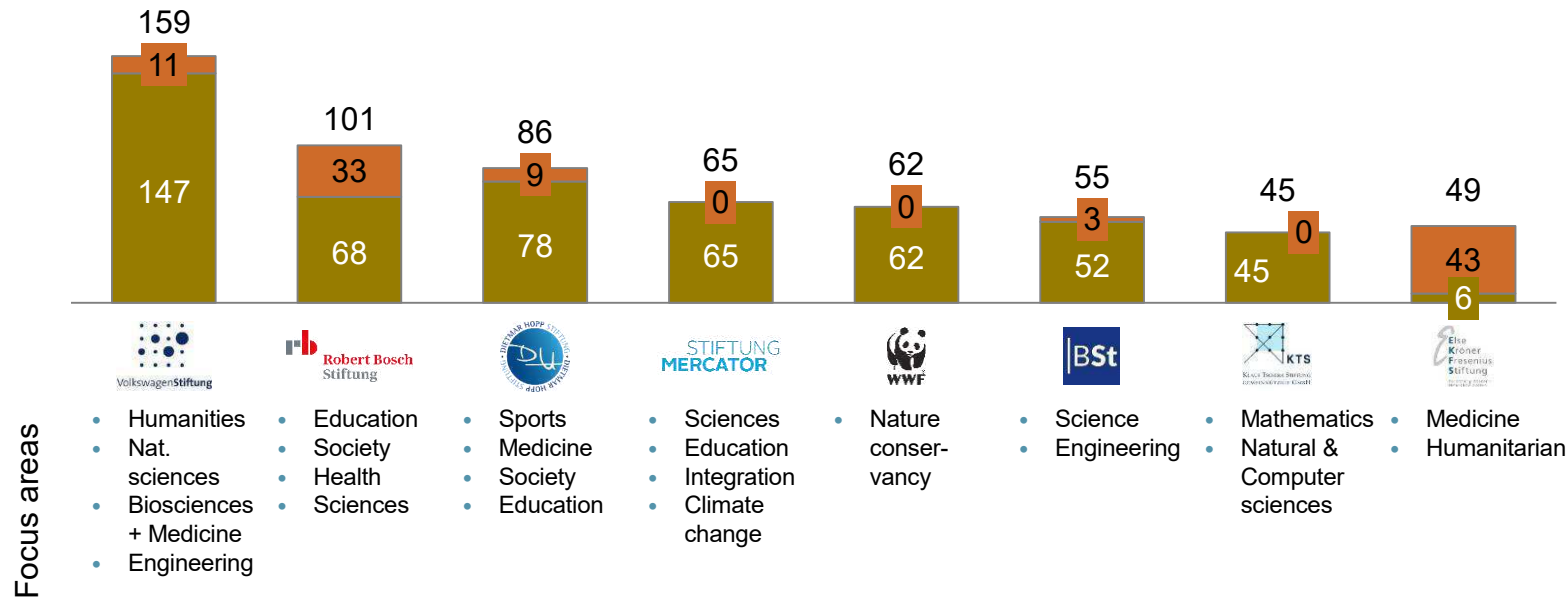
Low number of universities

1. Neglected infectious diseases from G-Finder for 2017 data Please note: data is for academia & other research institutions and government research institutions only – Source: G-Finder 2019

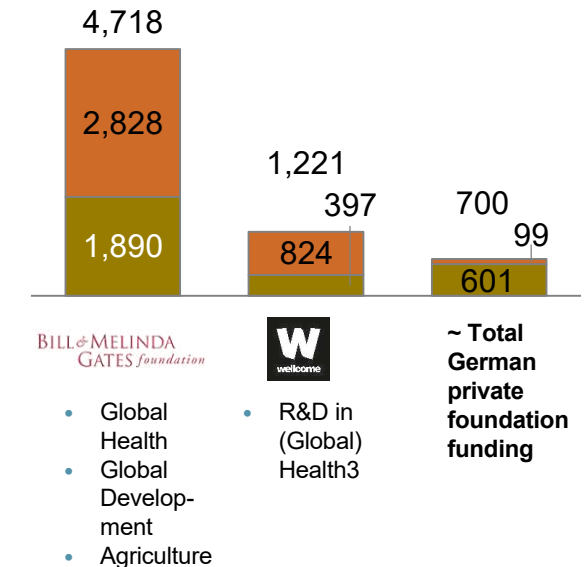
# Private foundations: Significant part of funding landscape at much smaller scope

2017<sup>1</sup> funding of German civic foundations in €M

"Health" funding<sup>3</sup> All other funding

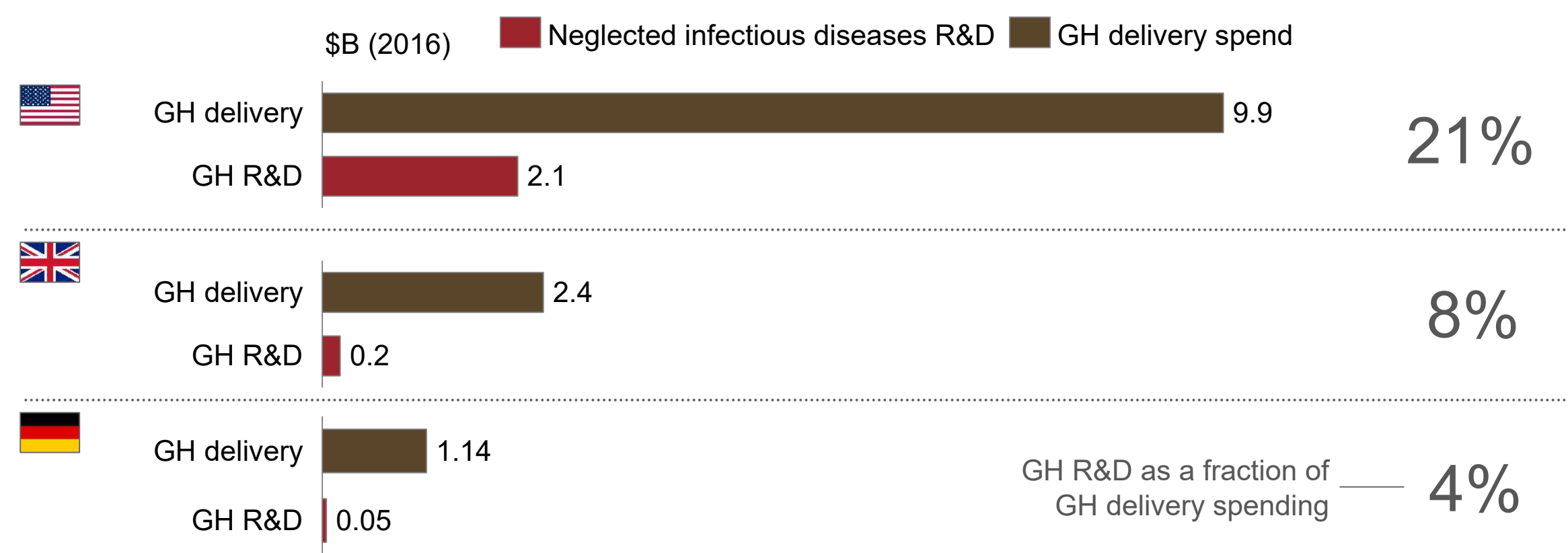


2017<sup>2</sup> funding in \$M<sup>5</sup>



1. Except: Dietmar Hopp Stiftung: FY 2016; WWF-Deutschland: 01.07.2016 - 30.06.2017; Data for Dietmar Hopp Health sector: per project dividing funding-amount by funding-duration if funding was only partially undertaken in 2017 2. Data for Wellcome Trust Health sector: Estimate by grant funding data combined with annual report 2017 3. "Health3 " data are estimates based on publicly available data; "Health" funding (represented within each foundation filtr as): Biosciences + Medicine; Health; Various projects identified as health sector; -; -; Care improvement – patient information, -; Medical & humanitarian research; Global health + 84% of Global Development (Polio, Vaccine Delivery, Family Planning, Nutrition, MNCH) + 2/3 Multilateral Partnerships; Infectious disease and immuno-biology + Genomics, genetics and epigenetics + Neuroscience and mental health + Population, environment & health + Cultural and social contexts of health 4. Ilona Kickbusch, Lancet 2017 Source: Bundesverband Deutscher Stiftungen, Volkswagen Stiftung, Robert Bosch Stiftung, Dietmar Hopp Stiftung, Stiftung Mercator, WWF-Deutschland, Bertelsmann Stiftung, Klaus Tschira Stiftung, Else Kröner-Fresenius-Stiftung, BMFG, Wellcome trust, la Caixa Banking Foundation, G-finder 2019, [www.statista.com](http://www.statista.com)

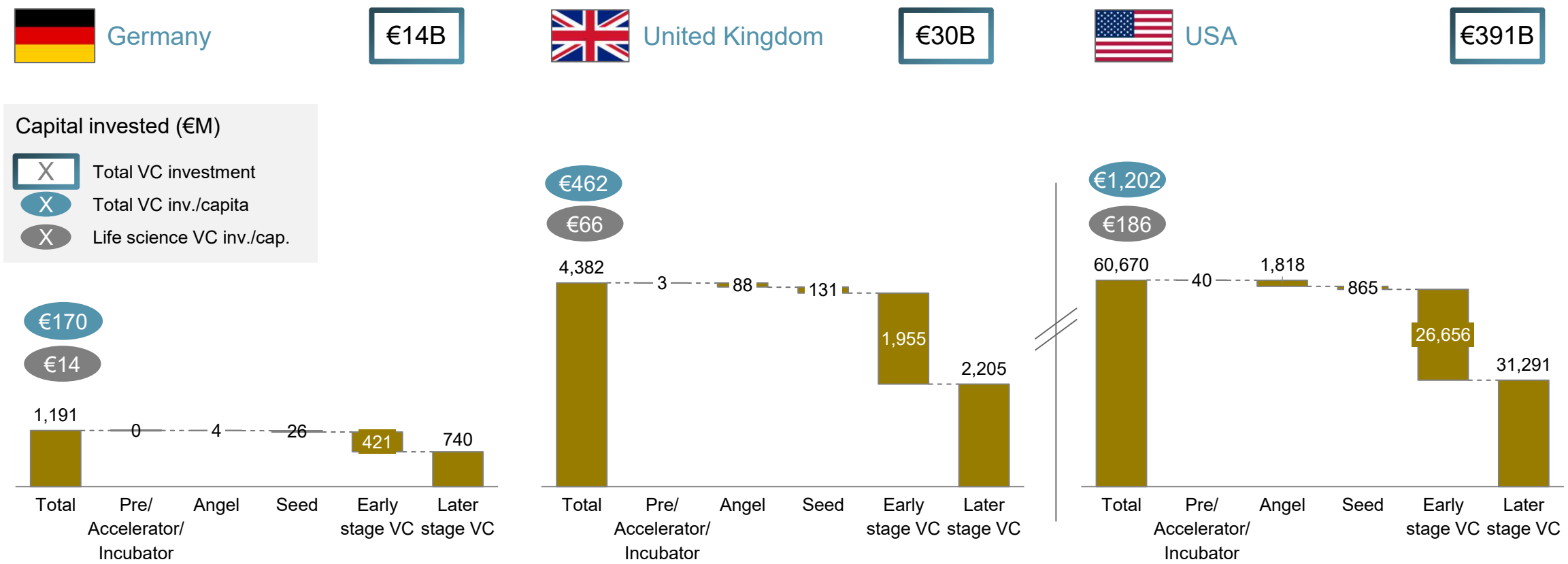
# Germany's Global Health R&D<sup>1</sup>/delivery<sup>2</sup> ratio significantly below international players



1. Neglected infectious diseases 2. Funding to bilateral projects in Germany mostly originating from BMZ and KfW  
Source: <https://donortracker.org>, G-finder

# Germany's life science VC with enormous potential to reach higher volumes

## Life sciences startup financing<sup>1</sup> (2014 – 2019)

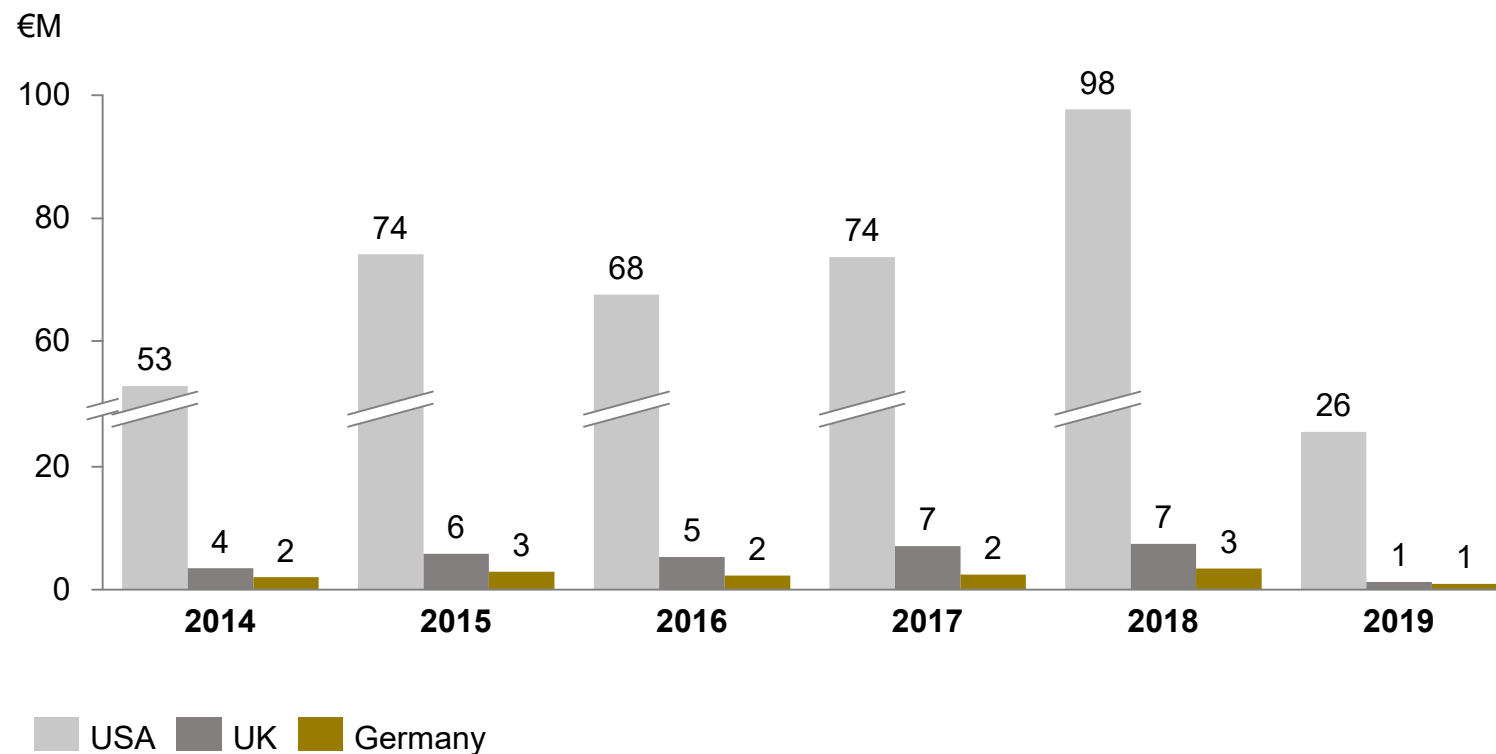


1. 2014 to Q1-2019  
Source: PitchBook 2019



# Overall German VC investment is only a fraction of UK and US VC investment

## Total annual VC investment



Cumulative VC investment  
(€B, 2014 – 2019)

Per capita  
(€, 2014 – 2019)



391

1,202



30

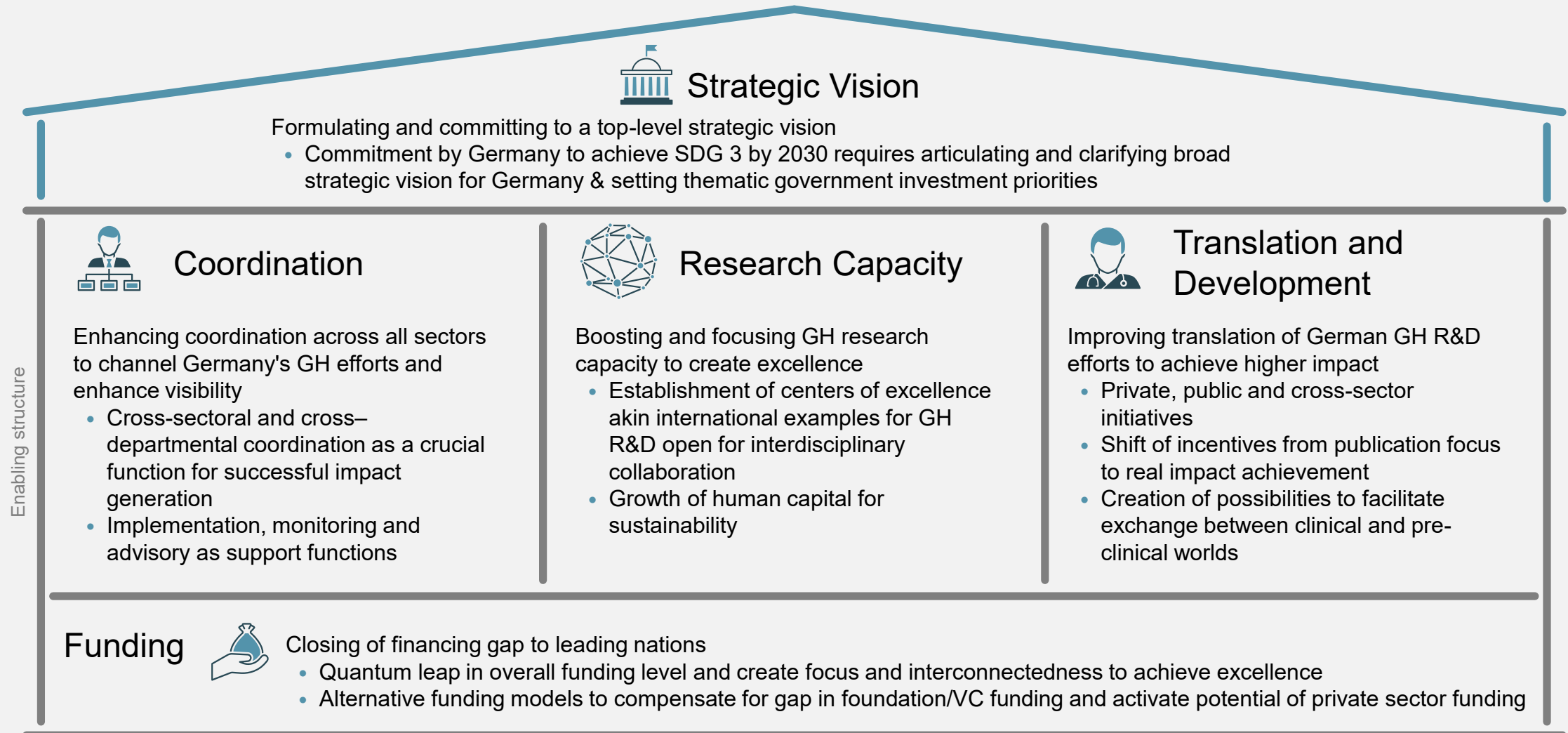
462



14

170

# Key enablers for Germany to unlock its full potential



BILL & MELINDA  
GATES *foundation*



Supported by **BCG**