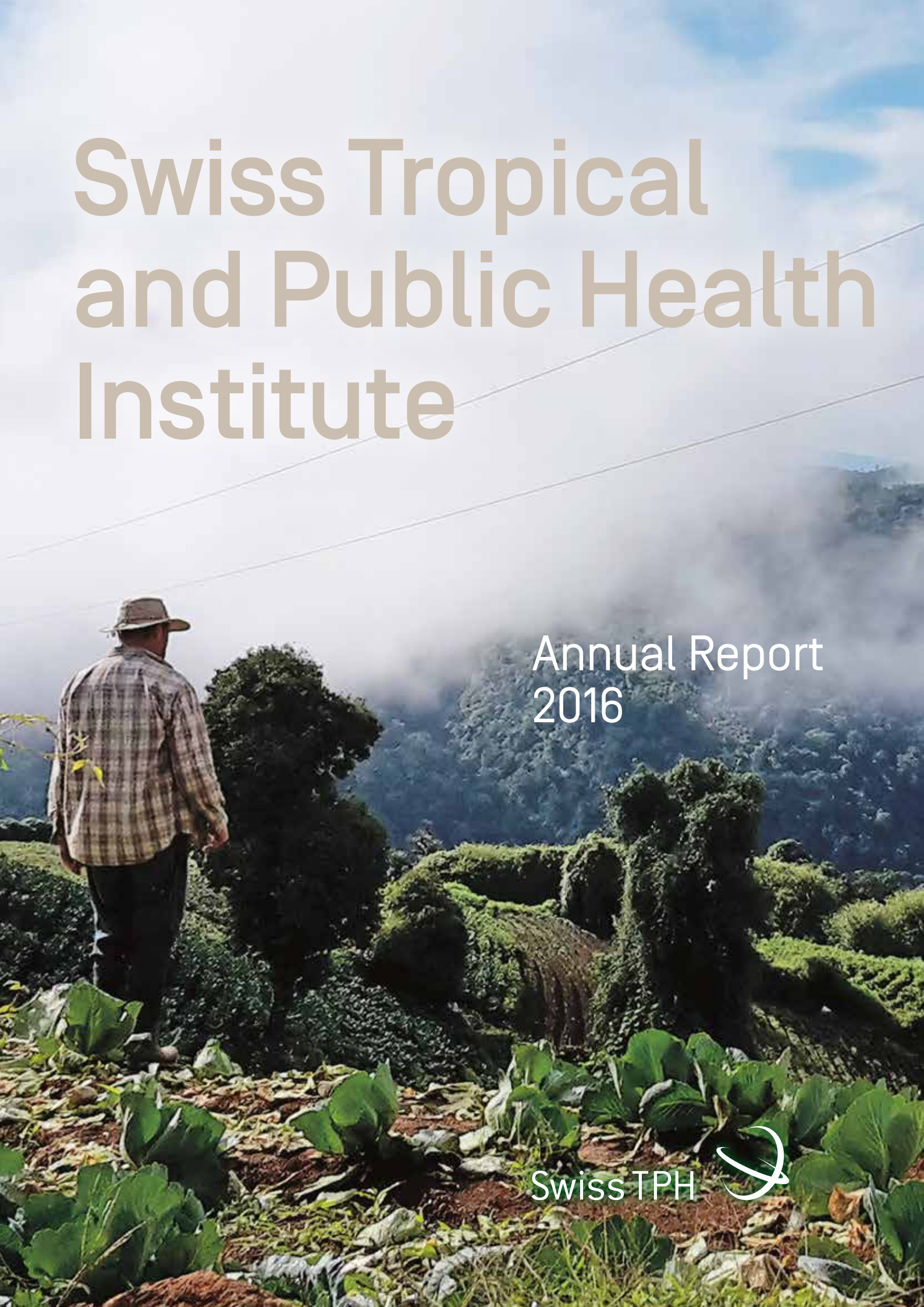
Swiss Tropical and Public Health Institute



Annual Report 2016

Swiss TPH

Swiss Tropical and Public Health Institute

Annual Report
2016

Contents

Preface

The year 2016 was characterised by staff transitions that furthered the generation change at the directorate level, consolidation of our strategy and structure, and an endorsement of higher core funding contributions from the local and national governments. Indeed, the state treaty for bi-cantonal support from Basel-Stadt and Basel-Landschaft was unanimously approved by the two parliaments, while the State Secretariat for Education, Research and Innovation endorsed the upcoming 4-year strategy. Hence, Swiss TPH is fit for the future.

Prof. Dr. Jürg Utzinger

I take pleasure introducing to you – our dear collaborators and colleagues, friends and funders, supporters and staff in Basel, elsewhere in Switzerland and around the world – Swiss TPH's annual report for 2016. Although we are living in an ever faster and profoundly changing world, with competing interests in personalised, precision, public, international, global and planetary health, Swiss TPH remains on course. A clear vision and strategy to improve population health, built on excellence in research, services, teaching and training, coupled with committed staff and core values of "partnership" and "trust", delivers measurable outputs and creates impact.

A year of successes

For the first time ever, our turnover exceeded CHF 80 million. While core contributions from the University of Basel and from the local and national governments accounted for 21% of these funds, the remaining 79% were acquired through competitive research, service and fellowship grants. In terms of research, Swiss TPH scientists – mostly in collaboration with partners from other institutions and transnational research consortia – produced more than 450 articles in the peer-reviewed, international literature, including top-tier journals, such as *The Lancet*, *Nature* and *Science*. Regarding excellence in service delivery, more than 12,000 clients were given travel advice and over 3,000 clinical consultations were offered. In the area of education and training, 25 students successfully completed their MSc studies in epidemiology and infection biology, adding to the now 216 MSc degrees issued since the launch of this programme 12 years ago. 26 fellows from 15 different countries were awarded PhD degrees. A host of additional postgraduate training took place, ranging from a one-week "Health in Detention" course, to our in-house, modular MBA in International Health Management programme. Swiss TPH also had a hand in developing the University of Basel's "Massive Open Online Course" on the topic of "One Health".

Two new associate professors were appointed after rigorous selection procedures: Martin Röösli, from Swiss TPH, is now Professor in Environmental Epidemiology and Günther Fink, from the Harvard T.H. Chan School of Public Health, is the Eckenstein-Geigy Professor in Epidemiology and Household Economy. In March 2016, Swiss TPH was designated a World Health Organization Collaborating Centre for Health Technology Management and eHealth.

Swiss TPH structure consolidated and strategy 2017–2020 approved

Over the course of 2016, the structure of Swiss TPH has been consolidated. The institute now consists of five departments: two research departments, Epidemiology and Public Health

(led by Nicole Probst-Hensch) and Medical Parasitology and Infection Biology (led by Sébastien Gagneux); two service departments, the Swiss Centre for International Health (led by Kaspar Wyss) and the Department of Medicine (led by Daniel Paris); and the Department of Education and Training (led by Nino Künzli). I wholeheartedly thank Christoph Hatz and Christian Burri for their constructive advice and forward-looking spirits, which paved the way for integrating the Medical Services and Diagnostics and the Medicines Research departments into the new Department of Medicine. Our clinical services and diagnostics, clinical research and pharmaceutical medicine are now under one roof and will foster collaboration and harness synergies within and across departments.

The Swiss TPH strategy for the next four-year period (2017–2020) has been endorsed by our board. The 14 key areas of activities and specific thematic nucleus areas were scrutinised during the annual project leader's retreat and helped us prepare for an external review that was conducted in early 2017, with the new chair Carol Vlassoff. The composition of our board of governors was endorsed by the local governments. It consists of nine members, including: the chair, Andreas Burckhardt (see pp. 15–16), and eight representatives from academia and from the public and private sectors; four representing Basel-Stadt and the other four Basel-Landschaft. We thank Philippe Burrin, the Director of the Graduate Institute of International and Development Studies in Geneva, who stepped down after many years and welcome aboard François Chappuis, from the Hôpitaux Universitaires Genève. Doris Fellenstein Wirth from the Education Department of Basel-Landschaft is now a full member on our board, after having served as a guest for more than a year – a warm welcome to all!

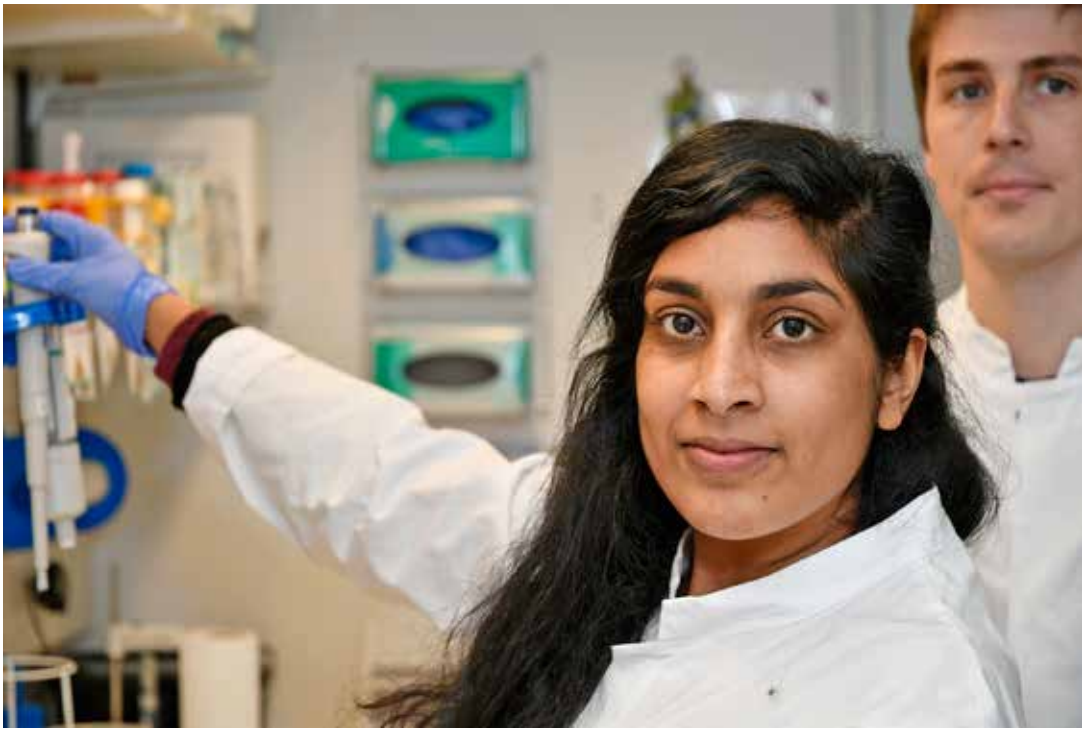
People, values and "Belo Horizonte"

One of our four strategic goals is to promote and strengthen responsible interactions and exchanges with individuals and communities in their cultural, ecological and social contexts. We recognise people as the foundation and centre of our thinking and action, and we greatly value diversity. Hence, we continue to forge partnerships and strategic alliances in Basel, Switzerland and all over the world. It is as simple as that. None of the activities and deliverables highlighted in this report would have been possible without the commitment, enthusiasm and loyalty of each staff member and of all our collaborators, donors and funders mentioned throughout. I am deeply grateful to all of you!

Finally, the die is cast for our new building and the move to Allschwil towards the end of 2020. The team of Kunz und Mösch won the architectural competition with their persuasive project, "Belo Horizonte".

I very much hope that you will find the current 2016 annual report a refreshing piece and I look forward to continued exchange. Together, we can make a difference to improve population health here, there and everywhere.

Prof. Dr. Jürg Utzinger
Director, Swiss TPH



Swiss TPH appeals to students from all over the world.

Swiss TPH's Vision Is to Improve Human Health and Well-being through Better Understanding Disease and Health Systems and Acting on this Knowledge

"From innovation to application to improving people's health – Swiss TPH has it all under one roof."

Jürg Utzinger, Director Swiss TPH

80 Million

Swiss TPH currently receives **21%** of its annual income of more than **80 million Swiss francs** from the cantons of Basel-Stadt and Basel-Landschaft, the Swiss Federal Government and the University of Basel.
The remaining **79%** are competitively obtained from funding agencies, foundations and clients.

300

research and implementation projects; **50** in Switzerland and **250** in more than **100** countries around the world

450

publications in peer-reviewed journals

60

nationalities are represented among Swiss TPH employees and students

490

Swiss TPH employees work in Basel; another **150+** are based in countries around the world

12,000

clients a year seek advice and treatment from Swiss TPH's travel medicine specialists

30,000

customers sought medical advice via the information hotline

Swiss Tropical and Public Health Institute (Swiss TPH)

Centre Suisse de Recherches Scientifiques (CSRS), Côte d'Ivoire

Centre de Support en Santé Internationale (CSSI), Chad

Ifakara Health Institute (IHI), Tanzania

Swiss TPH

Departments

Epidemiology and Public Health
(see p. 58)

Medical Parasitology and Infection Biology
(see p. 60)

Swiss Centre for International Health
(see p. 61)

Medicine
(see pp. 62–63)

Education and Training
(see p. 64)

Long-term Partnerships

A culture of partnership with many institutions and people around the world is one of Swiss TPH's secrets of success

Ifakara Health Institute (IHI), Tanzania

In 1957, the Swiss Tropical Institute founded the Ifakara Health Institute in Tanzania. Over time, it has developed into one of the most renowned research institutions in Africa. Its staff members develop new strategies to strengthen health systems and to fight poverty-related diseases such as malaria, tuberculosis and HIV/AIDS. A special focus is on chronic diseases, such as obesity, cardiovascular diseases and diabetes.

Centre de Support en Santé Internationale (CSSI), Chad

Already in the 1980s, Swiss TPH had been helping to improve the health of people living in Chad. Improving rural and urban health systems was of special concern. These efforts led to the establishment of the Centre de Support en Santé Internationale (CSSI) in N'Djamena. CSSI is devoted to the control of infectious diseases in urban and rural settings and to strengthening health systems.

Centre Suisse de Recherches Scientifiques (CSRS), Côte d'Ivoire

Founded in 1951 with support from the former Swiss Tropical Institute, CSRS has developed into a prime example of Swiss-African research partnership. Today, over 200 researchers and employees work for the centre. They conduct research on nutrition, biodiversity and health, among others, and implement numerous projects in Côte d'Ivoire and the greater sub-region. Swiss TPH acts as a "leading house" for CSRS as well as for IHI.

2016 – The Year in Retrospect

January

Marcel Tanner elected president of the Swiss Academy of Sciences

Director Emeritus, Marcel Tanner, was elected president of the Swiss Academy of Sciences (SCNAT) as of 1 January 2016. "We want to develop along the existing strategic plans, but we are always open and receptive to new ideas and approaches", says the former director of Swiss TPH. Tanner takes over the position from University of Geneva astrophysicist, Thierry Courvoisier.

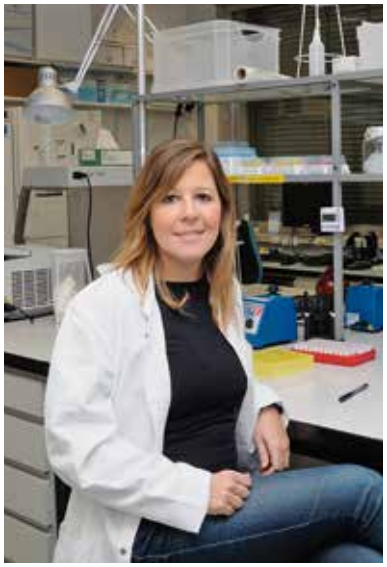
Andreas Burckhardt newly appointed Chairman of the Board of Governors of Swiss TPH

Andreas Burckhardt is the new chairman of the Board of Governors of Swiss TPH ("Kuratorium"). He replaces Felix Gutzwiller, who served as chairman for more than a decade. Andreas Burckhardt is well acquainted with Swiss TPH. He was vice-chair of the Board of Governors over the past two years.

March

Swiss TB Award for Mireia Coscolla Devis

The Swiss Foundation for Tuberculosis Research presented the Swiss TB Award 2016 to Swiss TPH researcher, Mireia Coscolla Devis, for providing new insights into the antigenic variation of tuberculosis bacteria. The value of the prize is CHF 10,000.



April

Spring symposium: The Future of Travel Medicine

Health experts from around the world attended Swiss TPH's spring symposium at Bildungszentrum 21 in Basel. With a focus on "The Future of Travel Medicine", participants discussed the challenges posed by newly emerging pathogens and the latest achievements in preventing, diagnosing and treating tropical diseases.

Marcel Tanner awarded the Bebby Bryys 2016

For his tireless and exemplary commitment to Swiss TPH, former director, Marcel Tanner, was honoured with this year's Bebby Bryys award. This prize is awarded every two years to a distinguished person who specifically commits him or herself to the City of Basel. Former recipients include George Gruntz, Clara B. Wilpert, Karl Odermatt, Erik Julliard, Mirjam Christ-Crain and Carl Miville.

April

Bern – The Capital of World Malaria Day 2016

On World Malaria Day (April 25th), a giant mosquito was erected on the Federal Square in Bern by the President of the National Council and the Mayor of Bern. This was followed by the signing of the Bern Malaria Declaration by members of the national parliament and the Swiss Malaria Group. The declaration signals Switzerland's commitment to reducing the global burden of malaria under the 2030 Agenda for Sustainable Development.

Christine Mensch receives University of Basel Teaching Excellence Award 2016

Christine Mensch, study coordinator at Swiss TPH, was awarded one of five Teaching Excellence Awards from the University of Basel. The prize honours her outstanding achievements as coordinator of several MSc and PhD programmes in the Faculty of Science. The award ceremony took place on 23 May at the university's Kollegiengebäude.

May

Elisabeth Zemp Stutz awarded the 2016 KHM Forschungspreis Hausarztmedizin

Elisabeth Zemp Stutz, head of the Society, Gender and Health unit at Swiss TPH, was a recipient of the KHM Forschungspreis Hausarztmedizin (Research Prize for Family Medicine) from the Kollegium für Hausarztmedizin (College of General Practitioners). In the prize-winning article, Zemp Stutz and her co-authors showed that many general practitioners in Switzerland consider the psychological aspects of end-of-life care to be as important as its medical aspects. The value of the prize is CHF 30,000. The award ceremony was held on 23 June, in the Culture and Congress Centre in Lucerne.

June

Martin Röösli appointed Associate Professor of Environmental Epidemiology

The university council appointed Martin Röösli as associate professor of environmental epidemiology at the University of Basel and Swiss TPH. The newly established chair is based at Swiss TPH. Röösli is an internationally renowned expert in environmental epidemiology. He studies the impact of environmental exposures, such as air pollution, electromagnetic fields, non-ionising radiation and noise, on the development of chronic diseases. Exposure assessment and modelling are among his key competencies. Röösli also co-chairs the Swiss South-Africa Chair of Environmental and Global Health.

25th SSPH+ Summer School in Lugano

Almost 150 participants from China, the Middle East, Africa, Europe, and North and South America attended the 25th SSPH+ Summer School in Lugano. The courses address the needs of public health professionals, researchers and graduate students alike who seek to improve their competences in several public health related fields. The summer school creates a platform of exchange between the faculty and all participants.

August

Marcel Tanner appointed High Representative of the European & Developing Countries Clinical Trials Partnership (EDCTP)

Marcel Tanner, leading global health specialist and former director of Swiss TPH, was elected as “High Representative North” by the European & Developing Countries Clinical Trials Partnership (EDCTP). High representatives act as goodwill ambassadors for EDCTP to increase the visibility of the programme and to promote partnerships with other EDCTP stakeholders in the fight against poverty-related and neglected diseases in Africa, Europe and globally.

October

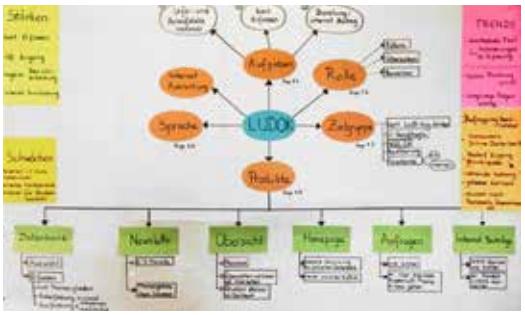
Hands-on science

Swiss TPH presented its activities to an interested public from Basel and the wider region. At the Fest der Moleküle, for instance, prospective University of Basel students explored the mysterious world of molecules and drugs against neglected tropical diseases. At the Nationaler Zukunftstag, around 20 pupils playfully learned about disease outbreaks and the health impact of devices such as mobile phones and microwaves.

November

Reorienting the documentation platform for air pollution and health (LUDOK)

Representatives from federal offices, NGOs and Swiss TPH met in Bern to discuss the reorientation of the documentation platform for air pollution and health (LUDOK). Initiated by the Federal Office for the Environment and based at Swiss TPH, LUDOK has been a repository for evidence-based information on air pollution and health from around the world for more than 30 years. The data is used to support the implementation of the Swiss Environmental Protection Act.



Winter symposium: Building on Success – Malaria Control and Elimination

More than 300 participants from all over the world attended the Swiss TPH winter symposium at the Congress Centre in Basel to debate the possibilities for and challenges of malaria control and elimination in different endemic settings.

December

The R. Geigy Foundation honours efforts to overcome neglected tropical diseases

Giovanna Raso and Jean T. Coulibaly were awarded the R. Geigy Award 2016 and will share a CHF 20,000 prize in recognition of their efforts to fight neglected helminth infections in Côte d'Ivoire. To commemorate the spirit and the achievements of Rudolf Geigy, the founder of the Swiss Tropical Institute, the R. Geigy Foundation confers the prize every second year to distinguished young scholars in the field of poverty-related diseases.

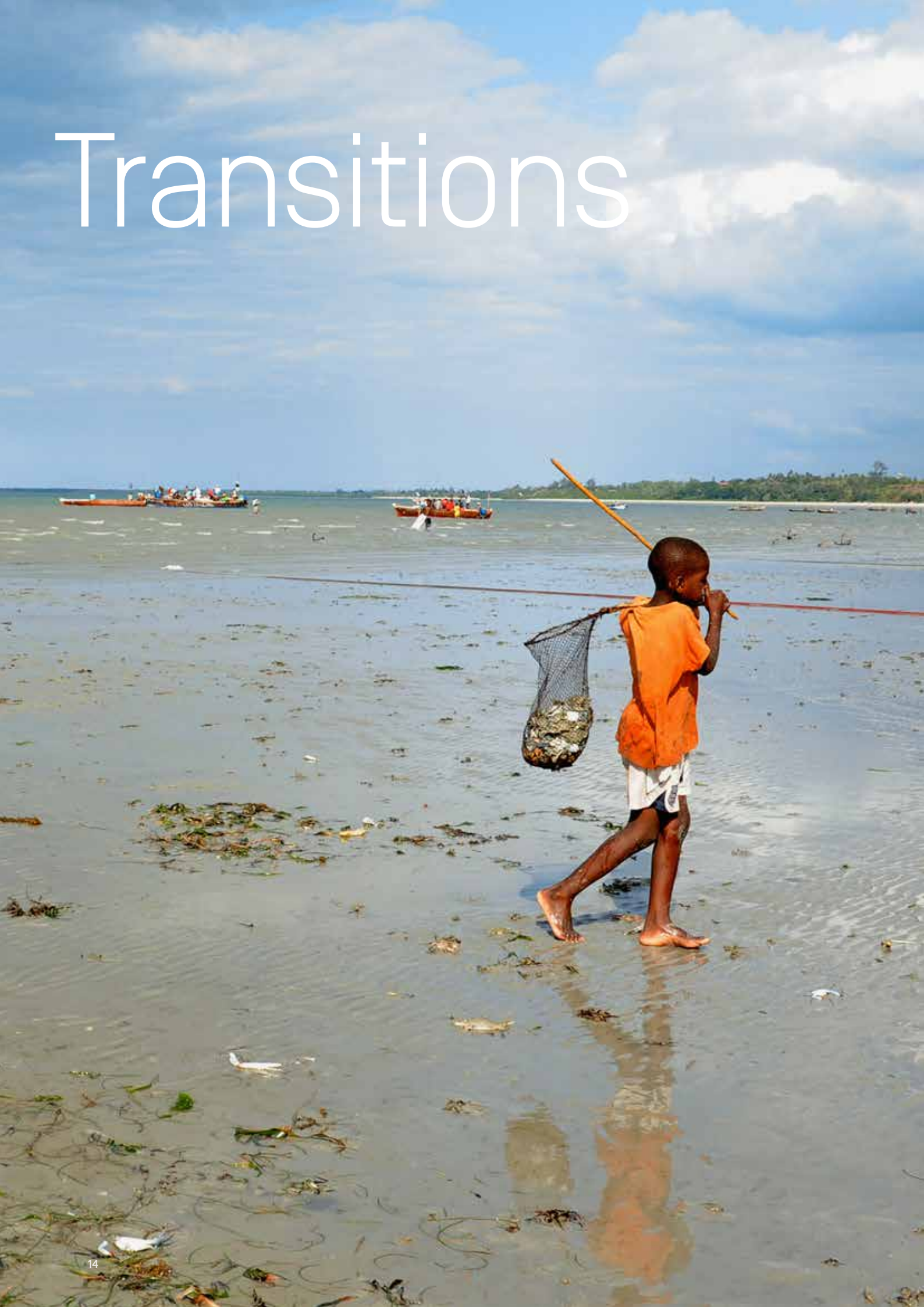
Massive Open Online Course (MOOC) on One Health: Connecting Humans, Animals and the Environment

In collaboration with Swiss TPH, the University of Basel created a MOOC on One Health: Connecting Humans, Animals and the Environment. The course reflects on the concept of "one health" and brings together different disciplines to analyse case studies that demonstrate the advantages of closer cooperation between human and animal health and social and cultural sciences. Students learn how to calculate the added value of this approach.

Nicole Probst-Hensch appointed honorary member of the Swiss Society for Public Health

Nicole Probst-Hensch, head of the Department of Epidemiology and Public Health at Swiss TPH, was made an honorary member of the Swiss Society for Public Health. The society commends her efforts to promote health and wellbeing in Switzerland and her contributions to the national strategy for preventing non-communicable diseases.

Transitions



“I See My Role as an Initiator”

Dr. Andreas Burckhardt has been Chairman of the Board of Governors – the chief supervisory body of Swiss TPH – since 1 January 2016, following a distinguished political career and successful period as Chairman of the Board of Directors at the Bâloise Group. In the following interview, he speaks about his role as Chairman of the Board of Governors at Swiss TPH, digitalisation of the health care system and the political landscape in Basel.

You are not exactly known for your laissez-faire approach. As Chairman of the Board of Governors, what are you doing differently from your predecessor, Prof. Dr. Felix Gutzwiller?
You know, when I was appointed Chairman of the Board of Directors at the Bâloise Group, everybody there asked me: “What will you do differently”? And my answer was simple – nothing. Because you cannot sit on a board for 10 years and then just tear everything down and start from scratch just because you have finally become Chairman. If something had been troubling me, I would not have waited to do something about it. That said, the Board of Governors at Swiss TPH is actually more of a supervisory body than a Board of Directors. It is my responsibility to ensure continuity in times of change.

But that doesn’t necessarily mean you don’t have certain priorities?
Absolutely not. Right now, there are neglected diseases such as sleeping sickness or a number of parasitic worm infections, which present a huge challenge to the health systems in many countries in the southern hemisphere. At the same time, I believe digitalisation has the potential to achieve great improvements in health care everywhere, including Africa. It is topics such as digitalisation in the health sector that particularly fascinate me as they go beyond my expertise in the legal field and are an ideal way to broaden my horizons.

So you will make a conscious effort to raise the profile of these topics at Swiss TPH?
Our operations are the responsibility of Swiss TPH Director, Jürg Utzinger and his team. I see my role as more akin to that of an initiator; my job is to question our strategies, come up with new ideas and put them to Swiss TPH.

Could you give a specific example?
The construction work on the BaseLink site in Allschwil is one project that we on the Board of Governors are actively supporting. It is an opportunity to found an institute in association with the University of Basel in the Canton of Basel-Landschaft itself, which is hugely significant in political terms. At the same time, it also gives us the chance to set up new facilities that are equipped with cutting-edge technology.

You have been campaigning for Basel as an economic hub for years. Yet Swiss TPH will be relocating to Allschwil as of 2020. Isn’t that something of a contradiction?
I am committed to Basel. It is my firm belief that the region will only prosper if we think beyond the 37 km² that form the Canton of Basel-Stadt. Even as Director of the Chamber of Commerce, I was never concerned whether a company decided to set up in St Louis or in Weil am Rhein. You have to consider the region as a whole and that includes the Alsace and Baden. Nowadays, everything is focused on Bern. I don’t think that’s right.

You can look back on a career in politics spanning 30 years, during which you developed quite a reputation for voicing your opinions.
I have mellowed since then.

Andreas Burckhardt

A member of the Liberal Democratic Party (LDP), Dr. Andreas Burckhardt quickly made a name for himself in the political arena. He was a member of the Basel Citizens Parliament from 1981 to 1989 and a member of the Citizens Council and president of the Bürgerspital Basel from 1989 to 1997. He became a member of the cantonal Parliament in 1997. Andreas Burckhardt reached the pinnacle of his political career in 2006/2007 when he became president of the cantonal Parliament. From 1994 to 2011, he was director of the Chamber of Commerce in both Basel Cantons, where he also oversaw a number of health projects in the fight against leprosy. In April 2011, he was named chairman of the Board of Directors at the Bâloise Group. Andreas Burckhardt joined the Board of Governors at Swiss TPH in 2014, initially as vice-chairman, before becoming chairman on 1 January 2016. He is married and has three children.

Yes, but the question is: Do you also make use of this particular quality to safeguard the interests of Swiss TPH?
Of course, my experience of politics in the Citizens' Community (Bürgergemeinde) and in parliament have helped me to deal with political bodies and administrative offices. I know the major objections you are likely to encounter there and how to overcome them. But that is quite different to running for office or dealing with the trenchant views you will encounter during a parliamentary debate. On the Board of Governors, the important thing is to represent the interests of Swiss TPH when dealing with different organisations, be they members or sponsors. In this case, it's not about debating – the point is to work together to find a solution.

Even so, it's surely no coincidence that a political heavyweight such as yourself has been chosen as Chairman of the Board of Governors?
I imagine they wanted someone from the economic sector who is also able to see the political side of things and can therefore take the lead in discussions.

What initiatives will you be spearheading as Chairman of the Board of Governors in the future?
One important measure will be to deepen the collaboration between the private sector and universities. We now receive core contributions by the governments of both the Canton of Basel-Stadt and the Canton of Basel-Landschaft, and we have to bear this joint support in mind at all times. On a personal note, it is also important for me that I continue to function as a sounding board for Jürg Utzinger and his team.

“Teaching Is Part of My Understanding of What Research Is All About”

On 1 January 2016, all Swiss TPH teaching activities were consolidated under a new Department of Education and Training (ET). Nino Künzli, deputy director and former head of the Department of Epidemiology and Public Health (EPH), heads the new department. He speaks about the transition, progress during the first year and the departmental vision for the future.

Can you explain the decision to move from a Teaching and Training unit to a Department of Education and Training?
The former Teaching and Training unit focused on professional postgraduate training, while bachelor, master and doctoral activities were largely the responsibility of others outside the unit. Many teaching activities and courses were managed and developed in an ad hoc way, which worked well while the institute remained small. But the retirement of key people, along with continuous growth of the institution’s staff and activities called for formal leadership and coordination. Notable changes in the learning landscape also required us to rethink many things. The new departmental structure will afford better coordination of activities and allow us to systematically determine gaps, overlaps and synergies between teaching activities.

You have a long history in public health research and led EPH for seven years. What was your interest in heading this new department?
I have always been interested and active in teaching – it is part of my understanding of what research is about – you share and learn from others, so teaching has always been on my agenda. As I approach the end of my career, I think of the future – what do we leave behind for the next generation? This position looks at how best to move forward and develop the future of teaching and training at Swiss TPH.

Nino Künzli

Nino Künzli is the Deputy Director of Swiss TPH and Dean of Study of the Swiss School of Public Health (SSPH+). He is a Professor of Public Health at the University Basel Medical School and heads Swiss TPH’s Department of Education and Training. He holds an MD from the University of Basel and an MPH and PhD from University of California Berkeley.

Künzli has conducted population health-oriented research for the last 25 years, with a particular focus on ambient air pollution and its cardiorespiratory health effects. His work in this field is reflected in more than 300 peer-reviewed articles, covering exposure science, epidemiological research and the integration of both into health impact assessment to serve policy makers, among other topics. He serves on national and international advisory committees, including those for the EU and WHO, and was formerly a member of two U.S. National Academy of Science committees in the field of air pollution sciences. Since 2012, he has been the President of the Swiss Federal Commission on Air Hygiene – the clean air advisory board of the Swiss Government. Künzli is Co-Editor-in-Chief of the *International Journal of Public Health*, owned by SSPH+ and published by Springer.

Around the same time that plans for ET were underway, I had become Dean of Study of the Swiss School of Public Health (SSPH+). I saw synergies with SSPH+ and thought the dual roles complimented each other well. On the one hand, SSPH+ seeks to bring together a community of teachers and trainers to secure a future public health work force. On the other, Swiss TPH is the largest constituency of SSPH+ with some 30 % of the inter-university faculty working at Swiss TPH. Half of the students in the largest SSPH+ PhD programme are supervised at Swiss TPH and we contribute to many SSPH+ teaching programmes.

What were the priorities for ET during its first year in operation?
A central task was to assess the teaching activities of our staff and establish transparency in planning and costs as strategic underpinnings of sustainable development. In terms of programmes, the MSc in Epidemiology has expanded from 90 to 120 ECTS and we have taken steps towards strengthening our PhD and professional postgraduate offerings. We have embarked on developing a marketing strategy to recruit more professional postgraduate students and fellowships, given increasing competition in the training landscape. A critical activity for ensuring quality across all Swiss TPH education and training products has been to streamline the course evaluation process. We have also taken stock of our capacities in eLearning and blended learning and launched the new inter-university SSPH+ eCampus platform.

eLearning is a key feature of many educational institutions these days. What is its role at Swiss TPH?
Swiss TPH has constantly explored modern teaching methods and this is reflected in the new department, with a unit dedicated to teaching technologies and didactics. Many of our courses and programmes use online tools and blended learning methods. The SSPH+ eCampus promotes eLearning among the Swiss public health science community and Swiss TPH spearheaded one of the first MOOCs offered by the University of Basel. These are excellent supports, but we must not forget that our roots and strengths lie in our ability to connect an international student body directly with multi-disciplinary expertise and global networks. Assembling students in class rooms where they work together in groups and debate and discuss is a unique selling point of the institute and offers a level of quality that we will not sacrifice just for the sake of reaching out to the masses.

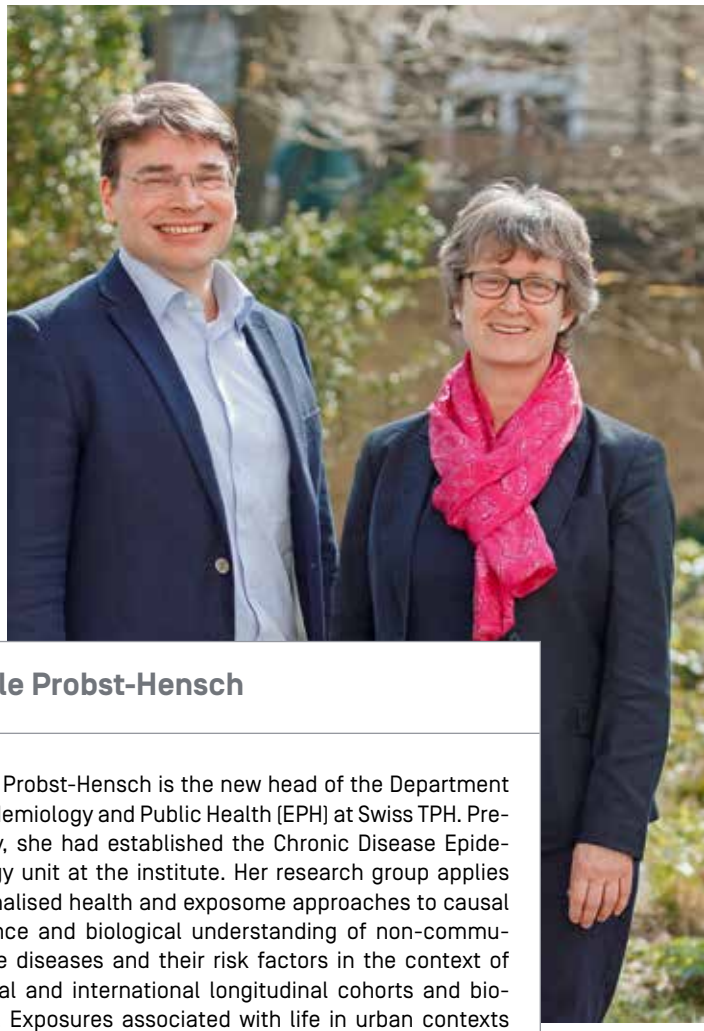
What is your vision for developing the department further?
Our overarching goal is that Swiss TPH should remain a leader in education and training, taking into account the current landscape, the evolving culture of learning and increasing interest in lifelong learning.

We need to find sustainable models to guarantee and build an academic public health workforce in the future. This is why we are expanding our Master programme and strengthening our PhD programmes and why we seek to collaborate with new public health oriented programmes at universities of applied sciences. We must strengthen a critical interdisciplinary mass through national and international collaborations. We are looking closely at our professional postgraduate offerings to make sure we have the right products for a changing audience. We are also working towards strengthening our junior academic workforce to increase their involvement in teaching, which will help to ensure a smooth transfer of about a third of all teaching commitments from soon-to-be retired colleagues over the next two to three years.

What challenges will you tackle in 2017?
We would like to see big funders coming in to support our global capacity building efforts by sponsoring fellowships that would allow students from around the world to profit from our programmes. At present, professional postgraduate programmes, such as our Master in International Health, the Master in Insurance Medicine or the MBA in International Health Management, must be fully covered through student fees given that postgraduate education in Switzerland is not supported by tax money. The strong Swiss franc makes us financially less competitive on the global market. Without fellowships, we risk losing the diversity of students that our educational offerings depend on.
In 2017, we will also continue to explore the current educational landscape, what we are doing and how we can best respond to training needs nationally and internationally, taking advantage of emerging opportunities and finding sustainable funding models.

Generation Change in the Departments

Sébastien Gagneux, a renowned tuberculosis researcher, now heads the Department of Medical Parasitology and Infection Biology (MPI) while Nicole Probst-Hensch, a gene-environment specialist, now heads the Department of Epidemiology and Public Health (EPH). Both have been elected to Swiss TPH's managing board.



Sébastien Gagneux

Sébastien Gagneux is the new head of the Department of Medical Parasitology and Infection Biology (MPI), succeeding Gerd Pluschke as of January 2016. Sébastien Gagneux is Associate Professor of Infection Biology at the University of Basel and head of the Tuberculosis Research unit at Swiss TPH. His research focuses on the evolution, ecology and epidemiology of *Mycobacterium tuberculosis*, the main cause of human tuberculosis. His work combines population genomics and genomic epidemiology with various experimental approaches to investigate the effect of bacterial variation on host-pathogen interaction and the spread of antimicrobial resistance.

Gagneux studied biology and medical parasitology at the University of Basel. His PhD focused on the molecular epidemiology of bacterial meningitis in Ghana. After several years of postdoctoral work on tuberculosis at Stanford University and at the Institute for Systems Biology in Seattle, he established his own research group at the Medical Research Council / National Institute for Medical Research in London. In 2010, Sébastien Gagneux joined Swiss TPH as a Swiss National Science Foundation Professor to set up the Tuberculosis Research unit.

Nicole Probst-Hensch

Nicole Probst-Hensch is the new head of the Department of Epidemiology and Public Health (EPH) at Swiss TPH. Previously, she had established the Chronic Disease Epidemiology unit at the institute. Her research group applies personalised health and exposome approaches to causal inference and biological understanding of non-communicable diseases and their risk factors in the context of national and international longitudinal cohorts and biobanks. Exposures associated with life in urban contexts (social stress, air pollution, traffic noise, physical inactivity, obesity) as well as infections in the context of dual disease burden studies are of particular interest. Probst-Hensch is the principle investigator of the only Swiss-wide population-based cohort and biobank, SAPALDIA.

She studied pharmacy at the ETH Zurich and earned a PhD from the University of Basel. She obtained a Master in Public Health and a PhD in Epidemiology from the University of California, Los Angeles. As a Visiting Research Assistant Professor at the Norris Comprehensive Cancer Center of the University of Southern California, she conducted research on gene-environment interactions in breast and colorectal cancer. Nicole Probst-Hensch established the National Institute for Cancer Epidemiology and Registration in Switzerland as its first director. She joined Swiss TPH in 2009 when she was elected Associate Professor of the Medical Faculty at the University of Basel. Probst-Hensch is a co-investigator of several Horizon 2020 projects and serves on various public health committees.

Insights

A Swiss–Tanzanian Research Partnership with a 50-year History

In 1966, Switzerland and Tanzania set the seal on the first official agreement on technical and scientific cooperation. Since then, Swiss TPH – along with its Tanzanian partners – has successfully implemented numerous health projects and programmes. A glance at the history of this partnership shows that with a permanent presence on site and an ability to adapt to new political and social circumstances, Swiss TPH has been able to establish itself as a reliable partner in Tanzania.

In terms of fighting against poverty-related diseases, strengthening health systems and setting up scientific institutions, Swiss TPH is one of Tanzania's most important partners today in its efforts to improve the health of the country's population. It began quite modestly, 70 years ago – with a handful of warthogs.

Missionaries and warthogs

In 1949, Professor Rudolf Geigy, the zoologist and founder of Swiss TPH, travelled through the Ulanga plain in Tanganyika, as Tanzania used to be called. Geigy was a guest of the Capuchin missionaries based in Ifakara, researching tsetse flies, which transmit African sleeping sickness. As part of his work, he drove a number of warthogs from their dwellings. Geigy suspected the animals to be carriers of the African tick-borne, relapsing fever. This hypothesis was not confirmed. Geigy's passion for warthogs, however, earned him the nickname "Bwana Ngiri" (Mr. Warthog) and, five years later, an invitation from the Capuchin Mission to set up his own field laboratory at St. Francis Hospital, which was run by the missionaries in Ifakara.

A middle class for a young country

In 1961, Tanganyika gained its independence. From then on, Swiss TPH no longer focused its attention solely on researching poverty-related diseases like sleeping sickness, river blindness and malaria, but also on the general development of the East African country. In his inaugural speech as Rector of the University of Basel in 1962, Geigy stressed that the next step was to train an "intellectual middle class" in the young African country. Together with representatives of Basel industry, he set up the Rural Aid Centre (RAC), an early example of a successful public-private partnership. His goal was to train "barefoot doctors" for the rural health system. The RAC later became a medical assistants training centre, the precursor of today's Tanzanian Training Centre for International Health (TTCIH).

Research partnership and health systems

During the 1970s and 1980s, a period of economic turmoil, the main goal was to cooperate with the local population and set up health systems. Health experts from Swiss TPH and the Swiss Agency for Development and Cooperation (SDC) helped to establish health systems at the district level. For the local government, improved health management and planning along with new funding mechanisms were the cornerstones of the health reform. The Tanzanian Essential Health Intervention Project was a key element. Besides in-depth health planning, the project introduced a "basket fund", a new financial instrument in the districts. The innovative feature of this project was that the international donors did not negotiate their health projects bilaterally with the Tanzanian government. Instead, the various stakeholders jointly defined the priorities for the health system in each district, and the donors amalgamated their contributions.

The "A to Z Textiles" company in Tanzania produces 30 million mosquito nets annually.

A new health insurance fund for Tanzania

The Swiss stakeholders drew on their experience from earlier projects and continued to develop them. Developing and implementing new financing models for providing health care to an impoverished Tanzanian rural population was the main focus. Today, the Health Promotion and Systems Strengthening (HPSS) project, financed by SDC, improves the basic health care of people in the rural Dodoma region. A general health insurance fund is the backbone of the project. For a fee equivalent to CHF 5 per year, the insurance policy guarantees basic health care for six members of the same household and access to the hospital – something completely new for rural Tanzania. The Tanzanian government is currently examining the possibility of transforming the health insurance model into a national health insurance scheme.

Mosquito nets reduce the number of malaria cases

Malaria control is another example of how Swiss projects can influence national health policy in Tanzania in the long term. Already in the 1990s, Swiss TPH was involved in research on mosquito nets treated with insecticides. The nationwide distribution of these nets led to a decline in the transmission of malaria in infants in the Kilombero district, from 60 % to 8 %. The NATNET Project, financed by SDC and implemented by Swiss TPH, has been supporting Tanzania's national malaria control programme over the last 12 years. In 2009 and 2010, more than 28 million nets were distributed across the country.

A clinic for chronic diseases

Since 2005, Swiss TPH has been assisting the Chronic Diseases Clinic in Ifakara (CDCI). Besides the medical treatment of HIV patients, the institute has a longitudinal cohort of more than 8,000 patients there, enabling important insights into the long-term success and challenges of antiretroviral treatment in rural Africa. Recently, the treatment of tuberculosis – a frequent comorbidity in HIV infection – was integrated into the CDCI. The Canton of Basel-Stadt supports the clinic with an annual donation of CHF 300,000. In addition to Swiss TPH, the university hospitals of Basel and Bern are also involved in the project.

Commitment to the population

These examples demonstrate that Switzerland is a reliable partner for Tanzania. The SDC and Swiss TPH have both put in place institutions and invested in training health care professionals. The former Swiss TPH field laboratory has been replaced by the Ifakara Health Institute, one of the most renowned research and training institutions on the African continent. Thanks to the commitment of the Novartis Foundation, TTCIH and the St. Francis University College of Health and Allied Sciences offer unique public health courses in rural Tanzania, while the St. Francis Hospital has consistently widened its area of activities – all this with a view to improving the health of the Tanzanian population.

Since the foundation of the Chronic Disease Clinic in Ifakara (CDCI) over 8,000 HIV patients have been treated.

Fighting Malaria in Papua New Guinea for 40 Years

Malaria has been the subject of extensive research in Papua New Guinea (PNG) for the past 40 years. Swiss TPH scientists have made seminal contributions to improving the malaria situation. However, new results show that there is still a long way to go until the disease is eliminated.

More than 280,000 malaria cases were registered in Papua New Guinea in 2014.

One day in 1976, two Australian scientists, Graham Mitchell and Michael Alpers, were on a plane flying from Melbourne to Canberra. On the flight, they made plans to develop a malaria vaccine at the Papua New Guinea Institute of Medical Research (PNG IMR), where Michael Alpers eventually went on to become the director. The island state in the Pacific Ocean seemed to be the perfect choice for a project of this kind; four out of five malaria pathogens that are dangerous to humans are indigenous to the island, and the PNG IMR had a good network of scientists from around the globe.

New malaria vaccination for children in endemic areas

"Back then, the prospect of malaria vaccination caused a lot of hype", Ingrid Felger remembers. Like many other researchers from the PNG IMR, the molecular biologist continued her career at Swiss TPH later on. The first epidemiological, immunological, genetic and entomological research activities began at the new field station in Wosera, in the province of East Sepik. In 1996 – 20 years after Mitchell's and Alpers's plane trip – the first test person was immunised in PNG with a vaccine made in the laboratory of an Australian biotech company. It was specifically developed for children in endemic regions and combined three different antigens. "This combination B vaccine marked a milestone in malaria research from which a great deal could be learnt for later vaccine trials", says Ingrid Felger. It was the first vaccine to successfully reduce the number of parasites in the blood. However, molecular-genetic tests revealed that the antigens in the vaccine were only effective against one group of the pathogen's strain-specific proteins. In order to develop an effective active ingredient, another antigen was needed; one that would also offer protection against a second large group of proteins. Although attempts were made to synthesise new antigen combinations, they were no longer tested on the population in Papua New Guinea.

Daniela Rodriguez-Rodriguez during a malaria survey in Madang Province.

Long-term teaching and research partnership

Swiss TPH and the Papua New Guinea Institute of Medical Research (PNG IMR) enjoy a long-term teaching and research partnership. Since 2007, the activities have been recorded in a joint Memorandum of Understanding. In addition to technical assistance in the laboratory, experts from Swiss TPH, for instance, develop all the molecular diagnostic tests for malaria at the PNG IMR. Furthermore, every year, master degree students from PNG are trained at Swiss TPH. Previous and ongoing graduates include:

Janet Gare (2006–2008), MSc thesis: *Molecular monitoring of HIV-1 reverse transcriptase mutations conferring drug resistance.* University of Basel, 2008

Sarah Javati (2009–2011), MSc thesis: *Detection of Plasmodium species gametocytes by quantitative reverse transcription PCR.* University of Basel, 2011

Celestine Aho (2010–2012), MSc thesis: *Diversity of disease and colonisation isolates of Streptococcus pneumoniae in Papua New Guinea.* University of Basel, 2012

Lincoln Timinao (2011–2013), MSc thesis: *Developing an SNP-based genotyping tool for Plasmodium falciparum gametocytes.* University of Basel, 2013

Diana Timbi (2014–2016), MSc thesis: *Changes in anti-malarial prescription, adherence to the new treatment guideline and treatment seeking for malaria following the introduction of a new treatment protocol in Papua New Guinea.* University of Basel, 2016

Grace Bande (2016–2018), MSc thesis: *Molecular diagnostic point-of-care tests for malaria and non-malaria fevers.* (ongoing)

Changing malaria epidemiology

Epidemiological research yielded extensive and important findings for successfully fighting malaria. For a long time, it was assumed that the malaria pathogen *Plasmodium falciparum* was the main cause of all malaria diseases and fatalities in PNG – until Blaise Genton and Valérie D'Acremont from Swiss TPH evaluated old epidemiological studies. They discovered that the *Plasmodium vivax* pathogen was also responsible for severe cases of malaria in the country. "This triggered a paradigm shift in malaria research in PNG", says Blaise Genton. "Suddenly, everyone started working on *P. vivax*." Although this was indeed an important finding, it dampened the hopes of those who had believed the disease could be rapidly eliminated in PNG.

Dormant malaria parasites

Unlike *P. falciparum* – the deadliest of all malaria parasites – *P. vivax* can survive in a dormant state in the liver of an infected individual for months or even years. Then, from one day to the next, the parasite invades the bloodstream and triggers the symptoms that are typical of malaria. Once in the blood, the pathogen is also infectious to mosquitoes. These so-called relapses play a major role in the spread of malaria in PNG. "Elimination of the disease is somewhat difficult at the present time", comments Blaise Genton, for that same reason. In order to control

an infection with *P. vivax*, one would have to target the hypnozoites, the liver-stage parasites, in all those affected. Unfortunately, that is not possible with the only effective medication available, as it has to be taken over a 14-day period and can trigger some rather severe side effects.

Major successes in malaria control

But even without an effective vaccine, efforts to contain malaria cases in PNG have been successful in recent years. Nicolas Senn and Ivo Müller demonstrated that malaria infections in infants could be reduced by 30 % if the children were given a malaria medication preventively during routine check-ups, regardless of whether the children had already contracted malaria at that point or not. The nationwide use of mosquito nets was a particularly important intervention for reducing new malaria cases. In this context, 2004 represented a new era in the fight against malaria in PNG when the Global Fund to Fight AIDS, Tuberculosis and Malaria contributed USD 16 million to the government's malaria control programme in PNG to support distribution of mosquito nets to the entire population. Manuel Hetzel, an epidemiologist from Swiss TPH, was in charge of evaluating the national malaria control programme and found proof of its success. Thanks to the programme, malaria infections rapidly declined by 80 %.

Various control strategies still required

With interventions ranging from vaccines and medications to mosquito nets, for decades, Swiss TPH researchers have successfully worked towards improving the malaria situation for the people in PNG. However, complete elimination of the disease is unlikely in the near future. To control the disease in the long run, it will be necessary to apply a combination of interventions and to strengthen the health system. Continued support for the national malaria control programme from international sponsors will also be critical. These are the only ways to safeguard and build on the successes achieved to date.

Selected Publications

Beck HP et al. (1994) Assessment of the humoral and cell-mediated immunity against the *Plasmodium falciparum* vaccine candidates circumsporozoite protein and SPf66 in adults living in highly endemic malarious areas of Papua New Guinea. *American Journal of Tropical Medicine and Hygiene* 51: 356–364.

Genton B et al. (2002) A recombinant blood-stage malaria vaccine reduces *Plasmodium falciparum* density and exerts selective pressure on parasite populations in a phase 1–2b trial in Papua New Guinea. *Journal of Infectious Diseases* 185: 820–827.

Müller I et al. (2003) The epidemiology of malaria in Papua New Guinea. *Trends in Parasitology* 19: 253–259.

Genton B et al. (2008) *Plasmodium vivax* and mixed infections are associated with severe malaria in children: a prospective cohort study from Papua New Guinea. *PLoS Medicine* 5: e127.

Senn N et al. (2011) Intermittent preventive treatment for malaria in Papua New Guinean infants exposed to *Plasmodium falciparum* and *P. vivax*: a randomized controlled trial. *PLoS Medicine* 9: e1001195.

Hetzel M & Müller I (2014) Focus issue on malaria. *PNG Medical Journal* 57: 1–4.

87 % of Papua New Guinea's population live in rural areas.

Half of All Refugees from Eritrea Suffer from a Parasitic Worm Infection

Swiss TPH supports researchers from around the world, such as Afona Chernet, a biologist from Eritrea. His refugee story differs from that of many others.

Dr. Véronique Sydow spreads a gel on the young woman's abdomen and moves a probe around carefully; it tickles, causing a bright laugh. The image on the ultrasound blurs, gains focus, blurs. Breathe in – hold. Breathe out. Good. Biologist, Afona Chernet, gives the woman from Eritrea a supportive smile and exchanges a few words with her in Tigrinya, the official national language of Eritrea. The press of a button and the image slides silently out of the device.

Last year, around 5,000 refugees from Eritrea sought asylum in Switzerland. According to a Swiss TPH study, 90 % of them suffer from vitamin D deficiency, 50 % from post-traumatic stress disorder and nearly 50 % from schistosomiasis, a chronic, progressive, parasitic worm infection. Many are examined and treated at Swiss TPH. Afona Chernet knows the refugees' health problems. He also has first-hand experience of flight and homelessness.

"Eritrea is in a permanent state of war", says Chernet. Freedom of speech or the freedom to choose your profession are not a given. Everyone is made to do military service. Chernet served in the army for eight years, studied biology and was sent to the front to fight against the country's enemy, Ethiopia. The government moved him to a military base, where he worked as a teacher. Later, he was obliged to teach in a secondary school and at the university in the capital, Asmara. In Eritrea, you are not your own master. "That's why it's so unbearable."

Dr. Sydow takes a box of praziquantel out of a cupboard, the best drug against schistosomiasis. One dose for today, and one to take in four weeks, but not on an empty stomach. The patient refuses to give a blood sample – she's afraid of needles.

Afona Chernet received a grant from the Japanese government. "A gift from God", he says. The military government exploited the opportunity for publicity; the whole world should see what the country was doing for its most talented students. For Chernet, the grant came at the right time – he was just about to leave Eritrea via the Sudanese border.

In his new home, Hokkaido, he studied physiology and was impressed with the quality of the studies and with his teachers. However, Japanese culture remained alien to him and he found it difficult to make friends outside the university. After a year, he was ready to leave. He contacted Marcel Tanner, the former director of Swiss TPH, applied for a doctoral position and was accepted. "A win-win situation", says Tanner. "At Swiss TPH, Chernet can continue his scientific career and make an important contribution to the health of migrants." However, the break with his past is final; to return to Eritrea would be life-threatening. Afona Chernet is considered a traitor, a spy, polluted by the outside world.

It took a long time for his parents to understand his decision. It has been seven years since he last saw them. He only rarely hears their voices on the phone as there is no electricity in their apartment in the Asmara suburb. Chernet is not homesick. "Home is where my friends are", he says. And they left Eritrea a long time ago.

At the moment, he has little time for friends. His doctorate requires a lot of time and energy, and many of his former companions now live in the USA. They phone and swap news via Facebook. Chernet is trying to make contact with the opposition party in Switzerland, but he is no politician. He knows he can have the biggest impact on his fellow countrymen's health at Swiss TPH.

Swiss TPH's Afona Chernet helps to improve the health of Eritrean refugees in Switzerland.

Afona Chernet leads the patient to the door and says her GP should contact him. He stands on the threshold of the consulting room for a moment and watches the young woman leave.

It took a long time before he could talk openly about the situation in Eritrea. It was easier for him than for others because he was able to keep a fragment of inner peace – because he was privileged, because he was not tortured, because he could go to university and leave Eritrea legally.

Chernet A et al. (2017) Accuracy of diagnostic tests for *Schistosoma mansoni* infection in asymptomatic Eritrean refugees: serology and POC-CCA against stool microscopy. *Clinical Infectious Diseases*: in press (DOI: 10.1093/cid/cix366).

The health of Eritrean refugees in Switzerland

Most asylum seekers in Switzerland come from Eritrea. For the first time, a Swiss TPH study examines the health of Eritrean refugees. It shows that most refugees suffer from mental stress, 90 % from vitamin D deficiency and nearly half from schistosomiasis, a chronic, progressive worm infection. The disease cannot be transmitted from person to person. People in Switzerland are therefore not in danger. Most refugees do not know about their infection. Swiss TPH, therefore, suggests that all new arrivals are routinely examined for certain diseases. Only then can those affected be treated simply and cheaply and avoid lengthy complications.

Swiss TPH – a Pioneer in Aligning Travel Medicine Internationally

Since 2000, Swiss TPH has led the Expert Committee for Travel Medicine (ECTM). It assembles travel medicine experts from Europe and beyond. Their ultimate aim is to harmonise travel recommendations worldwide.

Expert commission to harmonise health-related travel recommendations

Given a lack of evidence and preventive tools, not all countries issue the same medical information for travellers, resulting in differing recommendations for malaria prophylaxis, vaccinations or prevention of infectious and non-communicable diseases. In an effort to internationally align travel medicine, Swiss TPH leads the Expert Committee for Travel Medicine (ECTM) bringing together travel medicine experts from across Europe since 2000.

The goal of ECTM is to establish and expand an international platform to develop, implement and evaluate evidence-based and practical health recommendations for travellers to risk areas. Specifically, ECTM aims to build a conceptual framework to translate health risks into practical and evidence-based recommendations. The committee also intends to generate evidence on travel health risks for specific groups such as infants, children, pregnant women, immune-compromised and chronically-diseased travellers, seniors and the elderly.

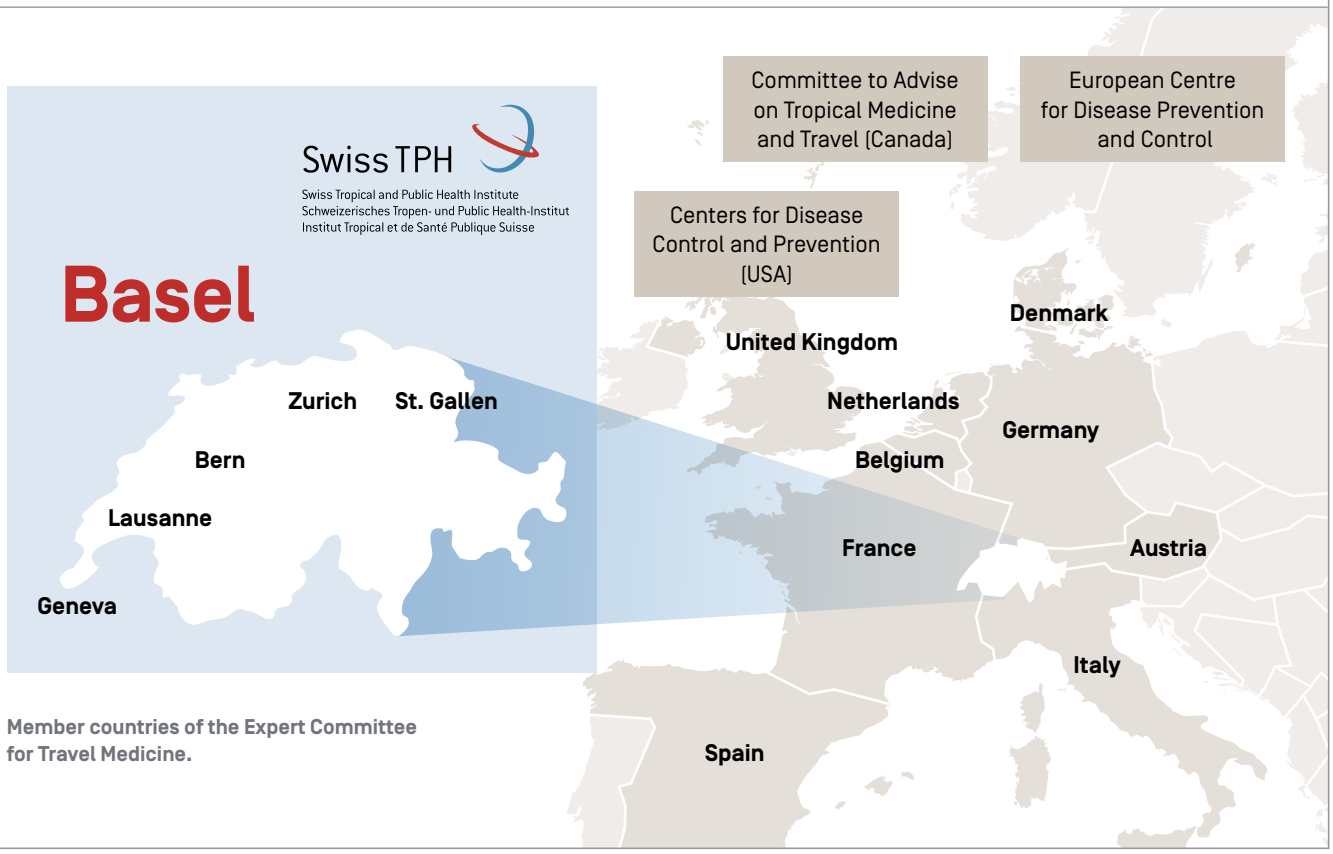
Expanding the group beyond Europe

For the first time, in December 2016, ECTM invited representatives from the American Centers for Disease Control and Prevention (CDC), the Canadian Committee to Advise on Tropical Medicine and Travel (CATMAT) and the European Centre for Disease Prevention and Control (ECDC) to their annual meeting. Meeting participants discussed travel recommendations on malaria prevention and vaccinations such as yellow fever.

Moving forward, the committee aims to involve other stakeholders such as insurance companies, the International Air Transport Association (IATA), repatriation agencies and the travel industry.

Swiss TPH is a national reference centre for imported parasitic diseases.

Expert Committee for Travel Medicine



Member countries of the Expert Committee for Travel Medicine.

Harmonisation reached to date

To date, ECTM has successfully streamlined some travel-health related recommendations, such as in malaria prevention strategies, vaccination guidance and prioritising travel advice. For instance, travel destinations were defined where preventive chemoprophylaxis is required, given the high risk of malaria, versus those where a standby emergency treatment and mosquito bite prevention may be sufficient.

The experts also unanimously accepted the need for hepatitis A vaccination in countries with poor hygiene status. ECTM also recommends further research to build evidence around neglected diseases such as rabies and Japanese encephalitis. Finally, the group agreed on closely collaborating to make recommendations for other types of risks, such as accident prevention and mental health topics.

History of the Expert Committee for Travel Medicine

In the early 1980s, travel medicine experts from Swiss TPH and the University of Zurich joined forces to compile practical recommendations for travellers. In 1987, they founded the Swiss Working Group for Travel Medicine, which later became the Expert Committee for Travel Medicine (ECTM).

Starting with representatives from five Swiss universities, the Federal Office of Public Health, specialist societies and the Swiss National Airline, ECTM was gradually enlarged. In 2000, Germany joined, followed by specialists from Austria, the United Kingdom, the Netherlands, Italy, France, Sweden and Denmark.

ECTM is part of the European Network for Tropical and Travel Medicine (TropNet) and advises the Swiss Federal Office of Public Health.

Prof. Dr. Christoph Hatz, Chief Medical Officer of Swiss TPH, has chaired the committee since 2000.

Expertenkomitee für Reisemedizin
Comité d'experts pour la médecine des voyages
Comitato di esperti per la medicina di viaggio
Expert committee for travel medicine

Health in Switzerland under Scrutiny

From cardiovascular diseases and lung cancer to measles, Swiss TPH researchers continuously try to identify health risks for the Swiss population. The research results serve to improve the Swiss health system.

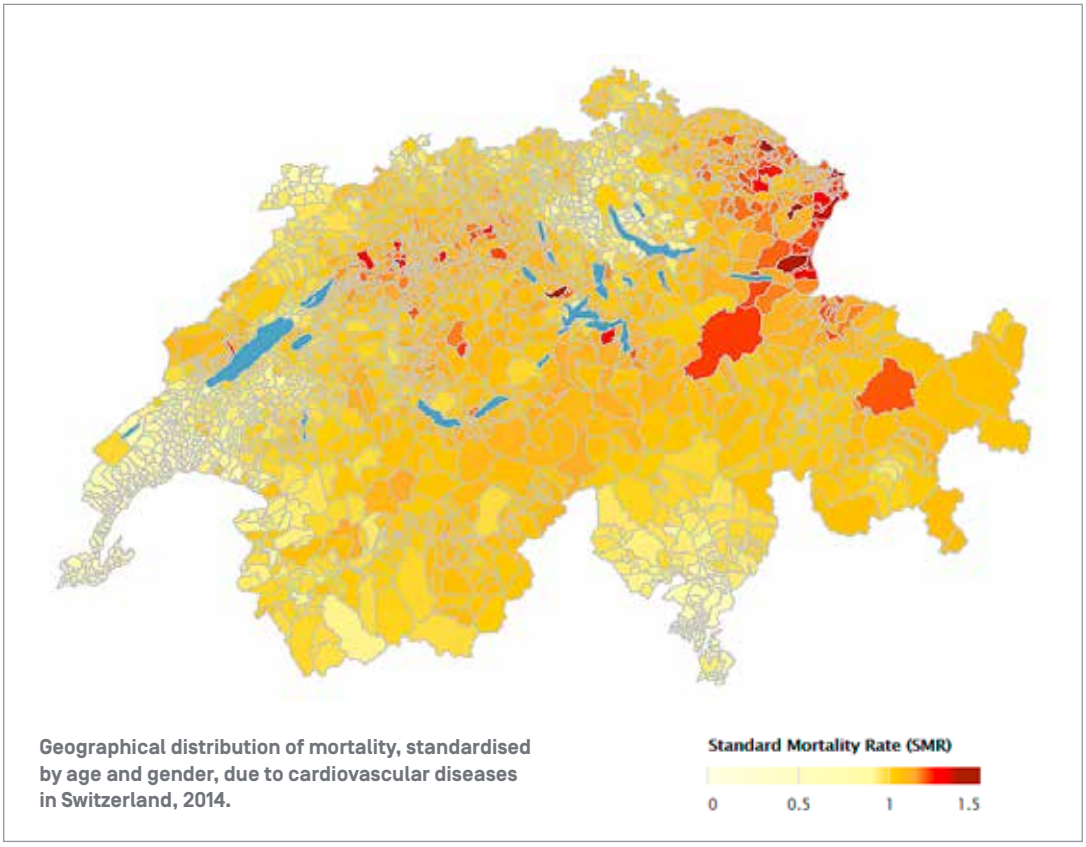
Diseases affecting the Swiss

Environmental influences and lifestyle have a major impact on the Swiss' risk of disease and mortality. Researchers at Swiss TPH investigated the geographical distribution of the mortality risk in Switzerland. In this context, major regional differences were revealed with regard to the risks of dying of cardiovascular diseases, lung cancer or cirrhosis of the liver.

The place of residence also affects the mortality risk, as demonstrated by the Swiss mortality atlas drawn up by Swiss TPH. Researchers analysed death certificates from 2008 to 2012 and, on that basis, drew up a geographical map of the mortality risks related to various causes of death in Switzerland. This revealed major regional differences, particularly with regard to the distribution of lung cancer, cirrhosis of the liver and cardiovascular diseases.

French-speaking Swiss die more frequently of lung cancer or cirrhosis of the liver

Not everyone in Switzerland faces the same risk of dying of lung cancer or cirrhosis of the liver. New data show that the French-speaking Swiss are affected to a far greater degree than the German-speaking Swiss. One explanation for this is tobacco and alcohol consumption.



Geographical distribution of mortality, standardised by age and gender, due to cardiovascular diseases in Switzerland, 2014.

The French-speaking Swiss apparently reach for their cigarettes more frequently than the German-speaking Swiss, and in French-speaking Switzerland and Ticino, twice as much alcohol is consumed than in German-speaking Switzerland. Nevertheless, the biggest drinkers are not only found in French-speaking Switzerland. According to the mortality atlas, Basel tops the nationwide statistics for liver damage. Zurich is also one of the municipalities with the highest rates.

German-speaking Swiss particularly affected by cardiovascular diseases

Cardiovascular diseases are the leading cause of death in Switzerland, accounting for more than one-third of all fatalities. However, for the German-speaking Swiss, the risk of dying of a cardiovascular disease is much higher than in French-speaking Switzerland. "We attribute this phenomenon to the different lifestyles in the different regions", says principal investigator, Penelope Vounatsou from Swiss TPH. High blood pressure, an unhealthy diet and a lack of physical exercise all contribute to an elevated risk of cardiovascular diseases.

Lack of prevention

A high mortality rate is not only an indicator of the risk of disease but also of the quality of the health care system. In contrast to mortality statistics, epidemiological studies can directly measure access to medical care and the success of treatment among the population. Results from the SAPALDIA cohort showed that, in Switzerland, almost 50 % of people with high blood pressure are unaware of it. For the 40 % of people with medically certified high blood pressure, it is simply poorly monitored. "High blood pressure is a very important risk factor for cardiovascular diseases. Regional differences in diagnosing and treating high blood pressure may explain some of the observed differences in mortality rates", says Nicole Probst-Hensch, principal investigator for SAPALDIA.

Chammartin F et al. (2016) Mortality atlas of the main causes of death in Switzerland, 2008–2012. *Swiss Medical Weekly* 146: w14280.

Eze IC et al. (2016) Air pollution and diabetes association: modification by type 2 diabetes genetic risk score. *Environment International* 94: 263–271.

Walther D et al. (2016) High blood pressure: prevalence and adherence to guidelines in a population-based cohort. *Swiss Medical Weekly* 146: w14323.

Two doses of a MMR vaccine offer lifelong protection against measles, mumps and rubella.

Reservation about measles vaccination in Switzerland

Switzerland is regularly afflicted by outbreaks of measles. For instance in 2006 and 2009, around 4,500 cases of infections were notified. Vaccination cover varies from canton to canton, ranging from 50 % to 93 %. A new study conducted in the Canton of Aargau confirms that a substantial number of parents are increasingly sceptical about measles vaccination. The health authorities are wise to continue their efforts to raise awareness among the population about the safety and benefits of vaccinations, the authors of the study conclude.

A negative attitude towards vaccinations is by no means as rare as sometimes assumed. A Swiss TPH study looked at the attitude of parents towards measles vaccination in the Canton of Aargau, revealing that most parents think that vaccination makes sense and vaccinate their children against this highly infectious virus. A second group is rather sceptical about vaccination but, as a rule, they follow the recommendations of the Federal Office of Public Health (FOPH). However, parents in a third group feel that the side effects of vaccination are just as severe as the illness itself. They argue that vaccination is less effective than the development of "natural" immunity in children.

Different ideas about disease and health

"This negative attitude has nothing to do with the parents' lack of knowledge", says Sonja Merten from Swiss TPH. "These parents have a different view about what it means 'to live healthily'". For the study, detailed questionnaires were evaluated from 190 parents of children under the age of three years.

Weiss C et al. (2016) Parental attitudes towards measles vaccination in the Canton of Aargau, Switzerland: a latent class analysis. *BMC Infectious Diseases* 16: 400.

Developing New Treatments for Multidrug-Resistant Tuberculosis

The treatment of tuberculosis (TB) is lengthy and carries many side effects. Cases of multidrug-resistant TB are rapidly increasing, particularly in Eastern Europe, Russia and Central Asia, often with fatal outcomes. Now, the safety and efficacy of new combination therapies are being tested in a clinical phase II/III trial across sites in three countries, Uzbekistan, Belarus and South Africa. The aim of the trial is to develop a treatment that is more efficacious, more tolerable and shorter in duration.

The Pharmaceutical Medicine unit at Swiss TPH managed the project during the set-up phase. Today, it is responsible for monitoring the study centres. The trial is run and sponsored by the international medical humanitarian organisation, Médecins Sans Frontières (MSF), and is supported by the London School of Hygiene & Tropical Medicine, as well as other leaders in medical research.

Multidrug-resistant TB on the rise

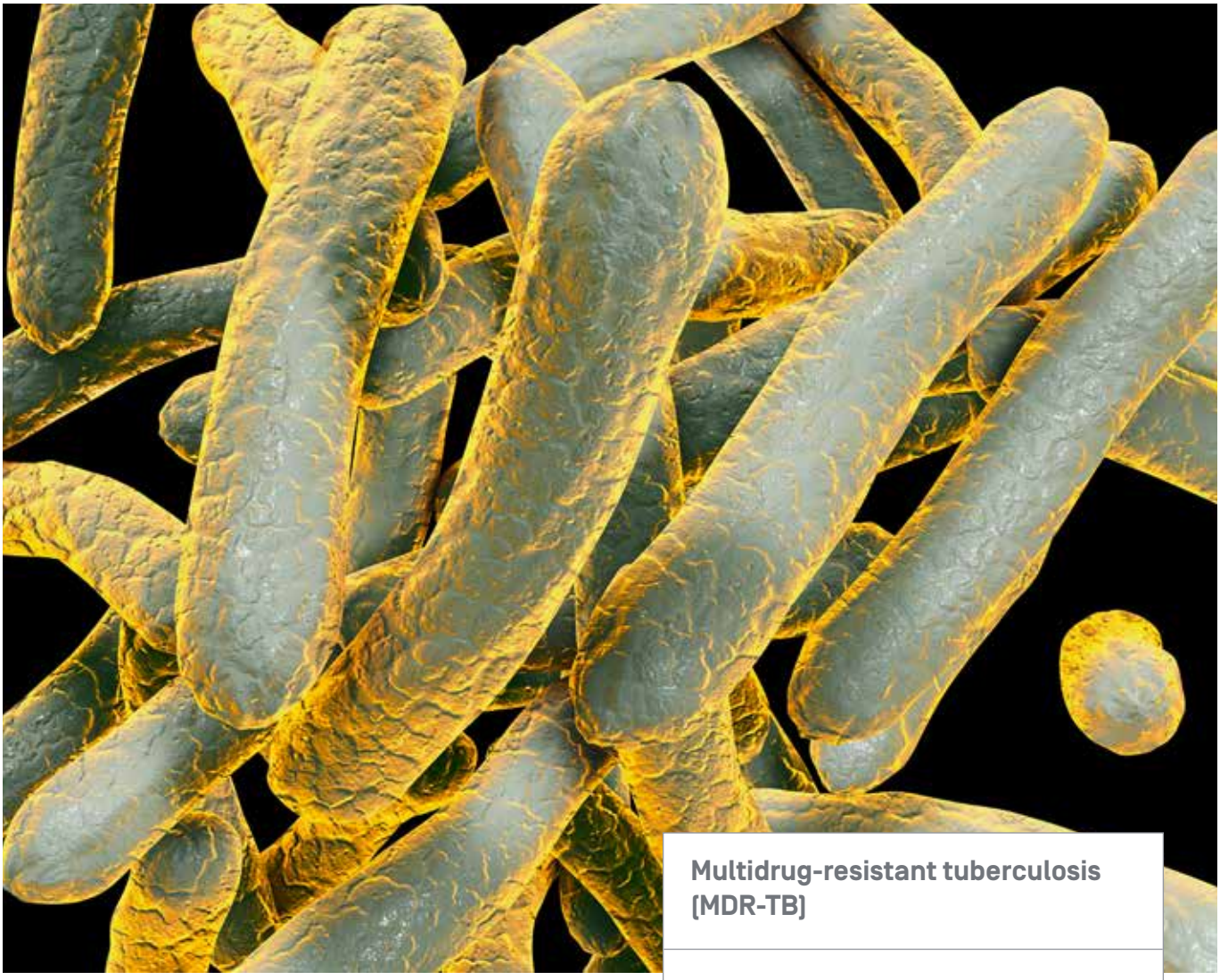
Tuberculosis is advancing in many countries. In recent years, several TB bacteria have developed resistances to conventional antibiotics. The former Soviet republics are particularly affected by multidrug-resistant TB, partly because antibiotics are often sold there without a prescription. Given the severe side effects, many TB patients prematurely terminate the lengthy treatment. This further promotes the development of multidrug-resistant bacteria. The TB PRACTECAL study (PRAgmatic Clinical Trial for Effective, Concise And Less-toxic treatment regimens) in Uzbekistan is testing new drug combinations to treat this infectious disease. The trial also includes representatives of two novel drug classes, bedaquiline and pretomanid. The trial was launched in Karakalpakstan in Western Uzbekistan – a region in which no clinical trial had ever been conducted before.

Training, infrastructure and patient safety

"The biggest challenge was to develop an understanding of the qualitative, ethical and regulatory requirements of clinical trials locally and to create the necessary preconditions for them", says Swiss TPH's Aita Signorell, Clinical Trial Manager of the project. The team of the Pharmaceutical Medicine unit at Swiss TPH was responsible for the organisation and smooth operation of the trial. Experts provided support to make available the necessary infrastructure and trial documentation. They trained local health care professionals in good clinical practice (GCP) and ensured the safe storage of the medications as well as compliance with the highest international ethical standards and patient safety.

Long-term experience in conducting clinical trials

The region in Western Uzbekistan constitutes new territory as a trial site for the Pharmaceutical Medicine unit, too. However, the team can draw on many years of experience in conducting clinical trials in the Democratic Republic of the Congo and other low-income countries. "We are familiar with many challenges from our work in Africa", says Suzanne Gajewski, Clinical Research Associate in the project. Water shortage, poor Internet connection and safe storage of patient files and medications are only some of the problems that have to be taken into account when planning a clinical trial of this kind. The trial began in January 2017. In a first phase with 240 patients, safety and preliminary efficacy data on three different drug combinations will be collected. The first results of this phase are expected in 2018. A second phase up to 2020 will examine the efficacy of the most promising of the combination therapies. To this end, a total of 630 patients will be included in the trial. Preparations are currently under way to extend the trial to Belarus and South Africa.



480,000 new cases of MDR-TB were diagnosed worldwide in 2015.

Multidrug-resistant tuberculosis (MDR-TB)

Just under 1.8 million people die of tuberculosis every year. Multidrug-resistant pathogens are gaining ground around the globe. The World Health Organization (WHO) defines MDR-TB as a form of tuberculosis where the pathogen is resistant simultaneously to at least the two most efficacious first-line drugs, isoniazid and rifampicin. In 2015, 480,000 new cases of MDR-TB were recorded worldwide, and the treatment success of MDR-TB was 52 % in 2013.

Managing Chronic Diseases through Integrated Care

Non-communicable diseases (NCDs) are the major health and development challenges of the 21st century. More than two thirds of global deaths are due to NCDs and they are on the rise. This calls for tailoring health systems to better meet the increasing demand and the specific needs of chronic disease patients and to reduce risks at population level.

Together with national partners, Swiss TPH has been strengthening multi-sectoral approaches to treating, managing and preventing non-communicable diseases (NCDs) in Eastern Europe, the Balkans and Central Asia.

Complexity of NCD care

Contrary to most acute diseases, NCDs cannot be cured and require life-long treatment in order to help maintain a reasonable quality of life for patients. Appropriately managing NCDs typically requires a range of services, such as health care, social services, home-based care, daily life support, patient activation through self-help strategies and increased physical activity, among others.

Patients, therefore, need to interact with many different entities that are not necessarily coordinated or aligned with each other. Apart from inefficiencies, such as duplication of services or care gaps, this can also cause patient dissatisfaction, negatively affecting treatment adherence and, ultimately, health outcomes. For these reasons, the World Health Assembly 2016 formulated its target for people-centred integrated care around better meeting the needs of patients.

In recent years, Swiss TPH has built up broad expertise in designing multi-sectoral approaches to treating, managing and preventing NCDs.

Shift to integrated care models

Given the increasing burden of NCDs in many societies, health service response needs to shift from single disease-specific care towards managing chronic long-term conditions, with a focus on improving quality of life and wellbeing of people. This entails adding and coordinating multi-sectoral measures involving social services, education, physical activity programmes and others.

For more than 15 years, Swiss TPH has supported health sector reforms in Eastern Europe and Central Asia to move away from over-specialised hospital care towards decentralised and comprehensive care provided by family medicine. Family medicine is close to people and thus better suited to managing chronic patient conditions by establishing long-term relationships, offering a broader set of services and coordinating a wider service network in a more cost-effective way. In Romania, for example, Swiss TPH supported family physicians and community nurses to increase pre-natal visits of pregnant women.

On behalf of the Swiss Agency for Development and Cooperation (SDC), Swiss TPH works with training institutions in Tajikistan to ensure that family doctors and family nurses are equipped with clinical skills and gain early patient exposure under the guidance of more experienced staff. Primary healthcare managers are trained in health management and planning skills. A business planning approach has been piloted in six districts and is now being scaled up under the leadership of the Ministry of Health and Social Protection.

Meeting patients' needs in Kosovo

Swiss TPH works with partners in several countries across Eastern Europe, the Balkans and Central Asia to improve the quality of life for NCD patients and to facilitate the management of care across multiple actors and service providers. In Kosovo, for example, Swiss TPH implements the Accessible Quality Healthcare (AQH) project, funded by SDC. AQH improves the quality of care, promotes health-seeking behaviour and integrates services in twelve municipalities.

Research on NCDs and the dual-disease burden

Apart from project implementation, Swiss TPH conducts research in the field of non-communicable diseases (NCDs). One objective is to improve the understanding of the dual-disease burden and interactions of infectious diseases with NCDs. For example, household air pollution can lead to repeated respiratory tract infections, while diabetes increases the susceptibility to tuberculosis.

By studying biobanks that are embedded in longitudinal cohorts, Swiss TPH looks at disease and risk factor relationships and their underlying mechanisms and aims to identify patterns consisting of lifestyle, social, environmental and genomic factors that cause or prevent NCDs.

In close collaboration with the Kosovo Ministry of Health, the programme defines the needs for updating clinical standards for family health, engages in capacity building for physicians and nurses, provides some medical equipment and trains facility managers in quality improvement mechanisms so that the health care providers are ready for the task.

The programme also works with the local authorities, helping them to better engage in the health of its citizens by establishing health profiles of their municipality to assess the health needs of the people. Demographic data, disease profiles, environmental and behavioural risk factors or information on tobacco and alcohol consumption, etc. form the basis for a joint action plan, where all parties collaborate for better health.

Finally, the project informs people about NCDs, such as hypertension, diabetes and chronic lung disease, in order to help them prevent disease outbreak, manage daily life with the disease and be aware of patients' rights. Hence, services are grouped around the needs of people and patients, coordinated by the municipalities and based on jointly developed and transparent intervention plans.

Non-communicable diseases (NCDs)

- Of 56 million global deaths in 2012, 38 million (or 68 %) were due to NCDs. In addition, more than half of all disability in the world arises from NCDs.
- 75 % of NCD deaths occur in low- and middle-income countries. NCDs are closely linked to poverty as their disabling effect reduces employment, income and quality of life.
- Cardiovascular diseases account for most NCD deaths, or 17.5 million people annually, followed by cancers (8.2 million), respiratory diseases (4 million) and diabetes (1.5 million).
- Contributing factors include aging populations, environmental factors related to rapid urbanisation, unhealthy lifestyles and nutritional habits.

(Source: WHO)

2016 R. Geigy Award for Efforts against Neglected Diseases

Giovanna Raso from Swiss TPH and Jean T. Coulibaly from the Université Félix Houphouët-Boigny and the Centre Suisse de Recherches Scientifiques en Côte d'Ivoire (CSRS) are the joint winners of the 2016 R. Geigy Award. The R. Geigy Foundation recognised their research and services in the fight against neglected diseases in West Africa. We met with both scientists to discuss research policy, the challenges of low-income countries and the key moments of a successful research partnership.

Every researcher dreams of a well-equipped laboratory in the UK or the USA. You worked in Côte d'Ivoire, a country with widespread poverty, especially in rural areas. What inspires you?

Jean T. Coulibaly: For me, it's about making an impact where science is of the most benefit – where the people are. It's very satisfactory to see that you can improve the health of people with simple means, such as a rapid test against the worm infection, schistosomiasis. Often, you don't need elaborate technology – which can't be used in rural areas anyway.

Giovanna Raso: It can be disheartening when you know that over 20 % of schoolchildren are suffering from a worm infection. On the other hand, there are many local researchers who want to contribute to improving the situation, which also inspires me to assist.

What are the everyday difficulties?

Jean T. Coulibaly: Everyone thinks lack of money is the problem. But that's not the case. The problems lie more in the excessive bureaucracy, the effort to keep pace with rapidly developing communications technology and our understanding of time. Our sense of time is probably one of the main reasons for the poverty in Côte d'Ivoire.

Giovanna Raso: The political instability of recent years in Côte d'Ivoire has made scientific work even more difficult. During the civil war, in particular, research inside the country was sometimes impossible because you didn't want to endanger the team unnecessarily. We also need to thank the CSRS management, the local researchers and those responsible in Switzerland for not stopping activities during the civil war. This creates additional trust among the population.

To what extent are your results acknowledged by the government and how can they influence health policy in Côte d'Ivoire?

Jean T. Coulibaly: Our results are acknowledged by the responsible government departments, there's no question of that. However, researchers and politicians often have different priorities. To put it somewhat pointedly, the former look at the results, the latter at the costs.

Giovanna Raso: A good example is the building of toilets. To control worm infections, the WHO recommends a combination of treatment, communicating knowledge about hygiene and building toilets. However, the concern with toilet construction, in particular, is that it will blow the budget, even if the population wants to help. We were able to show in a study that a mix of locally adapted interventions achieved better and faster control of these diseases, and that this saved costs over the long term.

Were there any of the famous key moments in your careers which shaped you as scientists?

Jean T. Coulibaly: In 2016, we were in the small village of Nyan in southern Côte d'Ivoire for a clinical study. A young villager spread the rumour that we were misusing the blood we

About the R. Geigy Award

In memory of the biologist and founder of the Swiss Tropical Institute, Rudolf Geigy, the R. Geigy Foundation presents this award every two years to young researchers who have distinguished themselves with excellent work in the areas of neglected diseases or public health. The award is bestowed with CHF 20,000.

Giovanna Raso

Epidemiologist, Giovanna Raso, researches measures for the improvement of health in rural populations in Côte d'Ivoire. Her special focus areas are parasitic worm infections and sanitary hygiene. In her research project, Raso currently investigates the combined influence of pharmaceutical therapies, toilet construction and educational measures in schools and villages. Her work forms the basis for further health care recommendations, for example, from the WHO. Giovanna Raso received her doctorate from the University of Basel and Swiss TPH in 2004 and now works as a project leader at Swiss TPH.

collected for commercial purposes. It became clear to me only afterwards that you have to take the concerns of the local people seriously, and that it requires extra effort to explain our intentions to the people and inform them about the results at the end.

Giovanna Raso: What very much impressed me as a young epidemiologist was the fact that many people in Côte d'Ivoire suffer from several infections at the same time. Schoolchildren have malaria parasites in their blood and also suffer from worm and gastrointestinal protozoan infections. Despite that, the children go to school as if everything was normal.

Jean T. Coulibaly

Epidemiologist Jean T. Coulibaly heads the Monitoring and Evaluation unit at the Centre Suisse de Recherches Scientifiques en Côte d'Ivoire (CSRS). He researches the spread and transmission of schistosomiasis and other worm infections in his home country of Côte d'Ivoire. Coulibaly develops and evaluates new diagnostic methods for improved early detection and medications for the treatment of worm infections. Thanks to his research work, schistosomiasis pathogens can now be detected in the urine using a rapid test. Time-consuming examinations of stool samples are no longer absolutely necessary. In collaboration with the research group of Jennifer Keiser at Swiss TPH, Coulibaly is also involved with clinical studies investigating deworming treatments. Jean T. Coulibaly received his doctorate from the University of Basel and Swiss TPH in 2012.

2016 – In Brief

Generating, Sharing and Applying Knowledge

Swiss TPH currently focuses on 14 key areas of activity, with an overall goal of improving the health of disadvantaged populations, in particular.

Researching poverty-related diseases, such as malaria, African sleeping sickness and tuberculosis, is one of Swiss TPH's main tasks. Research findings are, in turn, used to develop diagnostic products, compounds and vaccines. Other important topics include monitoring and modelling communicable and non-communicable diseases, determining environmental influences on health and strengthening health systems.

From innovation to application

In terms of strategy, the institute follows the developmental path from an idea or laboratory results, to validation in the field and then to broader applications among populations. Together with local partners, experts from various disciplines implement promising and scientifically proven approaches in health programmes. Swiss TPH's most important clients include the Swiss Agency for Development and Cooperation (SDC), the Global Fund and the Bill & Melinda Gates Foundation. New knowledge is also transferred through training and further education for students and specialists – both at Swiss TPH in Basel and on site in countries around the world.

Reacting to global threats

New global health problems led to the formation of three new fields of activity in 2016, namely in the areas of "Emerging Infectious Diseases", "Personalised Health" and "Mobility, Migration and Health".

Key areas of activity 2016

- **Basic Research and Infection Biology**
- **Preclinical Research and Development**
- **Clinical Research and Development**
- **Molecular and Genetic Epidemiology**
- **Emerging Infectious Diseases**
- **Statistical and Mathematical Modelling**
- **Personalised Health**
- **Environmental Epidemiology**
- **Health in Socio-Ecological Systems**
- **Society, Culture and Health**
- **Sexual and Reproductive Health and Gender**
- **Health Systems and Policy**
- **Travel and Tropical Medicine**
- **Mobility, Migration and Health**

Niklaus Labhardt performs an HIV test in Lesotho.

Basic Research

A new chemotherapeutic strategy against trypanosomes

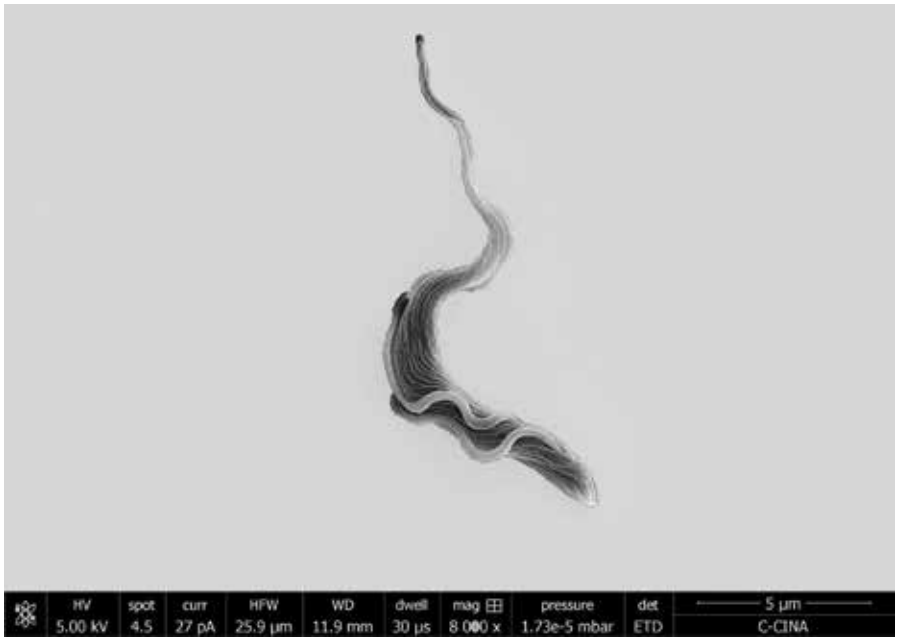
A protein coat protects trypanosomes, the pathogens causing African sleeping sickness, from the human immune system. Researchers have discovered molecules that breakdown this coating. Without the protein coat, the trypanosomes cannot survive. This breakthrough offers new possibilities for treating African sleeping sickness.

→ Wenzler T et al. (2016) A new approach to chemotherapy: drug induced differentiation kills African trypanosomes. *Scientific Reports* 6: 22451.

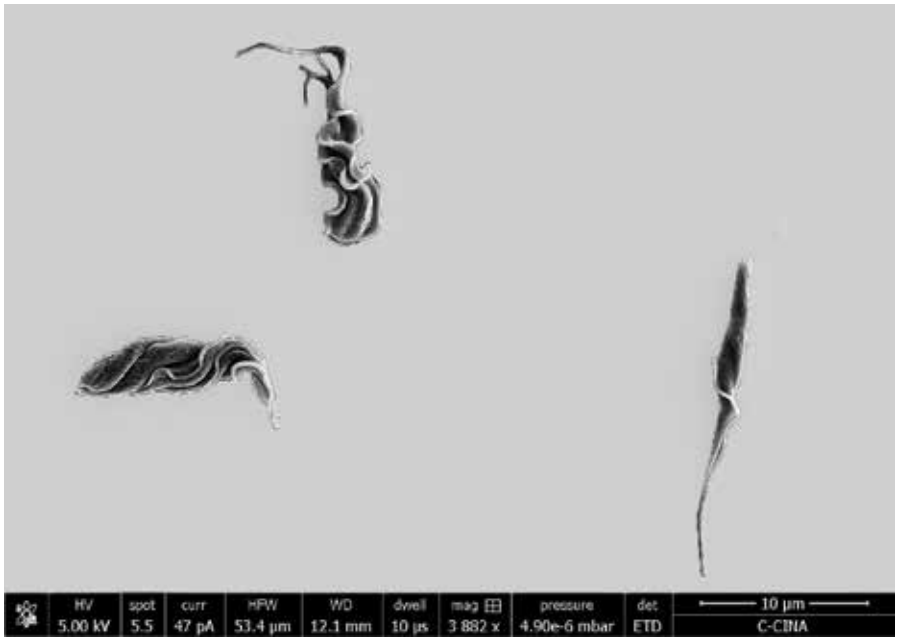
Malaria pathogens fool the immune system

Malaria-inducing *Plasmodia* pathogens employ an effective trick for impairing the body's ability to fight infection. The PfEMP1 protein they produce causes infected red blood cells to stick to the wall of blood vessels; in this way, the *Plasmodia* suppress an immune response. A new study illustrates the central role of PFE1605w in this process, which stabilises PfEMP1 in the cell membrane. If absent, fewer red blood cells adhere to the vascular walls.

→ Oberli A et al. (2016) *Plasmodium falciparum Plasmodium* helical interspersed subtelomeric proteins contribute to cytoadherence and anchor *P. falciparum* erythrocyte membrane protein 1 to the host cell cytoskeleton. *Cellular Microbiology* 18: 1415–1428.



***Trypanosoma brucei*, the pathogen causing sleeping sickness, before...**



... and after drug treatment.

Researching Poverty-related Diseases

The biological research of pathogens and their transmission is one of Swiss TPH's core activities. There is a special focus on poverty-related diseases, such as malaria, African sleeping sickness, parasitic worm infections and tuberculosis. Research findings are used, in turn, to develop new medicines, diagnostic tests and vaccines.

Basic Research

Number of projects

30

Research projects	97 %
Implementation projects	3 %

Antibodies neutralise Buruli ulcer effects

The *Mycobacterium ulcerans* pathogen produces a toxin – mycolactone – that causes the typical skin lesions seen in patients with Buruli ulcer disease. Using a new method, scientists have successfully synthesised antibodies against mycolactone. These antibodies bind directly to the toxin and prevent it from damaging mammalian cells. The results could accelerate the development of diagnostic products and vaccines against Buruli ulcer.

→ Dangy JP et al. (2016) Antibody-mediated neutralization of the exotoxin mycolactone, the main virulence factor produced by *Mycobacterium ulcerans*. *PLoS Neglected Tropical Diseases* 10: e0004808.

New malaria compound effective against therapy-resistant parasites

The new compound ACT-451840 is effective against malaria pathogens that are already resistant to current standard therapies. This finding comes from studies conducted in collaboration with universities and industry partners. ACT-451840 was developed by Actelion Pharmaceuticals Ltd in cooperation with Swiss TPH and tested for efficacy in Swiss TPH laboratories.

→ Le Bihan A et al. (2016) Characterization of novel antimalarial compound ACT-451840: preclinical assessment of activity and dose-efficacy modelling. *PLoS Medicine* 13: e1002138.

Preclinical Research and Development of Drugs, Vaccines and Diagnostics

Swiss TPH is one of the world's leading university laboratories for creating new compounds, therapies and vaccines against parasitic diseases like African sleeping sickness, malaria and various parasitic worm infections, among others. In collaboration with external partners, the institute makes a significant contribution to developing new ways of preventing, managing and treating diseases.

Preclinical Research

Number of projects

34

Research projects	82 %
Implementation projects	18 %

Clinical Research

Improved tuberculosis treatment

A promising result emerged from a clinical study conducted within the Pan-African Consortium for the Evaluation of Antituberculosis Antibiotics (PanACEA) in Tanzania and South Africa: a higher dose of the antibiotic, rifampicin, is safe and shortens the duration of treatment for tuberculosis. Thus, the lengthy and expensive standard therapy may eventually be replaced after further studies.

→ Boeree M et al. (2017) High-dose rifampicin, moxifloxacin, and SQ109 for treating tuberculosis: a multi-arm, multi-stage randomised controlled trial. *Lancet Infectious Diseases* 17: 39–49.

Promising compound against liver fluke infections

A 100 mg dose of the Chinese compound, tribendimidine, can relieve patients of infections with the *Opisthorchis viverrini* trematode. This was the result of a clinical study conducted in collaboration with the National Institute of Public Health (NIOPH) in Lao PDR. Tribendimidine could be a promising compound against liver fluke infections in the future.

→ Sayasone S et al. (2016) Efficacy and safety of tribendimidine against *Opisthorchis viverrini*: two randomised, parallel-group, single-blind, dose-ranging, phase 2 trials. *Lancet Infectious Diseases* 16: 1145–1153.

Clinical Research and Development of Drugs, Vaccines and Diagnostics

In clinical studies, scientists develop and validate new compounds, vaccines and diagnostic products for the fight against poverty-related diseases, such as African sleeping sickness, malaria, tuberculosis, parasitic worm infections and Buruli ulcer. Swiss TPH has extensive experience organising and monitoring clinical studies, especially in low-income countries. The highest ethical and professional standards are applied to ensure patient safety and reliable research data (see pp. 34–35).

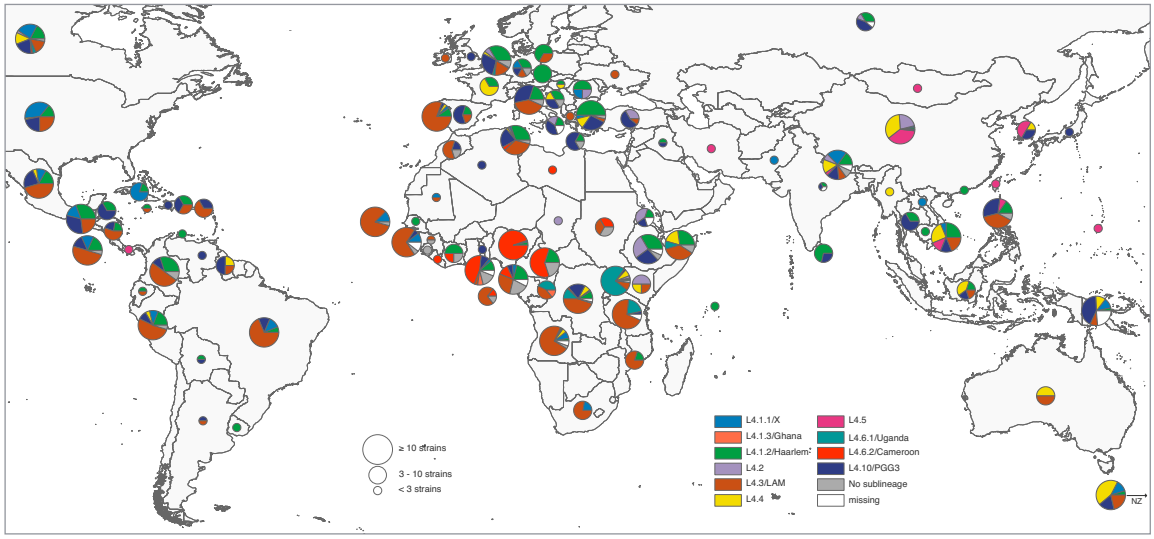
Clinical Research

Number of projects

30

Research projects	87 %
Implementation projects	13 %

The consumption of raw or insufficiently cooked fish is one source of *Opisthorchis viverrini* infections in Lao PDR.



Geographical distribution of different TB-bacteria strains.

Light phenomena as evidence of pathogens

Researchers are using polarised light to detect pathogens and biomarkers in the blood, rapidly and cheaply. When polarised light strikes a crystalline structure, visible patterns arise, reflecting the amount of the substance being sought. The new diagnostic test was developed in collaboration with the Swiss Federal Institute of Technology (ETH) in Zurich and the University of Zurich. It is simple to use and well-suited for countries with weak infrastructure.

→ Vallooran J et al. (2016) Lipidic cubic phases as a versatile platform for the rapid detection of biomarkers, viruses, bacteria, and parasites. *Advanced Functional Materials* 26: 181–190.

Tuberculosis bacteria seek ecological niches

Certain tuberculosis (TB) bacteria are present worldwide. Others, however, are only found in specific geographical regions. This is the result of a study carried out with some 60 research groups from around the world. The researchers isolated and analysed the genes of TB bacteria from several thousand patients in more than 100 countries. The study's results could pose challenges to the development of a new TB vaccine.

→ Stucki D et al. (2016) *Mycobacterium tuberculosis* lineage 4 comprises globally distributed and geographically restricted sublineages. *Nature Genetics* 48: 1535–1543.

Defining Molecular Markers for Predicting and Controlling Communicable and Non-communicable Diseases

By researching the risk factors and pathophysiological mechanisms of communicable and non-communicable diseases, new therapies and early disease detection are made possible. Genetic analyses of pathogenic microbes and patient groups in large field studies in countries around the world provide important insights and results, such as those identifying resistance to medications.

Molecular and Genetic Epidemiology

Number of projects

13

Research projects	92 %
Implementation projects	8 %

Emerging Infectious Diseases

Introduced intestinal bacteria resistant to antibiotics

Travellers returning from India often carry inside them intestinal bacteria that are resistant to various antibiotics. Researchers found that the spread of bacteria resistant to the antibiotic, colistin, has been underestimated up to now. Specific monitoring systems could help to prevent possible disease outbreaks.

→ Bernasconi O et al. (2016) Travelers can import colistin-resistant Enterobacteriaceae, including those possessing the plasmid-mediated mcr-1 gene. *Antimicrobial Agents and Chemotherapy* 60: 5080–5084.

Cases of dengue fever among returning travellers

Researchers are isolating and investigating the dengue virus in travellers returning to Switzerland. This is especially insightful for travellers from regions where the virus was not previously known to be, or for which no appropriate laboratory-based diagnostic tests are available yet. The characterisation of introduced dengue viruses helps to monitor the global spread of the virus.

→ Neumayr A et al. (2017) Sentinel surveillance of imported dengue via travellers to Europe 2012 to 2014: TropNet data from the Dengue Tools Research Initiative. *Eurosurveillance* 22: pii: 30433.

Emerging Infectious Diseases

Emerging or re-emerging pathogens can quickly spread to become a global pandemic. Swiss TPH is therefore strengthening its expertise in researching and diagnosing viral infections such as dengue fever, Zika, Chikungunya and Japanese encephalitis. The aim of these activities is to develop new diagnostic products for clinical studies in various endemic regions, to permit rapid and safe diagnosis of travellers returning to Switzerland and to establish a monitoring system for pandemics.

***Aedes aegypti*, vector of the dengue virus.**

Statistical and Mathematical Modelling

A strategy for eradicating lymphatic filariasis

According to the latest mathematical models, distributing medicines is the most important measure towards eradicating the worm infection, lymphatic filariasis. The model considered factors like the duration of the intervention and estimated costs and benefits for individuals and for public health.

→ Kastner RJ et al. (2016) Lessons learned from developing an eradication investment case for lymphatic filariasis. *Advances in Parasitology* 94: 393–417.

The new mosquito trap attracts mosquitoes with a human scent.

New mosquito trap as an effective weapon in the control of malaria

A solar-powered mosquito trap led to a strong reduction in the mosquito population on Kenya's Rusinga island. As a consequence, malaria infections fell by 30 %. Researchers, in collaboration with Wageningen University in the Netherlands and the International Centre of Insect Physiology and Ecology (ICIPE) in Kenya, showed for the first time ever that mosquito traps could have a positive effect on human health.

→ Homan T et al. (2016) The effect of mass mosquito trapping on malaria transmission and disease burden (SolarMal): a stepped-wedge cluster-randomised trial. *Lancet* 388: 1193–1201.

Modelling the Spatial and Geographical Distribution of Disease Risks

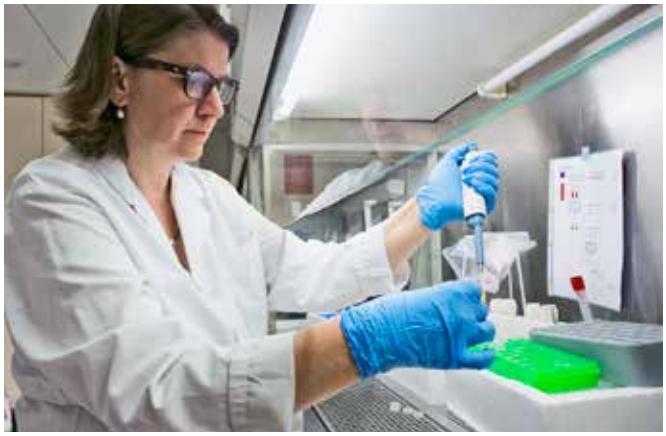
Analysing large amounts of data and predicting disease risks are key aspects of epidemiology and public health. The transmission and the spread of communicable and non-communicable diseases can be better understood using mathematical and statistical models. Models allow for a targeted estimation of the impact of health care measures, such as the introduction of new medicines or vaccines. Research results are available to decision-makers, donors and the local health authorities, and aid better use of limited financial resources in the health system.

Statistical and Mathematical Modelling

Number of projects

23

Research projects	91 %
Implementation projects	9 %



Researching air pollutants using methods from personalised medicine

Swiss TPH is a member of the EXPOsOMICS consortium financed by the EU. It applies personalised approaches to investigating the long-term effects of air pollution on human health. Measuring devices directly measure the study participants' exposure to pollutants. In addition, researchers use systems-biology approaches to examine the degree of air pollution in the blood, analysing its molecular fingerprint. These methods provide a better biological understanding of how air pollution affects human health.

→ Vineis P et al. (2016) The exposome in practice: design of the EXPOsOMICS project. *International Journal of Hygiene and Environmental Health* 16: 30130–30134.

Air pollution favours age-related diabetes

Age-related diabetes (type 2) is one of the most common chronic diseases. If left untreated, diabetes can lead to blindness, amputation of the extremities and kidney failure. Treatment is life-long and expensive, making prevention and, thus, an understanding of the disease risks imperative. A new study reveals a connection between air pollution and diabetes. Researchers were able to show that people with a genetically higher risk of type 2 diabetes are more sensitive to air pollutants. Gene variants associated with insulin resistance are primarily responsible, which hints at causality and the mechanism of pollutants. Researchers examined 1,524 subjects in the SAPALDIA cohort for the study.

→ Eza I et al. (2016) Air pollution and diabetes association: modification by type 2 diabetes genetic risk score. *Environment International* 94: 263–271.

Personalised Health

To research the various aspects of personalised health, Swiss TPH scientists rely on genomic methods to develop new diagnostic products, to optimise vaccines and to gain a better understanding of pathogen-host interactions. New techniques that rely on biomarkers and "Big Data" are also used. For example, environmental and exposome research links environmental and disease sensors with genomic biomarkers to investigate the causality of response relationships. Likewise, mathematical modelling and statistical prediction of disease and risk factor distributions profit from the availability of large data sets (often available on the Internet) and powerful computers.

Environmental Factors and Health

Reducing diarrhoea among Peruvian children

Improving air, water and hygiene quality in Peruvian households reduces diarrhoea in children by 29 %. This was the result of a study with the Instituto de Investigación Nutricional, published in the *International Journal of Epidemiology*. The authors assert that many childhood diseases could be prevented with simple and cost-efficient measures.

→ Hartinger S et al. (2016) Improving household air, drinking water and hygiene in rural Peru: a community-randomized-controlled trial of an integrated environmental home-based intervention package to improve child health. *International Journal of Epidemiology* 45: 2089–2099.

Summer heatwave causes fatalities in Switzerland

In the summer of 2015, Switzerland experienced its second-highest temperatures in 150 years. According to a study, the heatwave caused around 800 additional deaths, especially among those over 75-years-old. The number of heat-related deaths was only slightly lower than those recorded in the summer of 2003. Researchers concluded that measures to reduce heat-related health effects should be strengthened.

→ Vicedo-Cabrera A et al. (2016) Excess mortality during the warm summer of 2015 in Switzerland. *Swiss Medical Weekly* 146: w14379.

Many childhood illnesses in Peru could be prevented by employing simple household-level measures.

Environmental Factors and Health

Polluted air, electromagnetic radiation and noise influence our health and can lead to chronic diseases, cancer or diabetes. Current research projects highlight several such effects, including, for example, heatwaves on the health of the elderly in Switzerland, poor hygiene on childhood diarrhoea in urban South Africa and noise on physical activity, excessive weight and diabetes.

Environmental Factors and Health

Number of projects

42

Research projects	81 %
Implementation projects	19 %

Health Risks of Human Activities

Successful rabies control in Mali

Rabies can be effectively controlled through mass canine vaccinations. A study with the veterinary laboratory in Bamako, Mali, makes it clear that the success of such campaigns strongly depends on the quality of the information provided to the dogs' owners. Future vaccination campaigns could be designed with this knowledge in mind, thereby leading to more effective rabies control.

→ Mosimann L et al. (2017) A mixed methods approach to assess animal vaccination programmes: the case of rabies control in Bamako, Mali. *Acta Tropica* 165: 203–215.

The future of pastoralism

The pastoralist way of life is under threat around the world. Various measures are being implemented to encourage the maintenance and further development of nomadic cultures, including creating new sources of income from tourism, offering health care programmes for people and animals based on the latest technology, permitting private land crossings on migration routes and improving state-level support. The suggestions were formulated at a meeting of the World Organisation for Animal Health.

→ Zinsstag J et al. (2016) Une vision de l'avenir du pastoralisme. *Scientific and Technical Review* 35: 693–699.

Health Risks of Human Activities

Animal and human health interact with environmental and social issues. Swiss TPH adopts a systemic perspective to highlight health links from the molecular level to the human being and his or her social and natural environment. Work in this area includes, among other issues, assessing the impact of digging a mine on human health as well as devising effective strategies against rabies in African towns. Research results are available to governments, health authorities and the general public in the affected countries.

Health Risks of Human Activities

Number of projects

24

Research projects	67 %
Implementation projects	33 %

The elderly as caregivers for the elderly

Elderly people are typically cared for by younger relatives – at least, this is the rule in Tanzania and Indonesia. Increasingly, however, elderly relatives care for other elderly family members and younger caregivers make use of the "elderly-care-for-elderly" services in critical situations. Care of the elderly by other older people contradicts the cultural norms in Tanzania and Indonesia, but acceptance is growing.

→ Van Eeuwijk P (2016) Older people providing care for older people in Tanzania: against conventions – but accepted. In: *Hoffman, Jaco; Pype, Katrien (eds): Ageing in Sub-Saharan Africa: Spaces and Practices of Care*, Bristol, 71–94.

Family is essential to elderly care in Tanzania

According to a study by medical anthropologists, elderly people in Tanzania rely on the support of their family members. Many seniors either live with their children, receive daily visits from relatives, or are dependent on financial support from family abroad. Elderly people cannot rely on medical care from hospitals and health centres in Tanzania.

→ Obrist B (2016) Place matters. The home as a key site of old-age care in coastal Tanzania. In: *Hoffman, Jaco; Pype, Katrien (eds): Ageing in Sub-Saharan Africa: Spaces and Practices of Care*, Bristol, 95–114.

Health and Disease in a Cultural Context

Health is influenced by one's economic situation, personal values and social status, among other factors. Social scientists therefore investigate disease and health in a cultural context, with a special focus on the health of the young and the elderly. How is care for the elderly organised in Tanzania, where the state provides only limited care services? What role do family members play in the care of persons infected with HIV? How do young adults in Switzerland manage the transition from school to professional life?

Health and Disease in a Cultural Context

Number of projects

25

Research projects	56 %
Implementation projects	44 %

Elderly people in Tanzania often rely on the support of family members.

Sexual and Reproductive Health and Gender Issues

The importance of siblings in HIV patient care

Siblings play an important role in the care of those infected with HIV. An investigation in Zambia found that a sibling's willingness and capacity to help a sick brother or sister was contingent on a strong family bond and sufficient financial resources. These social influences should be considered in health programmes.

→ Merten S et al. (2016) Ambiguous care: siblings and the economies of HIV-related care in Zambia. *AIDS Care* 28: 41–50.

A safe start at home

Young parents are often left to cope on their own after the birth of their child, especially in the first few days following discharge from the hospital. Questions about nutrition, breast-feeding or the digestion of newborns remain unanswered. One study found that young parents would like to arrange midwifery support for the time at home while still in the hospital and would appreciate both a telephone helpline and access to housekeeping support. The Family Start project is now trying to meet these needs in the Basel region.

→ Kurth E et al. (2016) Safe start at home: what parents of newborns need after early discharge from hospital – a focus group study. *BMC Health Services Research* 16: 82.

Young parents in Switzerland seek more comprehensive support during the period following hospital discharge.

Sexual and Reproductive Health and Gender Issues

Promoting well-founded knowledge of sexually transmissible diseases, safe pregnancies and births worldwide, and greater autonomy in questions regarding sexuality and fertility are central areas of activity. Researchers investigate the influence of various gynaecological approaches on patients' health. They investigate gender aspects in the acceptance of vaccination programmes and the influence of hormonal factors in respiratory and cardiovascular diseases.

Sexual and Reproductive Health and Gender Issues

Number of projects

30

Research projects	50 %
Implementation projects	50 %

Health Systems

Using new algorithms to improve health care provision

Together with the International Committee of the Red Cross (ICRC), health experts provide hospitals and medical practices in Nigeria and Afghanistan with tablet computers loaded with special IT software for health care professionals, to facilitate the diagnosis and treatment of sick children. Following these standardised processes increases the children's chances of recovery. The hardware and software will eventually be made available to all health centres supported by the ICRC.

Improving handwritten health data

In regions with deficient infrastructure, health data is mostly recorded and collected on paper. Specialists are evaluating various measures to improve the quality of handwritten health information, starting with the health records of children in Mozambique, Nigeria and Côte d'Ivoire. The project receives support from the Bill & Melinda Gates Foundation.

Experts at Swiss TPH discuss how best to improve non-electronic health data.

Cost-efficient eradication of African sleeping sickness

New mathematical models show that African sleeping sickness could be eradicated by combining different cost-efficient strategies, including the use of state-of-the-art technology for diagnosis, treatment and monitoring; as well as measures to contain the tsetse flies that carry the disease.

→ Sutherland CS et al. (2017) Seeing beyond 2020: an economic evaluation of contemporary and emerging strategies for elimination of *Trypanosoma brucei gambiense*. *Lancet Global Health* 5: e69–e79.

Developing and Managing Health Systems

Swiss TPH engages in activities designed to support countries with unstable health facilities and services. Experts develop health insurance schemes for Tanzania's rural poor, draft IT solutions for hospitals and health centres, invest in training health care professionals in Eastern Europe, evaluate development projects and monitor the allocation of money provided by the Global Fund in many countries in Africa and Asia.

Health Systems

Number of projects

99

Research projects	35 %
Implementation projects	65 %

The tsetse fly, vector of human African trypanosomiasis (sleeping sickness).

Travel and Tropical Medicine | Health Systems

On-site HIV therapy

Many people in Lesotho live too far away from a health centre to be tested and treated for HIV. In collaboration with SolidarMed, health professionals visit the villages, test the local residents for HIV, and start treating those infected, on site. Simplifying access to therapy could contribute to stopping the HIV epidemic.

→ Labhardt N et al. (2016) Same day ART initiation versus clinic-based pre-ART assessment and counselling for individuals newly tested HIV-positive during community-based HIV testing in rural Lesotho – a randomized controlled trial (CASCADE trial). *BMC Public Health* 16: 329.

High rate of unsuccessful HIV therapy for children

A study in Tanzania has shown that HIV therapy is not effective for many children due to the development of resistance to the HIV medications during treatment. Insufficient therapy adherence, the age of the patients and the composition of the medications all account for this failure. The results yield important information for improving current therapy programmes.

→ Muri L et al. (2017) Development of HIV drug resistance and therapeutic failure in children and adolescents in rural Tanzania: an emerging public health concern. *AIDS* 31: 61–70.

Travel and Tropical Medicine

Swiss TPH is one of Switzerland's leading centres for travel and tropical medicine. More than 10,000 travellers from Basel and the surrounding region approach Swiss TPH to receive advice about possible disease risks, get vaccinations or to be treated for undesirable bacteria, viruses or parasites. Health professionals use their extensive experience to search for the smallest disease carriers with state-of-the-art technology. Internationally recognised for its expertise, blood, stool and urine samples from around the world are sent to Swiss TPH for analysis.

Travel and Tropical Medicine

Number of projects

16

Research projects	50 %
Implementation projects	50 %

Precarious health of migrant workers in the Amazon region

Migrant workers from the Peruvian highlands travel to the tropical Amazon region for the harvest season. Unprotected against biting insects, they contract malaria or leishmaniasis. Workers often have insufficient information and funds for treatment, while the hospitals and health centres are poorly stocked with the required medications. According to the authors of a recent study, the taxi and lorry drivers who transport the migrants to the Amazon region can play an important role in improving the situation, by using the journey time to inform harvest workers about the health risks and possible preventive measures.

→ Schelling E et al. (2016) Integrated analysis of human dimensions and policy implications of cross-border migration on vector-borne neglected tropical diseases (NTDs) in the Andes-Amazon region. *SNIS Final Report.*

Mobility, Migration and Health

Refugees, migrants, seasonal workers and nomads are especially susceptible to diseases due to their often risky situations. Swiss TPH explores and develops new concepts to improve the health of these populations. For example, specialists are developing smartphone technologies to provide health-care-relevant information to youths in refugee camps, designing new health insurance schemes for seasonal workers and offering routine vaccination services for people and animals among the pastoralists in Central Africa. All of these activities aim to create a more just health and social policy.

Harvest workers in the Amazon region lack protection against infectious diseases.

Committees & Departments

Managing Board 2017
Back: Daniel Paris, Kaspar Wyss, Stefan Mörgeli, Christian Burri, Christoph Hatz
In front: Nino Künzli, Nicole Probst-Hensch, Sébastien Gagneux, Jürg Utzinger

Directorate and Board of Governors

Directorate 2016

Prof. Dr. Jürg Utzinger
Director

Stefan Mörgeli
Administrative Director

Prof. Dr. Nino Künzli
Deputy Director

Additional Members of the Managing Board

Prof. Dr. Christian Burri
until 31.12.2016

Prof. Dr. Sébastien Gagneux

Prof. Dr. Christoph Hatz
until 31.12.2016

Prof. Dr. Daniel Paris
from 1.1.2017

Prof. Dr. Nicole Probst-Hensch

Prof. Dr. Kaspar Wyss

Board of Governors 2016

Dr. Andreas Burckhardt
Chair, Chairman and Member of the Board of Governors, Bâloise Holding AG

Prof. Dr. Philippe Burrin
Director, Graduate Institute of International and Development Studies, Geneva
until 31.12.2016

Prof. Dr. Sabina De Geest
Director, Institute of Nursing Science, University of Basel

PD Dr. Monika Griot-Wenk
Janssen Operations, Bern

Joakim Rüegger
Head, Higher Education, Cantonal Department of Education, Basel

Prof. Dr. Didier Trono
Dean, School of Life Sciences, Swiss Federal Institute of Technology, Lausanne

Christoph Tschumi
Administrative Director, University of Basel

Prof. Dr. med. Werner Zimmerli
Member of the Board of Governors, Kantonsspital Basel-Landschaft

Dr. Doris Fellenstein Wirth
Head, Stab Hochschulen Kanton Basel-Landschaft, Liestal
from 1.1.2017

Prof. Dr. med. François Chappuis
Medical superintendent, Tropical and Humanitarian Medicine, Hôpitaux Universitaires Genève
from 1.1.2017

Dr. Guido Miescher
Observer, State Secretariat for Education, Research and Innovation, Bern

Prof. Dr. Jürg Utzinger
Director, Swiss TPH (ex officio)

Stefan Mörgeli
Secretary of the Board (ex officio), Administrative Director, Swiss TPH

R. Geigy Foundation, Foundation Board and Administration

Prof. Dr. Marcel Tanner
President of the foundation board
Director emeritus, Swiss TPH

Jean-Marc Joerin
Vice-president of the foundation board, Lawyer, Joerin Advokatur

Ulrich Wasser
Managing Director

Beat Berger
Managing Director, Berger Liegenschaften

Dr. Nicolaus Lorenz
Former Head, Swiss Centre for International Health
until 31.12.2016

Bernadette Peterhans
Head, Professional Postgraduate Training, Swiss TPH
from 1.1.2017

Jörg Schwarzenbach
Vice-president, Board of Governors, Aquila & Co. AG

Jürg Toffol
Architect, ETH SIA

Prof. Dr. Jürg Utzinger
Director, Swiss TPH

Organigram 2017

Board of Governors

Members from the Cantons of Basel-Stadt and Basel-Landschaft, the Swiss Federation, Universities and the Private Sector

Chairman
Andreas Burckhardt

Directorate

Director
Jürg Utzinger

Deputy Director and Department Head
Nino Künzli

Department Heads
Sébastien Gagneux, Daniel Paris, Nicole Probst-Hensch, Kaspar Wyss

Administrative Director
Stefan Mörgeli

Departments

Administration

Stefan Mörgeli

Finances / Controlling
Mathias Kronig

Human Resources
Iris Haueter

Informatics
Alain Bertolotti

Infrastructure
Paul Haas

Project & Grant Service
Michael Käser

Epidemiology and Public Health

Nicole Probst-Hensch
Deputy: Jakob Zinsstag

Biostatistics
Penelope Vounatsou

Chronic Disease Epidemiology
Nicole Probst-Hensch

Ecosystem Health Sciences
Guéladio Cissé

Environmental Exposures and Health
Martin Röösli

Health Interventions
Christian Lengeler

Health Systems Research and Dynamical Modelling
Thomas Smith

Human and Animal Health
Jakob Zinsstag

Society, Gender and Health
Elisabeth Zemp Stutz

Medical Parasitology and Infection Biology

Sébastien Gagneux

Clinical Immunology
Claudia Daubenberger

Gene Regulation
Till Voss

Helminth Drug Development
Jennifer Keiser

Molecular Diagnostics
Ingrid Felger

Molecular Immunology
Gerd Pluschke

Molecular Parasitology and Epidemiology
Hans-Peter Beck

Parasite Chemotherapy
Pascal Mäser

Tuberculosis Research
Sébastien Gagneux

Organigram valid 1.1.2017

Communication and Public Affairs
Christian Heuss
(until 28.2.2017)

Security / Biosafety
Marco Tamborrini

Swiss Centre for International Health

Kaspar Wyss

Health Systems Support
Helen Prytherch

Health Technology and Telemedicine
Martin Raab

Sexual and Reproductive Health
Manfred Zahorka

Systems Performance and Monitoring
Odile Pham-Tan

Medicine

Daniel Paris
Deputy: Christian Burri

Medical Services

Christoph Hatz

- Medical Consultations
  Johannes Blum
- Medical Practice Föhre
  Johannes Blum
- Travel Clinic
  Andreas Neumayr

Clinical Research
Klaus Reither

Diagnostics
Hanspeter Marti

Division: Medicines Research

Christian Burri

- Pharmaceutical Medicine
  Marc Urich
- Research Cluster
  Christian Burri

Education and Training

Nino Künzli
Deputy: Axel Hoffmann

Bachelor-Master-Doctorate
Nino Künzli

Library and Documentation
Giovanni Casagrande

Professional Postgraduate Training
Bernadette Peterhans

Teaching Technology and Didactics
Axel Hoffmann

Epidemiology and Public Health

Head
Prof. Dr. Nicole Probst-Hensch

Staff number
117

The Department of Epidemiology and Public Health (EPH) seeks to understand, maintain and improve the health and wellbeing of the general population in various regions of the world. One of its main objectives is to reduce inequalities in health care.

Epidemiological data on the socio-demographic, geographical and temporal distribution of diseases and their associated risks form the basis for developing effective interventions. In 2016, an atlas was published to show the risk of worm infections among children in Côte d'Ivoire, the extent of cancer in Switzerland and the short-term impact of the 2015 Swiss heatwave on mortality. The department, a key partner of the INDEPTH Network and Bloomberg's Data for Health initiative, improves the cause-of-death statistics in countries in the southern hemisphere and provides technical expertise for data collection. Thanks to its know-how in cohort, biobank and environmental research, the department represents Switzerland in the European Horizon 2020 HM4EU network. It monitors and examines the chemical exposure of the population in Europe. The PESTROP project and the Swiss–South African Environmental Epidemiology Chair also carry out environmental and biomonitoring activities to assess pesticide exposures. The vast experience in the epidemiological monitoring of infectious diseases was extended to include diarrhoea in Switzerland, while the causes and financial implications of *Campylobacter* infections were examined.

Fight against malaria
Malaria remains the most frequent cause of death of children in many countries in the southern hemisphere. For years, the departmental experts have used mathematical modelling to assess the public health importance of interventions in the fight against malaria. Continuing support from the Bill & Melinda Gates Foundation was secured. The department coordinates the National Insecticide Treated Nets (NATNETS) programme in Tanzania, which, thanks to the distribution of millions of mosquito nets, has made a major contribution to reducing this disease in recent years (see p. 22). A publication on the geographical spread of *Aedes albopictus* in Switzerland attracted considerable media interest in the context of the Zika virus epidemic.

Non-communicable diseases
Non-communicable chronic diseases and their associated risks are increasing around the globe. Promoting physical activity is important for the primary prevention of these diseases. Therefore, the department assists the Swiss Federal Office of Sport (FOSPO) to evaluate the long-term effects of youth and sport programmes in Switzerland. Projects involving schoolchildren in South Africa and adults in Côte d'Ivoire examine the link between chronic worm infections, physical activity and hyperglycaemia. A newly funded Swiss Programme for Research on Global Issues for Development (R4D) project in Lao PDR investigates the link between liver fluke infections and cancer of the bile duct. The Swiss SAPALDIA cohort and various projects in the southern hemisphere focus on the effects and needs of elderly people, in terms of health and care. Against a backdrop of the increasingly chronic course of diseases, this newly funded R4D project is rather important and strives to gain a deeper understanding of out-of-pocket funding for health care. The results of a study on the lack of testing of children with an elevated risk of HIV in Zambia point to the major obstacles that must be overcome to diagnose and treat chronic diseases in countries in the southern hemisphere.

Environmental health research
The environment constitutes a major and, in principle, modifiable burden when it comes to both infectious and non-communicable diseases. The department was commissioned

by the Swiss Federal Office of Public Health (FOPH) to assess and quantify various environmental risks to health. In this context, the impact of noise on cardiometabolic diseases and sleep are examined from an epidemiological angle. Household- and school-level interventions explore new territory in terms of improving health by combining preventive measures against infectious and chronic diseases. The One Health approach takes into account the interaction between humans, animals and the environment and is currently being implemented in the Jigjiga One Health Initiative in the region of Ethiopia-Somalia. Work in this area underscores the department's increasingly systemic approaches to research activities.

Promotions

In the year under review, Dr. Nakul Chitnis, Dr. Manuel Hetzel and Dr. Sarah Moore were promoted to senior lecturers (Privatdozent – PD) in Epidemiology at the University of Basel.

Medical Parasitology and Infection Biology

Head
Prof. Dr. Sébastien Gagneux

Staff number 74

The Department of Medical Parasitology and Infection Biology (MPI) conducts basic research on pathogens, host-pathogen interaction and disease transmission. MPI researchers develop new diagnostics, drugs and vaccines against neglected tropical diseases and diseases of poverty, such as malaria, Buruli ulcer, tuberculosis and sleeping sickness. In 2016, activities ranged from conducting laboratory research to validating new tools in clinical trials.

Research on pathogen biology, host-pathogen interaction and immunity
Researchers explore the molecular and cellular mechanisms underlying pathogen survival, transmission and host-pathogen interaction. They investigate how host factors influence the response to infection and disease, using various models of infection as well as clinical samples from human patients. By improving our understanding of these biological processes, they contribute to controlling diseases of poverty such as malaria, tuberculosis, sleeping sickness, dengue, Buruli ulcer and helminth infections. In 2016, basic research in gene regulation of malaria parasites expanded significantly, thanks to the Swiss National Science Foundation Consolidator Grant awarded to Prof. Dr. Till Voss.

Research on pathogen evolution and transmission
MPI specialists study how pathogens evolve to evade host immune mechanisms and develop resistance to antimicrobials, as well as how these phenomena influence the spread of these microbes. They apply various molecular epidemiological approaches to analyse infection and transmission dynamics and monitor the effects of interventions such as transmission control, vaccination and drug treatment on the prevalence and population structure of these pathogens.

Development of diagnostics, drugs and vaccines
The department uses its enhanced understanding of host-pathogen biology to develop new diagnostics, drug sensitivity assays, drugs and vaccines against these diseases. Scientists evaluate new diagnostics and perform both pre-clinical and clinical studies of novel treatments, as well as of candidate antigens and antigen delivery systems for vaccine purposes. The work on new anthelminthic drugs received a major boost thanks to a new grant from the Bill & Melinda Gates Foundation awarded to Prof. Dr. Jennifer Keiser. Work at MPI also includes developing new animal models and controlled human infection models to assess novel interventions. These activities are carried out in collaboration with many international institutions, including our long-term partners in endemic countries. For example, in 2016, three of the 12 projects approved by the Scientific and Technological Cooperation Programme between Switzerland and the State of Rio de Janeiro were awarded to Profs. Ingrid Felger, Pascal Mäser and Sébastien Gagneux.

Swiss Centre for International Health

Head
Prof. Dr. Kaspar Wyss

Staff number 72

The Swiss Centre for International Health (SCIH) is a leading and highly-respected consulting agency in global health. The department hosts a multi-disciplinary team of 50 collaborators in Basel and around 140 collaborators abroad. The department offers services in the areas of consultancy and policy advice, economic evaluation, project design and implementation, operations research, organisational capacity assessment and performance monitoring and controlling.

Evaluating health programmes
In 2016, health specialists completed a high-profile evaluation of the United Nations Population Fund's (UNFPA's) adolescent and youth programming from 2008 to 2015. The evaluation report concludes that UNFPA significantly increased the priority, policy and programmatic focus of its support to adolescents and youth. Results of the review guide the UNFPA Strategic Plan 2018–2021, with the aim of helping countries reach the Sustainable Development Goals for adolescents and youth.

Various mandates for key players in the Swiss health sector
The department completed and contributed to various mandates from the Swiss Federal Office of Public Health, including an analysis of sexual education policies at school level and a study of treatment-seeking delays among tuberculosis patients in Switzerland. The results will contribute to optimising access to health services among vulnerable groups. The department continues to operate as a trusted partner and implementing agency in long-term mandates of the Swiss Agency for Development and Cooperation (SDC) in Tajikistan, Albania, Kosovo, Chad, Tanzania and the Great Lakes region. These mandates serve to strengthen primary and secondary health care services, including quality improvements, through enhancing financial, cultural and geographical access. In 2016, SDC commissioned a major new project, "Reducing the Burden of Non-Communicable Diseases", in Moldova.

Strengthening fragile health systems
SCIH successfully supports health systems development in countries with fragile health systems, particularly in Africa, Eastern Europe and Central Asia. Key topics covered include maternal and newborn health, health promotion and community health, family medicine and integrated care models, district management, human resource development, social health insurance and health information systems. In a new partnership with the International Committee of the Red Cross, SCIH develops health interventions that benefit children in areas of armed conflict.

Services to the Global Fund
The department provides Local Fund Agent (LFA) services to the Global Fund and monitors programme implementation relating to HIV/AIDS, tuberculosis and malaria control in a number of countries and regions. Recently, SCIH was awarded the LFA mandates for Burundi, Syria, Lebanon, Iraq, Palestine, Jordan and Yemen. Health specialists also assist the programmatic quality assurance and improvement approach of the Global Fund by conducting health facility assessments.

Department of Medicine

As of January 2017, the former Department of Medical Services and Diagnostics and the Department of Medicines Research were merged to form the new Department of Medicine. Medicines Research continues as a division within the new department. Under the leadership of Prof. Dr. Daniel Paris, the new department concentrates clinical, diagnostic and pharmaceutical expertise at Swiss TPH.

Head
Prof. Dr. Christoph Hatz
until 31.12.2016

Head
Prof. Dr. Daniel Paris
from 1.1.2017

Staff number
41

Medical Services and Diagnostics
until December 2016

The Department of Medical Services and Diagnostics (MedDia) has been a Swiss centre of excellence for travel and tropical medicine and parasitological diagnostic services for many years. It provides pre-travel advice and post-travel consultations to travellers from Basel and the surrounding region. As the National Reference Centre for Imported Human Parasitic Diseases, it offers a variety of diagnostic services to medical practitioners and hospitals all over Switzerland. 2016 was also marked by preparations for a new, larger Department of Medicine, which will bring together clinical, diagnostic and pharmaceutical expertise to enhance capacities in services, teaching and research in clinical contexts.

Travel clinic in Basel
Almost 12,000 clients visited Swiss TPH in 2016 for pre-travel advice, and over 200 patients were treated against infectious diseases. Another record figure that affirms the value of our services in northwestern Switzerland. Questions around the Zika epidemic kept our telephone lines busy, resulting in close to 30,000 telephone calls from the general public and professionals in Switzerland. The clinical staff are important interview partners for the media.

The Ifakara cluster in Tanzania
Since its foundation in 2004, more than 9,000 patients with HIV/AIDS visited the Chronic Disease Clinic in Ifakara (CDCI), 6,000 of whom started antiretroviral treatment. Patients with tuberculosis (TB) are now fully integrated in the service and research projects, including dual morbidity studies planned for the coming years. The mother-child clinic offered HIV testing to 7,500 pregnant women over the past two years, resulting in more than 350 HIV-positive women receiving antiretroviral treatment.
The Referral Hospital has benefitted from the implementation of emergency medicine services, including ultrasound service. Within 18 months, the second emergency department of the country was fully established and five medical staff were trained in ultrasound diagnosis.

Clinical tuberculosis research
Swiss TPH conducts clinical TB research in collaboration with long-term partners in Tanzania and Georgia. A central element of our work is the TB DAR cohort study, a research platform collecting epidemiological data and biological samples for genotyping and biomarkers. At the end of 2016, the cohort enrolled 980 smear positive TB cases and 695 household controls from Dar es Salaam (urban setting) and 198 TB cases from Ifakara (rural setting). A sub-study investigates TB transmission by using environmental carbon dioxide concentrations, a proxy for indoor ventilation conditions, at locations of public importance, such as markets, prisons, public transport, etc., to identify potential TB transmission hotspots.

Laboratory services
The National Reference Centre for Imported Parasitic Diseases had a booming year. More than 54,000 diagnostic tests for parasitic diseases were carried out, the majority of them in the serology lab. For "exotic" tests, like those for gnathostomiasis or angiostrongyloidiasis, we received requests from as far away as South-America, the Caribbean and the Pacific Islands. It is our aim to maintain these high standards and to invest in research to further improve our diagnostic platforms in the newly established Department of Medicine.

Head
Prof. Dr. Christian Burri
until 31.12.2016

Staff number
25

Medicines Research
until December 2016

The Department of Medicines Research (MedRes) organises and monitors clinical trials, particularly in countries with weak health care infrastructure. The focus is normally on trials seeking treatments for poverty-related or neglected diseases, such as sleeping sickness, schistosomiasis or tuberculosis (TB). Thanks to long-standing commitments and experience, sustainable research platforms for future clinical trials have been set up, for instance, in the Democratic Republic of the Congo.

Clinical trials to support clients
One example is the clinical development of fexinidazole and SCYX-7158 as new treatments for sleeping sickness. Together with the Drugs for Neglected Diseases initiative (DND*i*), MedRes has been working for more than ten years on improving treatments for African sleeping sickness in the Democratic Republic of the Congo. This work led to the introduction of NECT as a standard injectable treatment. The mortality rate during treatment subsequently dropped from 5 % to 0.1 %. In 2017, the dossier for the oral medication, fexinidazole, will be submitted for authorisation to the relevant authorities. In parallel, trials with the new active ingredient SCYX-7158 will begin, with a view to treating the disease in future with a single dose.

New combination therapies to treat multidrug-resistant TB
On behalf of Médecins Sans Frontières, MedRes supports, for the first time, a trial involving a new combination therapy to treat multidrug-resistant TB. New and existing forms of therapy are to be combined in an optimum manner, in order to improve the tolerance and administration period. After almost 18 months working to develop the infrastructure and training staff, the first patient was recruited for the trial in Uzbekistan, at the end of 2016. There are plans to extend the study to Belarus and South Africa (see p. 34).

A child-friendly formula to treat schistosomiasis
Praziquantel is the gold standard in medication for preventing and treating schistosomiasis. Children of pre-school age, however, are excluded from treatment programmes, as the medication is not registered for children under the age of four. A palatable, child-friendly formulation is not currently available. This is what prompted the establishment of the not-for-profit Paediatric Praziquantel Consortium in 2012. A complete clinical programme for the development of a new praziquantel formula was designed. Phase II trials began in Côte d'Ivoire in the spring of 2016.

Research cluster
Operational research is a new area of investigation in the department. Experts are looking into how clinical trials – particularly in countries with limited resources – can be conducted in a cost-effective and efficient manner, yet maintain the highest quality standards. To this end, a first doctoral thesis was completed in 2016 and the corresponding publications are being prepared. MedRes is also carrying out intensive fist-time work in the field of pharmacovigilance, the systematic monitoring of the safety of medicines. This work aims to record the side effects and interactions of medications, to identify risks and to prevent adverse events. Here, too, special attention is paid to countries with weak health care infrastructure and neglected diseases.

Quality management services
MedRes offers numerous initial and further training courses in the field of clinical trials. The GCP (good clinical practice) course, which is staged at regular intervals for investigators and trial teams, was certified in line with the new guidelines from Swissethics. The postgraduate programme in clinical research, run jointly with the Clinical Trial unit of the University Hospital Basel, is now entering its fourth year.

Education and Training

Head
Prof. Dr. Nino Künzli

Staff number	22
Number of teachers	100
Number of teaching hours	4,000

Education and training is one of the strategic pillars of the institute. Strengthened by the new department Education and Training (ET), Swiss TPH offers a unique learning experience. Activities range from bachelor, master and doctoral endeavours, to professional post-graduate programmes and short courses. Swiss TPH staff engage in teaching activities at Swiss TPH and the University of Basel, at other institutes of higher education and as part of project capacity building efforts in countries around the world (see interview pp. 17–18).

SSPH+ eCampus
In 2016, ET was mandated to establish and promote the inter-university SSPH+ eCampus, an online learning management system based on a Moodle platform. Participants of all SSPH+ offers can access eCampus, no matter whether and where they are registered. Workshops and support are available for lecturers looking to integrate convenient and modern teaching tools into their in-class, online or blended learning activities.

CARTA
In September 2016, Swiss TPH was elected to represent northern partners on the executive board of the Consortium for Advanced Research Training in Africa (CARTA). CARTA is a southern-led partnership with a mandate to establish a vibrant African academy capable of leading world-class multidisciplinary research that has an impact on population and health. Swiss TPH supports CARTA PhD fellows with advice, teaching and postdoctoral opportunities.

Health impact assessment – Brazil
In July 2016, Swiss TPH, in collaboration with Fundação Oswaldo Cruz, held a one-week course on, "Health impact assessment of large infrastructure projects in the Brazilian Amazon" in Rio de Janeiro, Brazil. Out of 80 applications, 50 participants from different institutes were selected for the course, which focused on different phases and methodological aspects of health impact assessment in the context of large infrastructure projects.

IGS North-South Summer School
The IGS North-South Summer School welcomed more than 20 PhD students from Chad, Ethiopia, Côte d'Ivoire, Kenya, Mali, Mexico, Morocco, Turkey and Switzerland to a nine-day course on health governance, environmental risks, regional infrastructures and conflict transformation. Swiss TPH organised the summer school together with swisspeace (University of Basel), the Centre for Development and Environment (University of Bern) and the Development Study Group (University of Zurich).

PhD Fellowships
Swiss TPH welcomed more than 30 PhD students from low- and middle-income countries who won competitive three-year fellowships funded by the Federal Department of Economic Affairs, Education and Research; the State Secretariat for Education, Research and Innovation; and the canton of Basel-Stadt. Many of these students pursue research relevant to their home countries, with the vast majority returning to their country to contribute to developing research and capacity.

Professional Postgraduate Training
In 2016, Swiss TPH added to its professional postgraduate training portfolio, taking on the Master in Insurance Medicine (MIM) programme, formerly hosted by the Academy of Swiss Insurance Medicine at the University Hospital Basel. A newly formed MIM alumni association organised several events for its members during the year. The MBA in International Health Management, launched in 2013, celebrated its first seven graduates in 2016.

European Educational Programme in Epidemiology (EEPE)
Swiss TPH collaborates with EEPE, which celebrates its 30th edition in Florence in 2017. This intense summer school has taught generations of epidemiologists and public health scientists from all over the world (see: www.eepe.org).

Administration

Head
Stefan Mörgeli

Staff number
48

The Department of Administration supports Swiss TPH employees through six service units: Finances, Controlling, Infrastructure, Informatics, Project & Grant Service, and Human Resources. Until the end of 2016, the Finances and Controlling units had been separate units and were merged into one Finances/Controlling unit in 2017. This paved the way for leaner processes and even better use of synergies.

Administrative Directorate
Managerial and operational excellence are among the goals of the institutional strategy 2017–2020. In order to achieve these, a satisfaction survey was conducted to elicit feedback on the services offered by the Administration department. All Swiss TPH employees were invited to voice criticisms and suggest improvements. This resulted in 38 action plans with concrete measures, some of which have already been implemented. Following staff departures in the Human Resources and Finances/Controlling units, we were able to secure the services of Iris Haueter, an experienced HR specialist, and Mathias Kronig, an in-house expert. The year was also characterised by preparations for implementing the bi-cantonal sponsorship contract.

Finances/Controlling
With a turnover of CHF 80 million, Swiss TPH covered around 80% of its required financing from third-party funds, provided by foundations and private and public clients in 2016. Some 20% of these funds came from public sector contributions, which are based on service agreements. Employees accounted for just under 65% of total expenses. In the year under review, further progress was made towards digitalising finances. The electronic workflow for issuing and allocating invoices and the electronic archive for all bookkeeping receipts and contracts are now up and running. Particular challenges are presented by liquidity planning and international money transfers to our project countries, as well as properly preparing all financial reports using the various formats required by our donors.
Controlling came up with a concept for a customised budgeting and evaluation tool. It is currently in the development phase. Budget quality could be further enhanced by moving the meeting of the Board of Governors from autumn to December. With the current figures at the end of the third quarter and a more precise project pipeline, the budget staff are in a position to make sound forecasts.

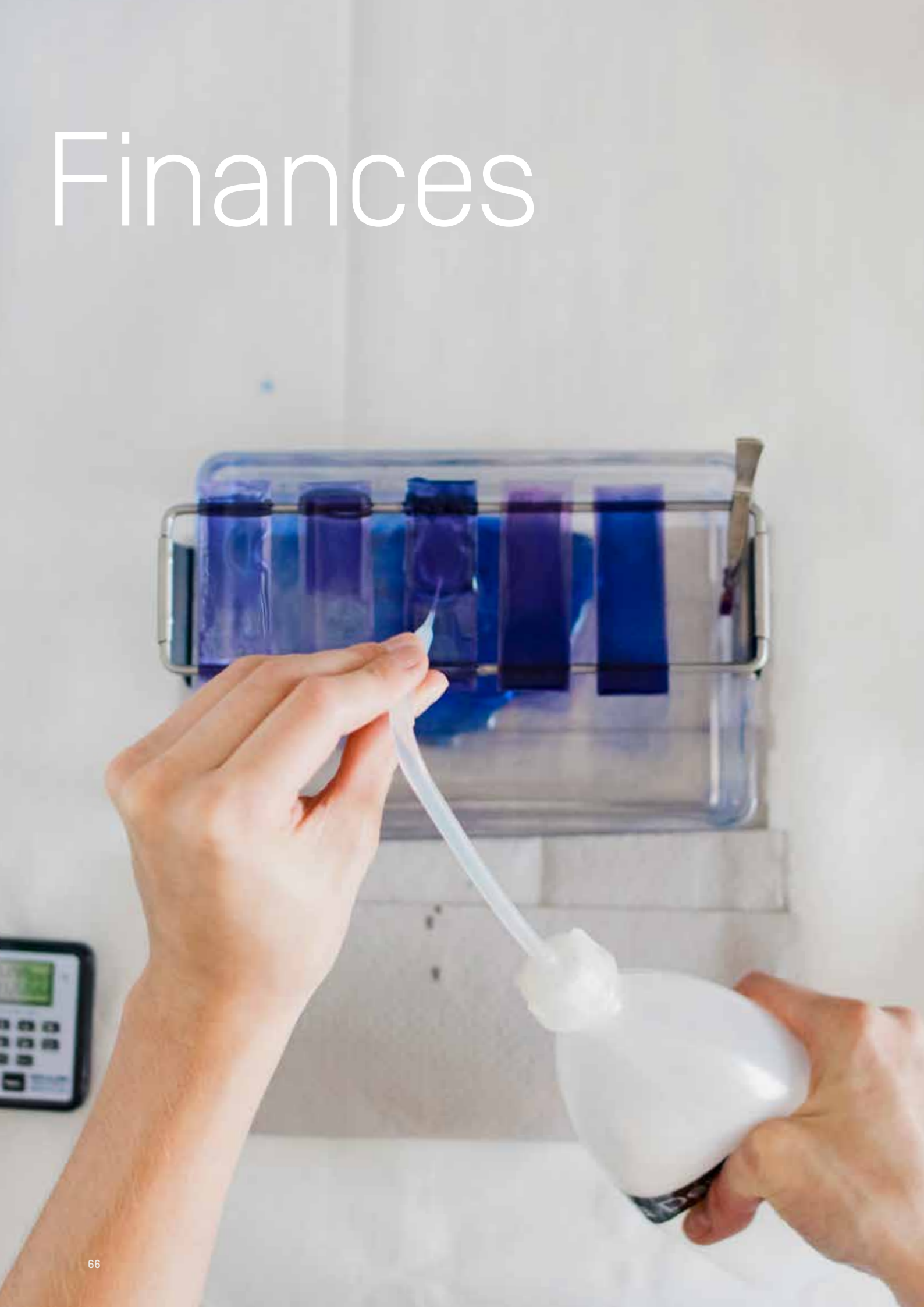
Infrastructure
In the spring of 2016, we moved to the converted premises on Socinstrasse 55. Because of a transfer of ownership, the lease for the villa on Eulerstrasse 68 could not be extended. However, thanks to relocations and changes in use, all the required workplaces could once again be made available. Space is still limited, but the situation has improved markedly thanks to the addition of Socinstrasse 55 and the acquisition of the former surgery premises on the ground floor of Socinstrasse 59. The architectural tender enabled us to take a major step forward in planning the new building in Allschwil. We can now start organising the project and will launch the preliminary project in 2017.

Informatics
The number of employees using IT services rose this year to more than 800. The new Intranet is better aligned with institutional requirements and now supplies valuable data about employees, projects and publications. This facilitates the efficient management of the institute. The master data management system permits improved process automation, better data quality and faster service. The IT service catalogue was further extended and supplemented with corresponding service level agreements.

Project & Grant Service
The Project & Grant Service (PGS) unit is in close contact with donor organisations and supports project managers with the preparation of project applications in cooperation with external partner organisations. One of the tasks of the service unit is to improve the quality of workflows in the project cycle, including project database, grant and contract management.
The PGS is responsible for the current Swiss TPH travel safety concept, based on international standards. For the purposes of fulfilling its mandate with regard to assignments abroad, this concept facilitates a comprehensive safety-first culture for employees in countries with unstable security situations.

Human Resources
In 2016, the business partner model has been met with widespread approval. In this area, the major focus is on achieving the strategic goals for the period 2017–2020.
The many different employment contracts, particularly for employees located abroad, result in a high degree of complexity in the field of both social insurance and taxes. Managing this broad spectrum of contracts continues to be demanding and work-intensive.

Finances



Finances

2016

	Mio. CHF	Total %
Funding		
Competitively acquired funds	64.1	**78.7%**
Core contributions	17.4	**21.3%**
Total income	81.5	**100.0%**
Core contributions		
University of Basel	7.1	**8.7%**
National government	6.3	**8.3%**
Local government	3.5	**4.3%**
Competitively acquired		
Mandates	27.5	**33.7%**
Other combined grants	17.6	**21.6%**
SNSF	5.5	**6.8%**
Medical Services & Diagnostics	4.6	**5.6%**
European Commission	2.0	**2.4%**
Medicines Research	3.5	**4.4%**
Postgraduate training	2.1	**2.6%**
R. Geigy Foundation	1.3	**1.6%**

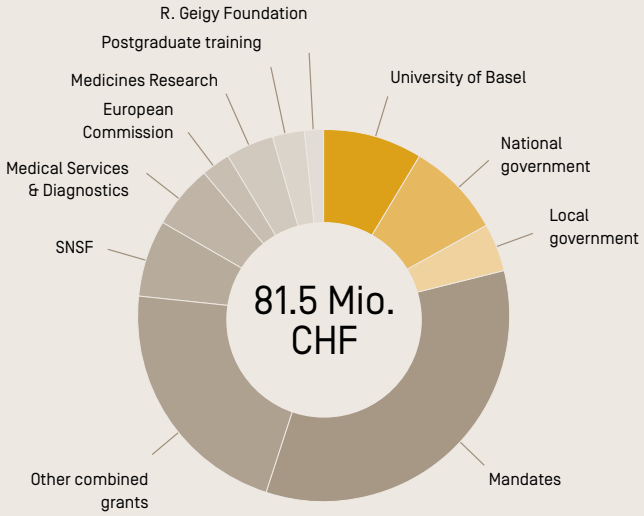
2015

	Mio. CHF	Total %
Funding		
Competitively acquired funds	61.3	**79.6%**
Core contributions	15.7	**20.4%**
Total income	77.0	**100.0%**
Core contributions		
University of Basel	6.9	**9.0%**
National government	6.8	**8.8%**
Local government	2.0	**2.6%**
Competitively acquired		
Mandates	25.6	**33.3%**
Other combined grants	18.0	**23.3%**
SNSF	4.0	**5.3%**
Medical Services & Diagnostics	4.4	**5.8%**
European Commission	2.6	**3.3%**
Medicines Research	3.2	**4.1%**
Postgraduate training	1.8	**2.3%**
R. Geigy Foundation	1.7	**2.2%**

Funding 2016

Competitively acquired
78.7 %

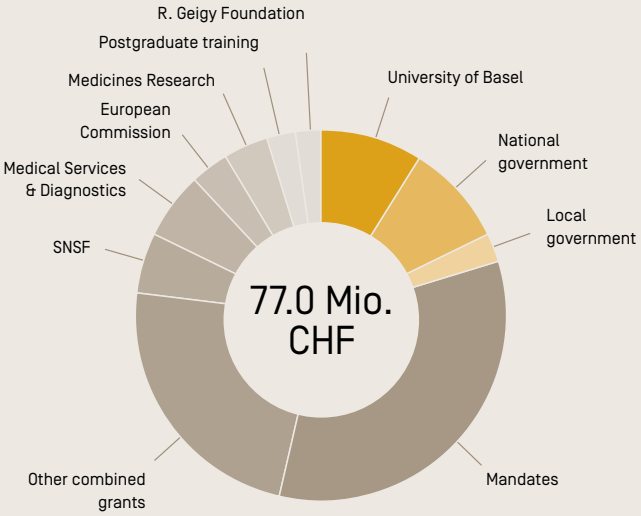
Core contributions
21.3 %



Funding 2015

Competitively acquired
79.6 %

Core contributions
20.4 %



Annual Accounts

Income Statement

	2016 in 1,000 CHF		2015 in 1,000 CHF	
Income				
Self-managed income	60,812	74.6%	61,465	79.9 %
Core funding from national and local government	17,356	21.3%	15,711	20.4 %
Other operating income	2,587	3.2%	2,230	2.9 %
Change in unbilled services	746	0.9%	–2,440	–3.2 %
Total income	**81,501**	**100.0%**	**76,966**	**100.0 %**
Expenditure				
Personnel expenses	–51,625	63.5%	–51,398	67.0 %
Material expenses	–3,956	4.9%	–4,479	5.8 %
Depreciation of tangible assets	–1,228	1.5%	–1,018	1.3 %
Amortisation of intangible assets	–103	0.1%	–50	0.1 %
Administrative expenses	–3,667	4.5%	–3,706	4.8 %
Other operating expenses	–20,767	25.5%	–16,119	21.0 %
Total expenditure	**–81,346**	**100.0%**	**–76,770**	**100.0 %**
Operating result	**155**		**196**	
Financial result	–51		–84	
Ordinary result	**104**		**112**	
Extraordinary result	0		0	
Overall results	**104**		**112**	

Balance

	2016 in 1,000 CHF		2015 in 1,000 CHF	
Assets				
Cash and cash equivalents	24,411	48.3%	24,097	49.4 %
Receivables	10,766	21.3%	11,066	22.7 %
Prepayments and accrued income	4,927	9.7%	3,553	7.3 %
Inventories	127	0.2%	132	0.2 %
Total current assets	**40,231**	**79.5%**	**38,848**	**79.6 %**
Non-current assets	10,342	20.5%	9,968	20.4 %
Total non-current assets	**10,342**	**20.5%**	**9,968**	**20.4 %**
Total assets	**50,573**	**100.0%**	**48,816**	**100.0 %**
Liabilities and equity				
Short-term financial liabilities	900	1.8%	2,000	4.1 %
Payables from goods and services	1,630	3.2%	1,988	4.0 %
Other payables	1,167	2.3%	1,204	2.5 %
R. Geigy Foundation – short term loan	2,000	4.0%		
Accrued liabilities and deferred income	33,547	66.3%	32,402	66.4 %
Short-term provisions	1,253	2.5%	811	1.7 %
Total current liabilities	**40,497**	**80.1%**	**38,405**	**78.7 %**
Long-term liabilities	566	1.1%	329	0.7%
Mortgages	1,500	3.0%	2,400	4.9%
Long-term provisions	1,455	2.9%	1,230	2.5 %
Total non-current liabilities	**3,521**	**7.0%**	**3,959**	**8.1%**
Equity	**6,555**	**13.0%**	**6,452**	**13.2 %**
Total liabilities	**50,573**	**100.0 %**	**48,816**	**100.0 %**

Financial statements established in accordance with Swiss GAAP FER

Income Statement by Activities 2016

	Income in 1,000 CHF		Total costs in 1,000 CHF	Balance in 1,000 CHF
Research				
Medical Parasitology and Infection Biology	11,874		–11,867	7
Epidemiology and Public Health	20,562		–20,584	–22
Institutional projects	2,874		–3,275	–401
Total research	**35,310**	47 %	**–35,726**	**–416**
Teaching and Training				
Education and Training	**4,040**	5 %	**–3,954**	**86**
Services				
Medical Services & Diagnostics	5,368		–5,179	189
Medicines Research	3,701		–3,621	80
Swiss Centre for International Health	27,576		–27,411	165
Total services	**36,645**	48 %	**–36,211**	**434**
Total activities	**75,995**	100 %	**–75,891**	**104**
Management	5,506		–5,506	0
Income statement	**81,501**		**–81,397**	**104**
Management and infrastructure costs included in total activities			–6,264	

Income Statement by Activities 2015

	Income in 1,000 CHF		Total costs in 1,000 CHF	Balance in 1,000 CHF
Research				
Medical Parasitology and Infection Biology	12,274		–12,261	13
Epidemiology and Public Health	20,317		–20,261	56
Institutional projects	3,033		–3,606	–573
Total research	**35,624**	49 %	**–36,128**	**–504**
Teaching and Training				
Teaching and Training	**3,111**	4 %	**–3,567**	**–456**
Services				
Medical Services & Diagnostics	5,264		–5,128	136
Medicines Research	3,269		–2,950	319
Swiss Centre for International Health	25,527		–24,910	617
Total services	**34,060**	47 %	**–32,988**	**1,072**
Total activities	**72,795**	100 %	**–72,683**	**112**
Management	4,171		–4,171	0
Income statement	**76,966**		**–76,854**	**112**
Management and infrastructure costs included in total activities			–6,369	

Funding Partners and Clients

Core Funding

Core contribution Kanton Basel-Stadt
State Secretariat for Education, Research and Innovation
University of Basel (Kantone Basel-Stadt and Basel-Landschaft)

Research Funding

EU research programmes, including EDCTP, ERC, Horizon2020
Commission for Technology and Innovation, CH
Medical Research Council, UK
National Institutes of Health, US
NWO-WOTRO Science for Global Development, NL
Swiss National Science Foundation, CH
Wellcome Trust, UK

Foundations

Bangerter-Rhyner-Stiftung, CH
Bill & Melinda Gates Foundation, US
Clinton Health Access Initiative, US
Cordaid, NL
Eckenstein-Geigy Stiftung, CH
Eremitage Foundation, LI
Fondation Pasteur Suisse, CH
Forlen Stiftung, CH
Freiwillige Akademische Gesellschaft Basel, CH
Medical Care Development International, US
Medicor Foundation, LI
Medicus Mundi, CH
Novartis Foundation, CH
R. Geigy-Stiftung, CH
Stiftung pro REHAB Basel, CH
Stiftung Symphasis, CH
Thrasher Research Fund, US
UBS Optimus Foundation, CH
Uniscientia Stiftung, LI
Walter Fischli-Stiftung, CH
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Bundesamt für Lebensmittelsicherheit
Bundesamt für Sport
Bundesamt für Umwelt
Canton de Vaud
Swiss Agency for Development and Cooperation (SDC)
EMPA Materials Science and Technology
EAWAG
Entwicklungszusammenarbeit des Kantons Basel-Stadt
Meteo Schweiz
State Secretariat for Economic Affairs (SECO)
SUVA

Public and Public-private Clients International

Centre hospitalier universitaire vaudois (CHUV), CH
Consiglio Nazionale delle Ricerche, IT
Department for International Development (DFID), UK
Deutsche Gesellschaft für Internationale Zusammenarbeit, DE
Drugs for Neglected Diseases initiative, CH
FIND, CH
Fundacio Privada Institut de Salut, ES
GAVI the Vaccine Alliance, CH
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Global Alliance for TB Drug Development, UK
Global Alliance for Rabies Control, UK
Global Fund to Fight AIDS, Tuberculosis and Malaria, CH
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International Committee of the Red Cross, CH
International Livestock Research Institute, KE
KfW Bankengruppe, DE
MMV Medicines for Malaria Venture, CH
National Centre for Malariology, CB
Netherlands Ministry of Foreign Affairs, NL
Norwegian Knowledge Centre Health Service, NO
PATH Malaria Vaccine Initiative, US
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SANRU, CD
UNICEF, CH
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United Nations Population Fund, CH
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Weltgesundheitsorganisation WHO, CH
World Bank, US

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Centre Hospitalier Universitaire Vaudois, CH
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