Amsterdam UMC
University Medical Centers


# MIDTERM REPORT 2017-2019

## Amsterdam Public Health

APH is a collaboration between:

Amsterdam UMC
University Medical Centers

VU
VRIJE UNIVERSITEIT AMSTERDAM

UNIVERSITY OF AMSTERDAM

# CONTENT

# WORD FROM THE DIRECTORS

In preparation of our external audit in 2023, we are presenting the current status of the Amsterdam Public Health research institute (APH) in this midterm report. Summarizing our joint initiatives and achievements, we reflect on the past years (2017-2019) and present our plans for the coming years. The information in this report is organized along the lines of the Strategy Evaluation Protocol (SEP).

APH is a network institute with over 1,500 researchers from different faculties of the parent universities. From the Vrije Universiteit (VU) the faculty of medicine (VUmc), faculty of science and faculty of behavioral and movement sciences formally participate in the research institute. From the University of Amsterdam (UvA) the faculty of medicine (AMC) formally participates. Therefore, the content and data in this report will primarily cover the formally involved faculties. Nevertheless, APH pursues an open policy for partner organization, which means that researchers from other UvA faculties, or organizations such as HvA, InHolland, ACTA and OLVG increasingly join our network.

For APH, the years 2017-2019 were largely dominated by merging two research communities of public health researchers as part of the merger between VUmc and AMC. As a result of this increase in scale, APH was still searching for its identity and the right fit in a larger and more complex setting than before. After this building phase in which the focus was mainly on creating internal cohesion within the research programs, our focus has shifted to external profiling during the end of 2019. We look back on fruitful years for the research institute, in every sense.

*"Health for all, powered by science"*

## APH Board of Directors

Prof. M.C. (Martine) de Bruijne, Director

Dr D.S. (Dionne) Kringos, Vice Director

Prof. C. (Carlo) Schuengel, Vice Director

# GOVERNANCE AND ORGANIZATION

The Amsterdam Public Health research institute (APH) is a network institute that links both intramural and extramural (clinical) care support and prevention to scientific research on origin, evolution and improvement of health, wellbeing, and societal participation. The research institute's focus is on the metropolitan area of Amsterdam, but the impact that is achieved is global and can be translated to other metropolitan areas worldwide.

To tackle complex public health challenges, APH's research is organized in eight research programs. The eight research programs are aligned with major public health themes: health behaviors & chronic diseases, mental health, societal participation & health, global health, aging & later life, quality of care, personalized medicine and methodology. In these research programs over 1,500 researchers participate that are appointed at Amsterdam UMC, location Amsterdam Medical Center (AMC) and location VU Medical Center (VUmc) and Vrije Universiteit Amsterdam (VU). From the University of Amsterdam (UvA) the faculty of medicine formally participates. Furthermore, APH pursues an open policy for other partner organizations, of which some may formalize collaboration with APH in the future.

Since the start of APH in 2016, the research institute was led by two directors. Judith Sluiter represented AMC and Eco de Geus followed by Willem van Mechelen in 2016 and Martine de Bruijne in 2017 represented VUmc. After the passing away of Judith Sluiter (in April 2018), the research institute was led by one Director (Martine de Bruijne) for several month, before APH Management was transformed to a broader directory team. Since November 2018 APH Management consists of Martine de Bruijne (VUmc), Dionne Kringos (AMC) and Carlo Schuengel (VU Amsterdam). The eight thematic research programs are coordinated by two Program Leaders per program (see **Figure 1**).

The APH Management has been meeting every six weeks with the 16 Program Leaders to update the internal strategy, align, and exchange experiences across research programs, and to discuss anticipatory or reactive response to external developments and opportunities. The daily operation of the research institute is delegated to the APH Management supported by APH Support Staff. The Program Leaders chair their Program Council (consisting of 4-6 senior researchers) and have been meeting at least bi-annually to implement or update the program-specific strategy and to discuss anticipatory or reactive response to external developments and opportunities.

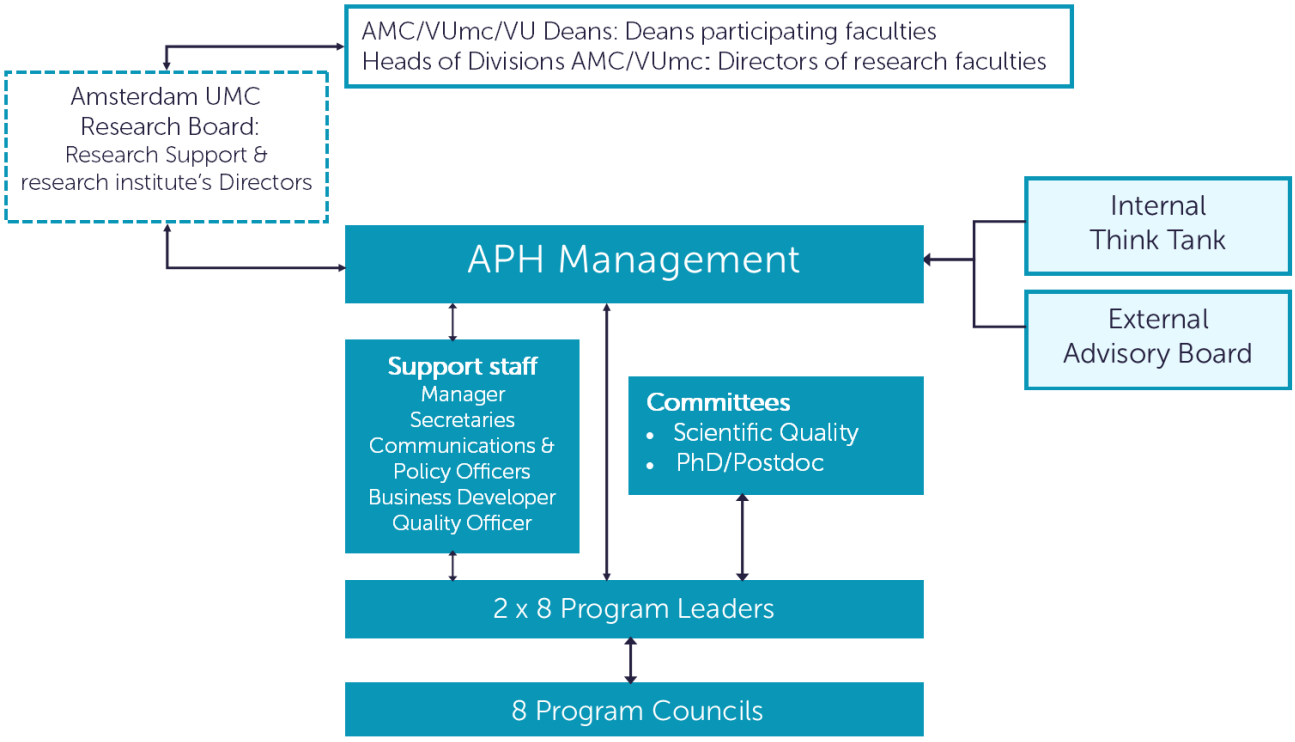



**Figure 1** – Organization of the Amsterdam Public Health research institute in 2017-2019

APH Management has been meeting quarterly with the chairs of the two APH committees: Scientific Quality Committee (SQC) and the PhD/Postdoc Committee. The SQC co-develops and supports the implementation of APH-specific research quality policies and monitors VU and Amsterdam UMC policies regarding the quality of research. The PhD/Postdoc Committee co-develops APH-specific educational activities, PhD and talent guidance and supports the network of PhD and Postdoc researchers. A Think Tank of junior public health researchers has been acting as a sounding board and a 'future forum' for APH Management. The Think Tank advise on policy decisions bi-annually and also provide unsolicited input at any time.

The External Advisory Board consisted of eight external members with a senior position at another organization in the field of public health. They have been meeting with APH Management bi-annually and can also provide unsolicited advice at any time. See Appendix A for an overview of the board members.

# STRATEGY OF THE PAST THREE YEARS

## Mission and vision

In the period 2017-2019, the mission of APH was to conduct high quality research to improve citizen health, reduce health inequalities, transform healthcare, and empower citizens. Health and health care are undergoing major transformations with rapidly changing expectations of citizens. Therefore, APH aimed to generate, disseminate, and translate and implement knowledge, based on sound research to: (1) help decision-makers at all levels to assess health needs, create a healthy environment, strengthen the healthcare system and safeguard its sustainability; (2) assist healthcare professionals in maintaining and improving their performance; (3) empower patients and citizens in managing their health.

## Strategic aims and results

The strategic aims of APH of the past three years were divided in the following strategic themes complemented by the Strategy Evaluation Protocol (SEP) accountability assessment criteria.

### Talent development and PhD policy

APH aims to stimulate talented researchers and to support them in developing their competencies to conduct high-quality research with societal impact. The research institute aims to support, guide, train and prepare the next generation of public health researchers. For APH PhD candidates, doctorate regulations apply from the University of Amsterdam (Location AMC and UvA)[1] and the Vrije Universiteit Amsterdam (Location VUmc and VU).[2] For location AMC, PhD support is centralized and provided by the Graduate School using the registration system Doctor.[3] At AMC no APH-specific criteria are required for PhD candidates' education. For location VU and VUmc, PhD support is provided by the involved research institute and faculty and by the office of the dean using the registration system Hora Finita.[4] In addition to the VU/VUmc specific training requirements, APH sets research institute-specific requirements including minimal 6 ECTS for advanced methodology courses. To facilitate this, APH started a collaboration with the EpidM school in order to provide PhD candidates a discount on epidemiological and advanced methodology course fees.[5]

Amsterdam UMC offers several talent programs, including the AMC Fellowship, the Tenure track (locations AMC and VUmc) and the Career track (VUmc). VU also offers several talent programs and career opportunities for talented researchers. APH collaborates with CAPHRI, NIVEL and RIHS within the Netherlands School of Public Health and Care Research (CaRe). PhD candidates can increase their network and presentations skills by visiting the yearly 2-day CaRe conference. Amsterdam UMC has active PhD candidate associations: APROVE at location AMC[6] and ProVU at location VUmc.[7] The latter organization is also active at VU and provides a network for postdoc researchers as well. APH PhD candidates are stimulated to join these associations. The associations provide a training and development program and organize social events.

In the summer of 2017, APH formed the PhD/Postdoc Committee. The committee organized introduction meetings, offered

[1] https://www.uva.nl/en/research/phd/documents-and-forms/documents-and-forms.html
[2] https://vu.nl/nl/onderzoek/meer-over/promotiereglement
[3] https://www.amc.nl/web/leren/graduate-school.htm
[4] https://www.vumc.com/departments/phd-portal.htm
[5] https://www.epidm.nl/
[6] https://www.aprove.nl/
[7] https://www.vumc.com/departments/phd-portal/phd-postdoc-organizations.htm

assistance to PhD candidates (e.g., when they are in a dispute with supervisors), started a 'APH PhD intervision activities program' and developed PhD manuals with details about the various general and research institute-specific educational steps within a VU/VUmc PhD trajectory (which are provided for AMC/UvA PhD trajectories by the Graduate School). The PhD/Postdoc Committee also intended to create a Postdocs network, including intervision activities, Postdoc manuals and individual coaching trajectories, but this has not been realized. As from 2019, the PhD/Postdoc Committee changed focus to mainly PhD candidates' activities and was renamed to the PhD Education Committee.

## Communication

APH aims to create a community or network of researchers with similar interests, stemming from different disciplines and research traditions. APH developed an active branding and public relations strategy using the APH website and other communication materials and built an online research community on the website with descriptions of each researcher and their ongoing projects in each of the research programs. In 2017, APH developed an internal and external communication strategy including a matching press plan and a web strategy. The APH website and e-newsletters (both institution-wide and research program-specific) were used for the central dissemination of information on lectures, seminars, colloquia and other events as well as information on calls, highlighted papers, and inspiring grant successes. To engage effectively with internal researchers and external stakeholders, the second APH Annual Meeting was held in 2017. Other activities with external stakeholders included the WeMakeTheCity festival and Hacking Health Amsterdam in 2019. Attention for and contact with external relations at the APH research institute level have grown between 2017 and 2019, as the research institute has passed its first building phase at the end of 2019. Within the research programs also much is done to establish connection with stakeholders and target groups. For instance, the debate series or the elderly panel initiated by the Aging & Later Life research program.

## Scientific quality

APH aims to provide a learning community environment that encourages good conduct in research and disincentives misconduct. In this light, APH (further) develops and stimulates the use of a number of instruments to facilitate scientific integrity and scientific quality in all phases of research, including study design, data collection, data analysis and reporting.

The Scientific Quality Committee (SQC) contributes to and oversees the development and maintenance of the APH research quality instruments, primarily the APH Quality Handbook (build upon the former 'kwaliteitshandboek' of the EMGO+ institute), internal quality audits, and internal peer review. The committee also gives solicited and unsolicited advice to the APH Management on all matters concerning research quality policy. The SQC is a representative reflection of midcareer and senior scientists in the research institute with at least two members from each of the eight APH research programs, supported by a dedicated Quality Officer embedded within APH Support Staff. In the past, the Quality Officer also has acted as the principal investigator of potential violations of research integrity that had been brought to the attention of APH Management. This role was taken over by the scientific integrity officers of the respective universities, with the implementation of the new VSNU code of conduct in 2018. Historically, different quality procedures in the former EMGO+ institute and AMC existed. It took considerable time to build consensus on the quality policy and procedures, which were only formulated by the end of 2019 as part of the overall renewed APH Strategic Plan (2020-2023). During the vacuum in which the two

quality systems of the two merging hospitals were integrated, a gap existed between the monitoring of the quality of non-WMO and WMO light risk category APH research projects versus the monitoring of WMO high risk projects at the beginning of the build-up phase of APH. However, reviewing activities of the scientific quality, feasibility and relevance of research proposals to be embedded in the institute has continued during this period.

## Cohorts and infrastructure

Research groups in APH coordinate and maintain many large-scale longitudinal cohorts and health (care) registries.[8] These long-standing projects provide a unique cross-section of society and are a wealth of long-term national data.

The sustainability and viability of the cohorts and registries are under constant pressure due to lack of structural funding that can safeguard and improve the infrastructure. APH continuously strives to sustainably strengthen the cohorts/registries and their position in the epidemiological field and has also regularly invested resources in the past to boost the cohorts. One of the successful examples of such an investment was the Geoscience and Health Cohort Consortium (GECCO)[9] in which six large-scale and ongoing cohort studies within APH have been enriched with a variety of existing geo-data. The centralization of these geo-data and the linkage of these data to individual-level data from longitudinal cohort studies enable large-scale epidemiological research on the impact of the environment on public health in the Netherlands.

Over the past three years, APH has set up a working group (representing PIs from the cohorts/registries) to come up with a new booster plan for the coming years. Although the plans were still in a premature phase at the end of 2019, the outline shows that the focus will be on developing a blueprint for linking cohorts to external data (such as microdata derived from CBS registers and data from general practitioners, hospitals and pharmacists) and making cohort data more findable and accessible through advanced data management and meta-coding.

## Societal impact and valorization

APH aims to produce excellent scientific research, but this research only fulfills its potential when it benefits society at large. Striving for societal impact not only justifies the use of public funds, but also provides focus for APH's research projects and direction for the institute's policy. In 2017-2019 APH researchers contributed to several clinical guidelines and health policy reports on various topics. In addition, many articles in national professional journals, papers for the general public and (chapters in) handbooks were published. Another important indicator of the research institutes' societal relevance is memberships of many APH researchers of civil society advisory bodies in the public or commercial field, through which APH's scientific insights can directly be translated into policy, medical practice and medical products, and various contributions to the media.

In order to have a direct impact on the daily practice of extramural and transmural health care APH has established over the years a number of Academic Collaborative Centers ('Academische Werkplaatsen').[10] These centers cover specific topics of applied research and develop and provide expertise relevant to health care practice. The Academic Collaborative Centers are formal collaborations between APH and practice settings to conduct practice-based research of strong methodological rigor. In

[8] https://www.amsterdamumc.org/en/research/institutes/amsterdam-public-health/strengths/aph-cohorts.htm
[9] https://pubmed.ncbi.nlm.nih.gov/29886447/
[10] https://www.amsterdamumc.org/en/research/institutes/amsterdam-public-health/strengths/academic-collaborative-centers.htm

these collaborative networks, practice, research, education and policy are brought together by direct collaboration between clinicians, teachers, researchers and managers. Two examples of these centers are: (1) the Academic Collaborative Center with 's Heerenloo in which academic research is developed on developmental pathways, personalized treatment and quality of care for people with intellectual disabilities in the Institution. And (2) the University Network of Organizations for Elderly care (UNO) with several care organizations across the Netherlands in which a bridge is built between research and practice in long-term elderly care, especially in nursing homes.

Much of the research that is carried out within the research institute potentially has a direct impact on clinical, non-clinical, and preventive care and support. Like other knowledge institutions, APH is expected to and strives to produce knowledge in line with societal health challenges and to ensure that this knowledge can actually be utilized in healthcare policy, practice and beyond. Yet the path from the academic setting to practice is often unpaved and there are several factors that can influence success. Factors that hinder or promote the implementation and scale-up of scientific knowledge from public health research play a role at all levels. APH strives to strengthen her researchers to anticipate in an early stage of their research on potential applications of the intended results in a practical setting, to involve stakeholders and develop appropriate strategies for this. Moreover, APH stimulates a climate which encourages the pursuit of societal impact by developing accountability information alongside the more traditional scientific metrics.

From the Spring of 2017 until 2019, APH appointed a dedicated business developer who, in collaboration with the Innovation Exchange Amsterdam (IXA), was asked to draw up a strategy on how to combine academic and industrial activities in grant applications and how to collaborate with industry and small and medium-sized enterprises (SME) partners to create sustainable solutions in health care. This pilot did not yield what APH had hoped for. Possibly the focus on prevention and the more system-wide approach characteristic of the public health domain hampers development of a profitable and sustainable business model, compared to, for example, entrepreneurial activities in the more pharmaceutically or clinically oriented domain. To gain more insight into which valorization issues are most relevant for public health researchers and how APH can better facilitate its researchers in more tailor-made valorization support, the research institute started an exploration in 2019 among a dozen APH researchers. First observations showed that there is a need for more and targeted support to timely recognize and anticipate valorization opportunities, especially in the public health setting, for example on issues on stakeholder engagement and the development of digital tools, such as software and apps. Also, the importance of organizational embedding and systematic shift in culture towards implementation and practice were recognized. Results of this exploration will shape APH's course on this matter the coming years.

## Open Science

APH fully supports the international Open Science movement which aims to increase scientific quality and impact by fostering transparency, cooperation, reproducibility and sharing of research methods, data, and products. APH stimulates researchers to make research data and other research processes freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods. The research institute strongly believes that Open Science improves trust among researchers as others can verify research findings, it promotes reuse of research data, and it promotes building

new collaborations with researchers and societal partners.

As part of Open Science, Amsterdam UMC and VU central policy encourages Open Access (OA) publishing and the reuse of data for future research by other groups. Over the past few years, OA deals have been made with publishers and journals that enable Amsterdam UMC researchers (and thus APH researchers) to publish their articles OA at discount rates (up to 100%). Support and information regarding OA publishing is provided by the Medical Library for location AMC[11] and by the UBVU for location VUmc and VU.[12]

For the reuse of data, it is a prerequisite that research data is stored in a FAIR (Findable, Accessible, Interoperable and Re-usable) way. Research Data Management support can facilitate the creation of FAIR datasets by providing APH researchers with tools for and support with drawing up Data Management Plans. For instance, APH's Amsterdam UMC researchers can use various open data repositories (e.g., Figshare for location AMC and DANS for location VUmc) to share and openly publish their FAIR research data sets. Support regarding storage and archiving is provided by the Research Data Management Helpdesk and the Medical Library for location AMC, and the Research Data Management department and the UBVU for location VUmc and VU. Furthermore, the APH Quality Handbook facilitates FAIR data by offering guidance on issues such as asking for informed consent with data sharing, metadata standards, and good data management practices.

## Academic culture

APH Management advises Amsterdam UMC and VU in their policies to ensure openness, (social) safety, inclusivity and research integrity. At Amsterdam UMC and VU an 'Ombudsman' office has been installed. This office aims to improve social safety and combating unethical and/or undesirable behavior, to increase ownership and responsibility of employees and managers regarding (safety) signals and to promote an open reporting culture. Moreover, APH Management advises Amsterdam UMC and VU in the development of its policies on diversity and inclusion (see for more details Human Resources policy).

Regarding research integrity, APH Management advises Amsterdam UMC and VU on strategies to achieve an academic culture in which researchers are stimulated and supported to perform research to the highest ethical standards. This is also a recurrent theme in APH's annual meetings and e-newsletters. Elaborating on the European and the Netherlands Code of Conduct for Research Integrity, that articulate broad values and principles characterizing research integrity, the Research Code defines local expectations and guidelines for researchers when conducting research at Amsterdam UMC.[13] APH actively promotes awareness and use of the Research Code among its researchers. Since APH researchers perform various types of research - preclinical, observational, clinical - the research institute has to adhere to various standards, rules and regulations and have a quality framework in place. Dedicated Research Support teams are in place at Amsterdam UMC and VU to provide hands-on support and help researchers comply with integrity and quality requirements.

[11] https://intranet.amc.nl/web/personeel/links-voor-de-werkplek/medische-bibliotheek-amc-literatuur/open-access-publiceren.htm (limited access)

[12] https://www.ub.vu.nl/nl/ub-voor-onderzoekers/open-access/index.aspx

[13] https://amsterdamumc.org/research/integrity.htm

The executive boards of VU[14] and UvA[15] have appointed several independent confidential counsellors focusing on research integrity. Any employee or external party involved in research at Amsterdam UMC, VU or UvA who has a question about research integrity or suspects research misconduct can discuss this with the confidential counsellors. They can mediate and advise about whether to file a complaint. Furthermore, they can support the submission of a formal complaint to the research integrity committees, that are established by the executive boards of the UvA and VU (because the universities hold responsibility for research done in their institution, including the medical faculties). Moreover, the confidential counsellors provide research integrity training, for instance for clinical investigators as part of the Introductory Clinical Research Organization course (BROK). As part of the PhD trajectory, a research integrity training is mandatory for PhD candidates.

## Human Resources policy

APH is convinced that science is best pursued with a wide diversity of staff members and teams: talented people who each bring their own knowledge, values and experiences to the task and respect each other. Therefore, APH is dedicated to create a diverse and inclusive research environment. Diversity and inclusion in relation to health and health care is a research theme as well within the APH Personalized Medicine research program. The research groups involved provide the affiliated organizations with evidence based advice on increasing diversity and inclusiveness suiting the population they serve.

Amsterdam UMC has endorsed the Charter 'Talent to the Top'.[16] By signing this Charter, Amsterdam UMC and its research institutes have committed to the objective for having more female talent in the top and sub top levels. An example of how this is stimulated is the Amsterdam UMC 'Female Career Development' program that is designed to stimulate talented female scientists in their ambitions and career paths. To boost the number of women scientists in top positions, both Amsterdam UMC locations use the institution's part of the NWO Aspasia Grants to help female researchers progress to higher levels on the career ladder. Here too, young female scientists are stimulated to plan international work visits, since research experience abroad and setting up international networks are important steps in a scientific career. Besides gender equality, attention is also paid to being an inclusive organization for other underrepresented groups via various programs (e.g., the working group on 'intersectionality') that were created bottom up.

Amsterdam UMC has a principal investigator (PI) system which challenges individual scientists to take up leadership, develop their own research lines and gain visibility.[17] The criteria are: publications over the last 6 years as first or last author that demonstrate one's own line of research, active research funding of €200,000 as main applicant, and supervision of ≥1 PhD candidate as co-promotor. PIs are appointed annually by the executive board. The PI system originated at location AMC, has been adopted at location VUmc in 2017 and is harmonized within Amsterdam UMC since 2019.

## Internal accountability

APH Management collaborates closely with colleagues in the other Amsterdam UMC research institutes to create strong research centers and a strong infrastructure for research in Amsterdam UMC, VU and UvA. Internal accountability is also built through the meetings

[14] https://www.vu.nl/en/about-vu-amsterdam/academic-integrity/index.aspx
[15] https://www.uva.nl/en/research/research-environment/academic-integrity/academic-integrity.html#Confidential-advisers-for-academic-integrity
[16] https://talentnaardetop.nl/charter
[17] https://intranet.amc.nl/web/organisatie/clusters/afdelingsoverzicht/research-policy/principal-investigators.htm

of APH Management with all 16 Program Leaders, who in turn meet with their Program Council frequently to reflect on achievements and vision of the respective research program.

The quality policy of APH complies with the overarching quality policy of our parent organizations (e.g., Joint Commision International (JCI) of Amsterdam UMC). In addition, internal quality policy is set up and monitored by the SQC. Procedures are gradually developed and implemented by researchers to set minimum requirements to ensure scientific quality and to organize and perform thematic audit activities on the topics of quality improvement and quality assurance. Since the transition from EMGO+ to APH these activities were performed less frequently and the operational part of these activities will be reexamined in the coming years. Another important activity is to create a database of all APH affiliated research projects and organize peer-audits in the research programs. Furthermore, internal accountability is built through the activities of the APH Think Tank, advising APH Management on policy decisions yearly.

## External accountability

Yearly, APH publishes an annual report where the facts, figures and other developments of the research institute are shared. In 2019 and 2020 no annual report was published, due to quality issues with the data of the participating faculties and a general shift towards how to evaluate research with less quantitative data and more narrative information on quality, societal relevance and viability. Regular evaluation of APH is done according to the national Strategy Evaluation Protocol (SEP) of the Netherlands Organization for Scientific Research (NWO), The Royal Netherlands Academy of Arts and Sciences (KNAW), and the Federation of the Netherlands Universities (VSNU). At six-year intervals an external evaluation takes place. Internal midterm evaluations - such as this report - are held in between, as organized in coordination with the deans involved.

APH's External Advisory Board, consisting of eight external members of other organization in the field of public health, started in the winter of 2017. The Board provides guidance on the overall strategy of APH including the viability of existing research programs and the need for new research programs. Members were selected on the administrative, academic and/or policy experience deemed relevant to the adopted broad definition of public health research by APH and for their interest in transmural and extramural health care and research. Members have no direct interest in the research institute.

# RESEARCH PROGRAMS AND HIGHLIGHTS

APH concentrates its research efforts in eight research programs. For each research program its focus and highlights of the past three years are described.

## Health Behaviors & Chronic Diseases

Although on average a positive trend is visible in a decreasing number of people that smoke and other health behaviors are increasingly receiving more attention in care and policy, obesity rates and non-communicable disease prevalence are still growing. As are inequities between people in low and high socio-economic groups. The contribution of the HB&CD research program to improve the burden of behavior-related chronic diseases is related to: (1) understanding health-related behaviors, their impact on health and functioning, and distribution across the population; (2) development, implementation and evaluation of interventions aimed at promoting healthy behaviors in the complexity of real-life settings.

To deal with the complex nature of chronic disease and health disparities, participatory methods and system approaches in research play an increasing role internationally and are developed and applied by APH researchers both locally and in international consortia. A good example is the LIKE project: Lifestyle Innovations based on youths' Knowledge and Experience.[18] Childhood overweight and obesity and related determinants including poor diet, poor sleep, excessive screen use and insufficient physical activity are considered important health problems. The driving factors are multiple, diverse, complex and dynamic, ranging from biological factors and personal behaviors to aspects of the physical, economic, socio-cultural and political environments that shape them. Against this background, there is a growing recognition of the need to, firstly, apply systems thinking to tackle this problem, and secondly, to include target populations in the development and implementation of interventions. That is exactly what the LIKE project does: it follows a system dynamics and participatory based approach to promote healthy habits among 10-14 years old in multi-ethnic, lower socio-economic groups living in Amsterdam East. It is carried out in a partnership between APH research groups and other universities (Rotterdam, Maastricht), the municipality of Amsterdam (Amsterdam Healthy Weight Program) and the GGD Amsterdam, with a big role for children (10-14 years old) as well as other local stakeholders (social welfare organizations, supermarket, sport clubs etc.) in the development as well as evaluation of interventions.

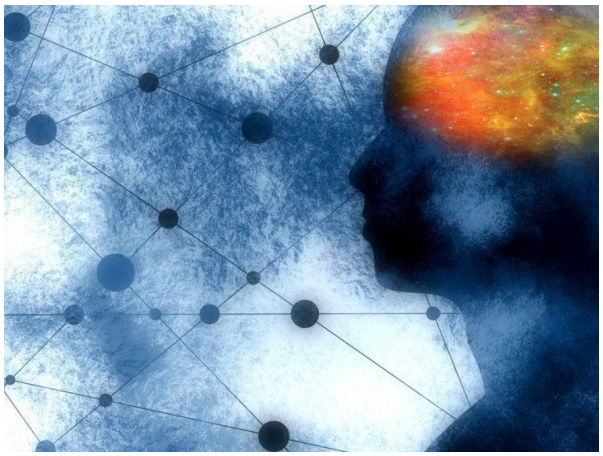
The quality of the research in this research program is demonstrated by publications with high scientific and societal impact, such as the paper published in JAMA, highlighting the findings of the multi-center MooDFOOD prevention trial. This is the largest trial thus far focusing on the effect of two different nutritional strategies to prevent a clinical

[18] http://like-onderzoek.nl/

depression in a high-risk population.[19] To increase sustainable societal impact of their research, APH researchers join governmental bodies, such as professor Marjolein Visser and Joline Beulens who became members of the nutrition committee of the Dutch Health Council in 2017. Similarly, professor Mai Chin A Paw, professor Eco de Geus, associate professor Hidde van der Ploeg and professor Marjolein Visser were members of the Dutch Health Council committee for the 2017 Dutch physical activity guidelines.

## Mental Health

The Mental Health research program aims to examine the development of (chronic) mental disorders, and also encompass mental well-being and quality of life. Such a wide focus will provide insight into resilience factors that prevent mental ill-health, and will provide new keys for preventive strategies of mental health problems. Another strong focus in the research program is on the development of better interventions to improve health among those with mental health problems. It is well known that the currently available treatments work, but not for all. Developing personalized approaches, in which existing or new treatments based on patient profiles are better targeted, is an important focus for the next decade of mental health research.



While the prevalence of mental illnesses in the Netherlands appears stable, their impacts on societal participation and care use are increasing. The investments in mental health research and innovation over the past decades do not appear to have curbed these trends. In rethinking the scientific contribution to mental health, APH researchers of the Mental Health research program have joined international efforts to devise new strategies, building on research from APH and other research institutes.[20,21] Important elements of these strategies align with APH's general strategy, including taking a global perspective aimed towards local and sustainable implementation, striving for synergistic, transdiagnostic, and cross-modal interventions, aiming for preventive and early interventions, and using ICT as a catalyst for innovation, personalization, and accessibility. Such strategies require that communities and stakeholders are involved from the beginning of formulating impact goals and research aims. The introduction of the Thrive-initiative to Amsterdam[22] has been highly useful in this regard, so that research and community leaders (e.g., the Amsterdam city council) better coordinate their countless efforts towards fostering mental health and resilience. Another example of a project that incorporates these strategies as well as the infrastructure for collaboration is the collaborative ENgage YOung people earlY (ENYOY) project[23] that has been awarded a large grant from ZonMW in 2017.

The consortium with three Dutch mental health care institutions (Levvel in Amsterdam and Mondriaan & Virenze in Maastricht), Amsterdam UMC, and Maastricht University developed Headspace teams offering community-based, easily accessible and personalized mental health care for young people aged 12-25 years.

[19] https://pubmed.ncbi.nlm.nih.gov/30835307/
[20] https://doi.org/10.1016/j.euroneuro.2019.12.105
[21] https://pubmed.ncbi.nlm.nih.gov/29482764/
[22] https://thriveamsterdam.nl/
[23] https://www.zonmw.nl/nl/onderzoek-resultaten/geestelijke-gezondheid-ggz/programmas/project-detail/onderzoeksprogramma-ggz/engage-young-people-early-enyoy-headspace-in-the-netherlands/

Amsterdam and Maastricht have opened @ease centers, and more of these are due to open.[24] These centers allow young people to walk in (online and/or offline) and just talk about their worries and problems with trained volunteers, supporting them in addressing beginning problems (e.g., using substances, common mental complaints, relationship problems), as well as linking them to services in case of symptoms of serious mental disorders. The research component of the project tests the efficacy of this approach. In 2019, the project received the societal impact award of Amsterdam UMC. Lessons from this project are highly informative for other initiatives to increase resilience in youth and families as well, underlining the importance of embedding these projects in APH.

## Societal Participation & Health

The purpose of research in the SP&H research program is to help maintain and further improve societal participation of people with and without health problems. Full societal participation is defined as the opportunity for individuals to optimally participate in as many social roles as desired. Such social roles not only involve paid work, but also voluntary work, informal caregiving and participation in other forms of social activities in society. The relevance is growing, since the number of people with chronic diseases is increasing, both in a growing number of (young) people suffering from such diseases, of which a substantial part is lifestyle related, and in the aging population. The alliance of AMC and VUmc has strengthened the research program.

Overall, the research program covers four themes: (1) Informal care and other forms of participation in society; (2) health behavior and medical examinations; (3) etiology and prevention of work-related disorders, and (4) multidisciplinary and top-referent care for complex work-related disorders. The research program has a strong alliance with other research institutes around Amsterdam UMC, such as Cancer Center Amsterdam and Amsterdam Cardiovascular Sciences as well as a longstanding collaboration with societal partners such as companies (Tata Steel), Occupational Health and Safety Providers (ArboNed, Arbo Unie, VU/VUmc/AMC arbodienst), the Employee Insurance Agency (UWV), and the municipality (of Amsterdam). These collaborations form the basis for vast societal contributions, such as Dutch guideline Cancer and Work, and the NVAB Guideline for psychological problems.

The scientific impact of the research program is illustrated by the leading role in the organization of international conferences and memberships of editorial boards of occupational health journals such as Scandinavian Journal of Work, Environment and Health, and Cochrane Work. The evidence-based ikHerstel 2.0 app[25] for working adults undergoing a knee replacement is increasingly implemented and translated to other patient groups, since it has proven to increase work participation in a cost-effective way. The application was developed in collaboration with doctors' and patients' organizations. The ikHerstel 2.0 app provides

[24] https://ease.nl/

[25] https://ikherstel.nl/

personalized advice on resuming activities after surgery that the patient has indicated are important to him/her. Thus, the app supports the patient during the care process and the doctor remotely watches the progress of the recovery. Research on ikHerstel 2.0 app has led to a large number of publications in renowned journals such as the Lancet in 2018, a cum laude PhD and the CaRe Award for the best academic dissertation in 2019.

## Global Health

The Global health research program is about worldwide health improvement, reduction of disparities, and protection against global threats that disregard national borders. The research program provides insights in the role of urbanization on health in low-resource settings, and the vulnerable migrant populations globally, including high-income countries. For instance, the European Commission funded RODAM and Pros-RODAM study conduct high quality research in Europe and Africa to enable the development of novel and targeted treatment and health promotion strategies to effectively reduce cardiovascular disease and its risk factors in African populations worldwide.[26] The RODAM study assesses the health and wellbeing of Ghanaian residents in Ghana and Europe and follows them up over time. With this unique approach the RODAM study attempts to unravel the causes of cardiovascular disease and its risk factors among African migrants in Europe and non-migrants sub-Saharan Africa.

A second focus area of the Global Health research program is on factors affecting maternal health and the health of early life including poverty, malnutrition, low education and poor access to healthcare services. Through one of the research projects, an in-depth understanding was gained of the daily realities of women from poor urban settlements in Southern Africa who are caring for disabled children, and interventions were identified that ameliorate their wellbeing based on these realities.[27] The research was ambitious by taking on an under-researched but essential area (mothers of children with disabilities) and doing so in a challenging geography (Southern Africa), while using state of the art methodology.

Thirdly, the research program is dedicated to advance and perform surveillance, disease program evaluations, transmission models, antimicrobial resistance, and preventive strategies of several communicable diseases. The program spearheaded the development and endorsement by the World Health Organization and dissemination of a guideline for the scientific evaluation of new diagnostics to predict progression to tuberculosis disease. Part of this was the introduction of a new paradigm of 'incipient tuberculosis test', which has now been mainstreamed in the global narrative on development and utilization of novel diagnostics for tuberculosis.[28,29]

Members of the research program are also very active in international advocacy for Global Health research and agenda setting. Professor Frank Cobelens initiated and spearheaded the establishment of the European Global Health Research Institutes Network, aimed at

[26] www.rod-am.eu
[27] https://research.vu.nl/en/publications/against-all-odds-exploring-wellbeing-transformation-with-mothers-
[28] https://pubmed.ncbi.nlm.nih.gov/28017341/
[29] https://pubmed.ncbi.nlm.nih.gov/30139776/

advocating for Global Health research and Global Health research funding with the European Union.[30] Overall, the research program actively contributes to health for all in a global context through inter- and transdisciplinary research collaboration that fosters interaction between theory, policy and practice.

## Aging & Later life

The Aging & Later Life research program aims to help people in the Netherlands grow old and be old in the best possible way. The process of aging affects different people in different ways, meaning that the older population is a very heterogeneous population. But what many older people do have in common is a desire to grow old gracefully and live well, and then die with dignity.

The research program explores the complex process of aging, the experience of being old, and experiencing the last years of life, and uses this knowledge to develop evidence-based strategies to promote a healthy and meaningful old age for all. Central concepts of research within the research program are resilience, quality of life, and personalized care during three stages: aging (growing old), the older person (being old), and the last years of life. Aging is studied from the start of life. The studies on the first 1,000 days contributed, through APH-participation in the Health Council of the Netherlands' 2018 report on parent-child relationships and early life trauma[31], to the government policy regarding 'Promising Start' program investing 41 million euros to give each child the best possible start in life. Regarding older people with dementia and carers, the MEETINGDEM project gained a lot of media attention. This research program successfully translated the Dutch evidence-based personalized approach called the Meeting Centres Support Programme to three other European countries. Thriving consortium member Rose-Marie Dröes was knighted as Officer in the Order of Orange-Nassau for her innovative, substantial and societal important work in dementia care, including for the Meeting Centres. The program invests a lot in connecting and collaborating with stakeholders (for example within Academic Collaborative Centers) and target groups (for example the elderly panel), in order to promote the implementation and translation of research findings into practice.

The Longitudinal Aging Study Amsterdam (LASA) is a prospective cohort study among several thousand older Dutch adults, which started in 1992 and was still ongoing in 2019. It is a strong asset of this research program and formed the basis of many studies. For example, the study on sex differences in physical performance by age, educational level, ethnic groups and birth cohort.[32] This is the first study that systematically investigated the sex differences in physical performance among older adults in a long-term longitudinal setting, using four different objective measures of two different birth cohorts. The results showed, in line with previous research, that there is a sex difference in all physical performance measures, where women perform worse compared to men.

[30] https://pubmed.ncbi.nlm.nih.gov/31646008/
[31] https://www.gezondheidsraad.nl/documenten/adviezen/2018/05/22/de-ouder-kindrelatie-en-jeugdtraumas
[32] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0226342

However, there are no specific risk groups with regard to age, educational level or ethnic groups where this 'female disadvantage' is most apparent.

## Quality of Care

In the context of major changes in the healthcare system, research of the Quality of Care research program aims to optimize quality of care for individuals and groups of patients, covering the life-cycle of people. Moreover, solid research is performed to make health care more patient-centered, sustainable, and available for everyone and taking ethical issues and legal aspects into account. This is done by: (1) improving quality of care across disciplines (e.g., internal medicine, acute care, surgery, ophthalmology, midwifery, ear-nose and throat, palliative care, genetics, general practice care); (2) improving management of care, via implementation, supporting communication and the utilization of remote (e-health and m-health) care, and multidisciplinary teams, and (3) monitoring (patient-specific) outcomes (e.g., quality of life, patient safety) and societal impact. Overall, the research program is oriented around the domains of 'Research', 'Society' and 'Implementation and Valorization'.

The EU-funded International Training Network for Healthcare Performance Intelligence[33] dedicated to training 14 PhD candidates across Europe[34] and the platform 'The Embassy of Good Science'[35] illustrate well the focus of the 'Research' domain, which is on skills and capacity building, internal collaboration and cohesion, and on the promotion of national and international visibility and consolidation. An example of applied research is the BMJ publication on the findings of the IRIS study; a stepped wedge cluster randomised trial, which showed that routine ultrasound in the second half of pregnancy did not result in better neonatal outcomes compared to performing ultrasound based on medical indications only.[36] Results of this study are currently used to update guidelines on intrauterine growth restriction.

The main goals of the 'Society' domain focus on connecting projects to societal themes, consolidate QoC as an active societal organization, and strive for (inter)national acknowledgement for being a societal relevant organization. For instance, in the form of citizen and patient engagement in research projects. The research program for instance collaborates with the Dutch Heart Foundation (Hartstichting) in developing and evaluating a heart age tool for the public. Based on the developed heart age tool, the general public can inform themselves about their risk of cardiovascular diseases. Healthcare professionals can use the tool as well in their communications with patients, to better explain their risk of cardiovascular diseases.

And finally, the goals of the 'Implementation and Valorization' theme focus on developing and establishing QoC expertise and to encourage and ensure private and public collaboration and translating research findings into societal

[33] https://www.healthpros-h2020.eu/
[34] https://journals.lww.com/academicmedicine/Fulltext/2019/06000/Training_the_First_Generation_of_Health_Care.7.aspx
[35] https://embassy.science/wiki/Main_Page
[36] https://pubmed.ncbi.nlm.nih.gov/31615781/

impact. To illustrate, members of the research program created a new definition of fetal growth restriction that was immediately implemented worldwide and has received the Stewart Campbell award lecture for best cited article of the UOG journal in 2019. Another example of successful public-private partnership is the development and use of a new method to measure listening effort. Members of the research program developed a method to quantify how effortful listening is. The largest hearing aid manufacturer in the world (Oticon AS in Denmark) adopted the method in their R&D process, patented it and uses it for the development of hearing aids. A longstanding fruitful collaboration with Oticon AS is now in place. They translated the scientific findings in their brochures for patients distributed worldwide in many countries/languages, and the work on listening effort was published in a series of professional journals and attracted the Dutch media too.[37,38]

## Personalized Medicine

With the combination of ongoing (bio)-technological developments and the perceived need for person-centered decision-making and treatment, medicine has now arrived in an era where more customization is both needed and possible. Personal genomes, information on subtypes of diseases, and individual characteristics and preferences can guide stratification and personalization in healthcare. Importantly, personalized medicine is not limited to individualized medicine, let alone to people's genomes. In response to societal changes, there is increased recognition that healthcare should also become more responsive to the cultural, ethnic, socio-economic, gender, and psychological diversity in the population and to people's social identities across their intersections, hence, across people's 'biosocial' locations (intersectional approach) and their privileges and disadvantages. Overall, the PM research program aims to bring the prospect of personalized medicine closer by research on the following themes: (1) mapping diversity in healthcare needs; (2) risk profiling; (3) stratified interventions; (4) training for diversity, and (5) innovative research methods.

Societal impact is reached nationally and internationally. For instance, a chapter was contributed to the OECD Report Educating 21st Century Children: Emotional Well-being in the Digital Age. Title of the chapter is 'The social context of adolescent relationships'. This chapter describes the status and importance of social relationships nowadays and the threats to these relationships. It discusses how 21st century social changes in the distal context – climate change, forced displacement, individualization and new technologies – affect adolescent development, relationships and mental health. Adolescents not only directly experience the outcome of social changes, they will also be the key driver for social change, for better and for worse.

Longitudinal data, such as collected in the Twin registry, often linked to other sources, form a strong basis for biosocial studies. For example, a new method for multivariate gene identification

[37] https://www.trouw.nl/verdieping/horen-is-meer-dan-alleen-luisteren-er-komen-cognitieve-functies-bij-kijken~b25acc4c5/

[38] https://www.nrc.nl/nieuws/2019/09/22/hoor-nou-eens-a3974209

for well-being was published in Nature Genetics.[39] Supported by NWO, the Twin registry has invested in making the data FAIR and open to other researchers.

Application of innovative personalized approaches leads to many high-quality publications, such as the publication in NPJ Science of Learning: reporting on differences between higher and lower educated Dutch people based on Lifestyle linked epigenetic data. Lower educated Dutch people are in general less healthy and have a lower life expectancy of around 6 to 7 years, compared to those with a higher education.[40] There is still a lot unclear about the causes of this gap. DNA-methylation arranges which genes are 'on' and which genes are 'off' and this has on influence on health and life expectancy. The level of methylation was tested in >4,000 people in blood samples for their relationship with educational achievement. These more than 4,000 came from Dutch cohort studies. The researchers found 58 locations in the DNA where the methylation-level in blood cells differed between higher and lower educated Dutch people.

## Methodology

Scientific instruments and methods require continuous refinement and improvement to address evolving and new scientific questions. The Methodology research program aims to develop and evaluate quantitative and qualitative methods for public health, healthcare and biomedical research, ranging from theories and frameworks to instruments and statistical techniques. The research program promotes and supports methodological research by bringing together methodologists from Amsterdam UMC, VU and UvA and is strongly connected with other research programs within APH. The research program is affiliated with many national and international scientific partners and networks, as well as societal partners, such as the Ministry of Health, Welfare and Sports, the Central Bureau of Statistics, and the World Health Organisation. The program focusses on three themes: (1) development of new methodology; (2) the evaluation of existing and new methods, and (3) research on research, including research integrity.

Regarding societal relevance, a strong tradition of sharing and supporting methodologic knowledge and support tools in the open domain exists. For instance, the COSMIN website - aimed to support researchers in selecting outcome measurement instruments - was renewed (funded by NWO). On the highly accessed COSMIN website[41] (estimated average is 300 daily visitors) researchers can freely access all COSMIN tools, such as a guideline for selecting and evaluating the quality of outcome measurement instruments and a database of systematic reviews of outcome measurement instruments[42], which is yearly updated in collaboration with MAPI Research Trust, and Zuyd Hogeschool.

Mediation analysis is an increasingly used method to unravel the pathways in which an intervention affects a specific outcome. Researchers within the Methodology program evaluated different statistical methods to conduct mediation analyses. Their results

[39] https://pubmed.ncbi.nlm.nih.gov/30643256/
[40] https://www.nature.com/articles/s41539-018-0020-2
[41] https://cosmin.nl
[42] https://database.cosmin.nl

showed that when dealing with continuous outcomes, ordinary least squares (OLS) regression, structural equation modelling (SEM) and the potential outcomes framework provided similar results. However, for dichotomous outcomes the potential outcomes framework was recommended over OLS regression and SEM. [43,44]

The research program has a leading international role in research-on-research integrity, which already has and will have major impact on scientific quality and valuable results for the research and public health society.

Members of the Methodology research program investigated researchers' perceptions about scientific misconduct and found that they experience a major impact from insufficient supervision and negative role models. Although the perceptions differed between scientific fields, sloppy science was recognized throughout science. This and other projects on research integrity have led to a guideline for responsible epidemiological research practice, a superb supervision course for supervisors, and a reproducibility funding scheme within ZonMw.[45,46]

[43] https://pubmed.ncbi.nlm.nih.gov/29696178/
[44] https://pubmed.ncbi.nlm.nih.gov/30665353/
[45] https://pubmed.ncbi.nlm.nih.gov/29432862/
[46] https://pubmed.ncbi.nlm.nih.gov/31819806/

# FACTS AND FIGURES

## Researchers in institute

Over 1,500 researchers from Amsterdam UMC (VUmc and AMC) and VU were affiliated with APH in the period 2017-2019. The apparent decline in 2019 as shown in **Table 1**, might be explained by inconsistencies in researchers' affiliations in the output information systems. These inconsistencies are a consequence of the ongoing harmonization of administrative systems within the merger of VUmc and AMC. The scientific core staff includes assistant, associate, full and endowed professors, and professor emeritus. PhD candidates include both internal and external candidates. Other scientific staff includes junior and senior researchers, postdocs, and visiting fellows.

In **Table 2a-c** the distribution of researchers across the APH's research programs is listed. In Appendix B, an overview is presented of the 26 appointed professors within the research institute in 2017-2019.

**Table 1** – Total number of researchers affiliated to the research institute*

| | 2017 | 2018 | 2019 |
|---|---|---|---|
| Scientific core staff | 304 | 321 | 331 |
| PhD candidates | 649 | 656 | 551 |
| Other scientific staff | 586 | 575 | 495 |
| Total APH researchers | 1539 | 1552 | 1377 |

* From the VU both the faculty of behavioral and movement sciences, faculty of science and faculty of medicine (VUmc) formally participate in the research institute. Whereas from the UvA only the faculty of medicine (AMC) formally participates. The data as shown in all tables cover these formally involved faculties.

**Table 2a** – Total number of researchers affiliated to the research institute and per program in 2017

| | Total | HBCD | MH | SPH | GH | ALL | QoC | PM | Me |
|---|---|---|---|---|---|---|---|---|---|
| Scientific core staff | 304 | 59 | 85 | 31 | 23 | 78 | 87 | 47 | 70 |
| PhD candidates | 649 | 103 | 141 | 45 | 105 | 122 | 213 | 151 | 128 |
| Other scientific staff | 586 | 97 | 123 | 55 | 42 | 124 | 200 | 78 | 75 |
| Total APH researchers* | 1539 | 259 | 349 | 131 | 170 | 324 | 500 | 276 | 273 |

* The sum of researchers of the research programs is more than the total, since a researcher can be affiliated with one or two programs.

**Table 2b** – Total number of researchers affiliated to the research institute and per program in 2018

| | Total | HBCD | MH | SPH | GH | ALL | QoC | PM | Me |
|---|---|---|---|---|---|---|---|---|---|
| Scientific core staff | 321 | 62 | 88 | 30 | 27 | 80 | 94 | 51 | 75 |
| PhD candidates | 656 | 101 | 154 | 42 | 107 | 125 | 215 | 148 | 128 |
| Other scientific staff | 575 | 95 | 128 | 55 | 47 | 128 | 180 | 71 | 73 |
| Total APH researchers* | 1552 | 258 | 370 | 127 | 181 | 333 | 489 | 270 | 276 |

* The sum of researchers of the research programs is more than the total, since a researcher can be affiliated with one or two programs.

**Table 2c** – Total number of researchers affiliated to the research institute and per program in 2019

| | Total | HBCD | MH | SPH | GH | ALL | QoC | PM | Me |
|---|---|---|---|---|---|---|---|---|---|
| Scientific core staff | 331 | 60 | 85 | 31 | 30 | 81 | 102 | 50 | 80 |
| PhD candidates | 551 | 79 | 136 | 33 | 90 | 108 | 176 | 125 | 105 |
| Other scientific staff | 495 | 77 | 117 | 51 | 35 | 108 | 155 | 72 | 64 |
| Total APH researchers* | 1377 | 216 | 338 | 115 | 155 | 297 | 433 | 247 | 249 |

* The sum of researchers of the research programs is more than the total, since a researcher can be affiliated with one or two programs.

## Scientific output

Publications or other forms of scientific output are considered APH output if APH has been mentioned in the affiliations of one (or more) of the authors, and the author was an APH researcher in the year of publication. At Amsterdam UMC and VU, scientific output is collected based on affiliations in the output information system PURE. In the period 2017-2019 the information from these systems was not always correctly processed and integrated. To minimize bias, APH made some modifications manually.

Table 3 lists the number of APH refereed articles (VU/AMC/VUmc) that was published in the period 2017-2019, as well as other scientific output. Although the bulk of the output is in the form of papers in scientific journals, APH researchers also produce many book chapters and professional publications in clinical practice-oriented journals, thus contributing to the necessary knowledge transfer to professionals in several health care settings.

In Table 4a-c the scientific output is presented per research program and per year. Please note that the sum of the research output of the research programs is more than the total scientific output, since a publication can have authors that are affiliated with one or two research programs.

**Table 3** – Scientific output of the research institute in 2017-2019

| | 2017 | 2018 | 2019 |
|---|---|---|---|
| Refereed articles* | 2867 | 2949 | 3139 |
| Non-refereed articles | 126 | 161 | 118 |
| Books and book chapters | 64 | 56 | 51 |
| PhD-theses | 141 | 140 | 139 |
| Professional publications | 334 | 281 | 307 |
| Publications aimed at general public | 11 | 18 | 20 |
| Other research output** | 138 | 124 | 145 |
| Total scientific output*** | 3681 | 3729 | 3919 |

* Refereed articles are based on information from local instances and de-duplicated by DOI number, because modifications made by us manually afterwards in local instances were not correctly processed in the central instance. All other research output types are based on information from the central instance, since for these types very few modifications have been made in local instances. Moreover, other research output types often lack a DOI number, up to 80% in some cases. Part of the scientific output (books, book chapters, publication aimed at general public, other research output) is (only) available after researchers' manual entry in the instances, therefore the numbers might be underestimated.
** Other research output is defined as: abstracts, meeting abstracts, letter to the editor and editorials.
*** The sum of publications of the institute's units (VU/VUmc/AMC) is more than the total per year, since a publication can be affiliated with more than one unit.

**Table 4a** –Scientific output of the research institute and per research program in 2017

| | Total* | HBCD | MH | SPH | GH | ALL | QoC | PM | Me |
|---|---|---|---|---|---|---|---|---|---|
| Refereed articles | 2867 | 585 | 790 | 273 | 387 | 654 | 945 | 619 | 899 |
| Non-refereed articles | 126 | 10 | 15 | 10 | 14 | 33 | 51 | 38 | 42 |
| Books and book chapters | 64 | 6 | 19 | 4 | 18 | 18 | 22 | 6 | 11 |
| PhD-theses | 141 | 24 | 43 | 15 | 15 | 13 | 33 | 6 | 7 |
| Professional publications | 334 | 38 | 87 | 66 | 14 | 68 | 164 | 44 | 48 |
| Publications aimed at general public | 11 | 1 | 2 | 1 | 1 | 3 | 3 | 2 | 3 |
| Other research output | 138 | 41 | 52 | 13 | 3 | 27 | 41 | 7 | 40 |
| Total scientific output | 3681 | 705 | 1008 | 382 | 452 | 816 | 1259 | 722 | 1050 |

* The sum of the research output of the research programs is more than the total, since a publication can be affiliated with one or two programs.

Table 4b – Scientific output of the research institute and per research program in 2018

| | Total* | HBCD | MH | SPH | GH | ALL | QoC | PM | Me |
|---|---|---|---|---|---|---|---|---|---|
| Refereed articles | 2949 | 521 | 839 | 252 | 415 | 722 | 936 | 630 | 814 |
| Non-refereed articles | 161 | 35 | 28 | 16 | 24 | 26 | 62 | 42 | 44 |
| Books and book chapters | 56 | 12 | 22 | 8 | 4 | 9 | 14 | 10 | 9 |
| PhD-theses | 140 | 26 | 41 | 12 | 32 | 33 | 62 | 29 | 28 |
| Professional publications | 281 | 39 | 72 | 50 | 14 | 59 | 115 | 57 | 20 |
| Publications aimed at general public | 18 | 13 | 4 | 0 | 0 | 1 | 0 | 0 | 1 |
| Other research output | 124 | 41 | 51 | 16 | 3 | 27 | 47 | 15 | 26 |
| Total scientific output | 3729 | 687 | 1057 | 354 | 492 | 877 | 1236 | 783 | 942 |

* The sum of the research output of the research programs is more than the total, since a publication can be affiliated with one or two programs.

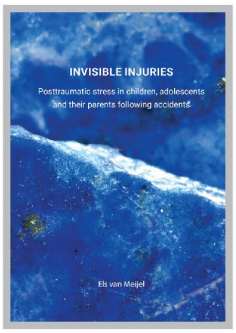
Table 4c – Scientific output of the research institute and per research program in 2019

| | Total* | HBCD | MH | SPH | GH | ALL | QoC | PM | Me |
|---|---|---|---|---|---|---|---|---|---|
| Refereed articles | 3139 | 570 | 865 | 205 | 500 | 767 | 989 | 670 | 906 |
| Non-refereed articles | 118 | 14 | 25 | 11 | 28 | 21 | 44 | 29 | 34 |
| Books & book chapters | 51 | 5 | 19 | 3 | 3 | 13 | 14 | 5 | 12 |
| PhD-theses | 139 | 31 | 34 | 10 | 29 | 40 | 61 | 25 | 22 |
| Professional publications | 307 | 34 | 91 | 29 | 24 | 87 | 115 | 66 | 23 |
| Publications aimed at general public | 20 | 13 | 2 | 0 | 1 | 3 | 5 | 1 | 2 |
| Other research output | 145 | 22 | 67 | 14 | 2 | 15 | 55 | 19 | 35 |
| Total scientific output | 3919 | 689 | 1103 | 272 | 587 | 946 | 1283 | 815 | 1034 |

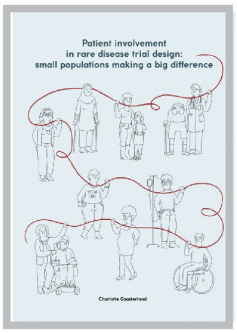
* The sum of the research output of the research programs is more than the total, since a publication can be affiliated with one or two programs.

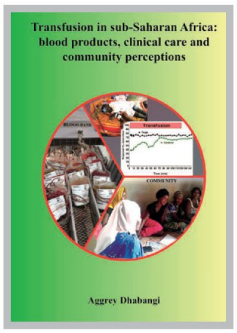
# PhD theses

Each year approximately 140 PhD theses were produced in the period 2017-2019 within the research institute (see **Table 3**). Below you can find a selection of the dissertation covers, with which the diversity of PhD research topics is well illustrated.

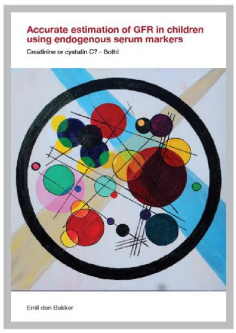




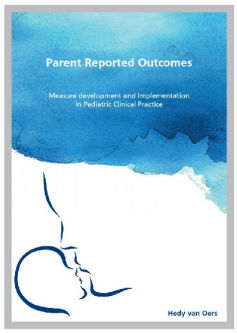


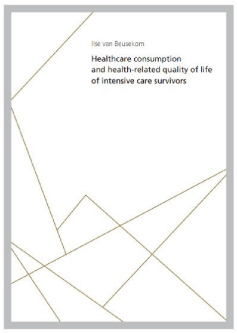





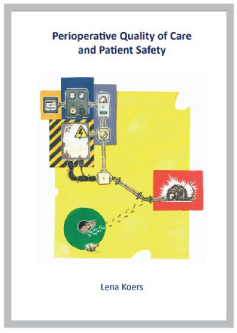


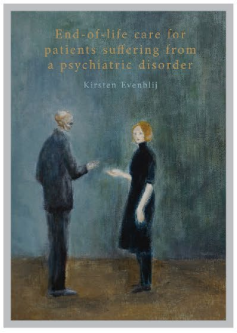


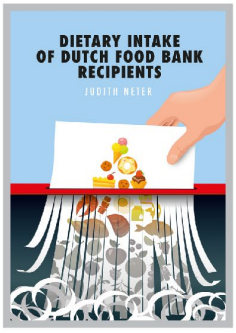



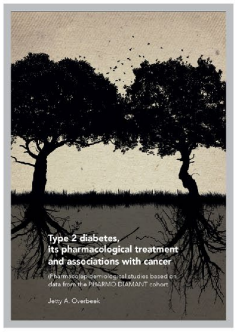





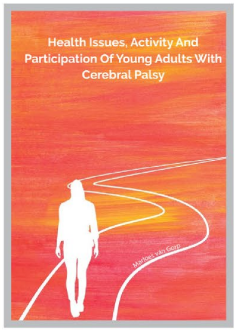


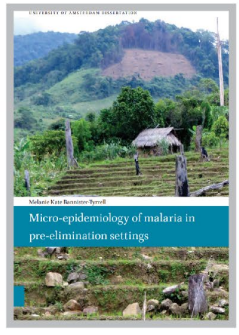



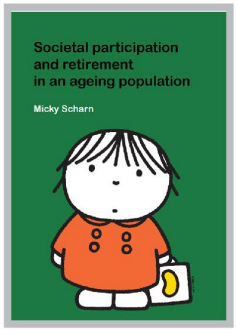



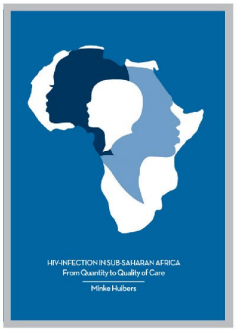





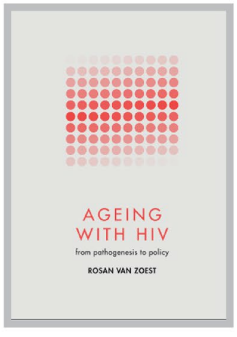


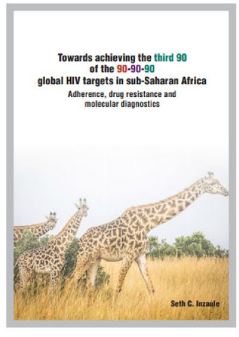



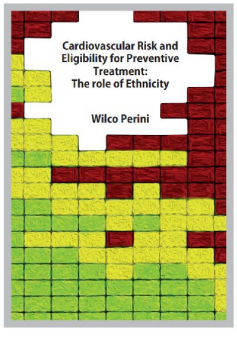








## Scientific impact of publications

In **Table 5a** the number and proportion of APH refereed articles published in top 25% journals are presented in the period 2017-2019. The numbers presented are based on the relative impact factors of all journals in which was published using Thomson Reuter's journal citation reports table. This table assigns all journals to a number of domains and computes the relative ranking of the journal within its own domain. All publications were classified to a quartile, based on the impact factor of the journal in its respective domain. Then the number of publications in the top 25% (first quartile) for the entire research institute and each of the eight research programs were counted and presented in **Table 5b**. As shown in **Table 5a**, around 50% of APH publications are published in the top 25% journals based on their impact.

**Table 5a** – Number and proportion of APH publications* in top 25% journals

| | 2017 | 2018 | 2019 |
|---|---|---|---|
| Refereed articles** | 2867 | 2949 | 3139 |
| Number of publication in top 25% journals | 1421 | 1565 | 1545 |
| Proportion of publication in top 25% journals | 49.6 | 53.1 | 49.2 |

* Based on refereed articles from local instances with DOI number, since the coverage ratio of refereed articles with DOI number is substantial and provides a representative overview.
** The sum of publications of the institute's units (VU/VUmc/AMC) is more than the total per year, since a publication can be affiliated with more than one unit.

**Table 5b** – Number and proportion of publications in top 25% journals in the relevant research field, for the research institute and per research program in 2017-2019*

| | Total** | HBCD | MH | SPH | GH | ALL | QoC | PM | Me |
|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1421 | 289 | 433 | 95 | 172 | 322 | 448 | 329 | 497 |
| | 49.6% | 49.4% | 54.8% | 34.8% | 44.4% | 49.2% | 47.4% | 53.2% | 55.3% |
| 2018 | 1565 | 294 | 510 | 115 | 184 | 370 | 492 | 341 | 462 |
| | 53.1% | 56.4% | 60.8% | 45.6% | 44.3 | 51.2% | 52.6% | 54.1% | 56.8% |
| 2019 | 1545 | 289 | 489 | 78 | 220 | 377 | 485 | 321 | 488 |
| | 49.2% | 50.7% | 56.5% | 38.0% | 44.0% | 49.2% | 49.0% | 47.9% | 53.9% |

* Based on refereed articles from local instances with DOI number, without displaying the distribution between institute's units (VU/VUmc/AMC).
** The sum of top publications of the research programs is more than the total, since a publication can be affiliated with one or two programs.

# Funding and grants

## Internal funding

In 2017-2019 (as part of the four-year budget period 2016-2019), APH received €2,000,000 innovation funding spread over 4 years from the AMC/VUmc executive boards to support the building phase of the new APH research institute. This was supplemented by contribution from AMC Division J/K and VUmc Division VI and the formally participating faculties of the Vrije Universiteit in proportion to the number of researchers embedded within APH. This funding has provided the research institute with sufficient support for the operational costs, research infrastructure and facilitating societal and scientific impact in the building phase.

The innovation funding of €2,000,000 from the AMC/VUmc executive boards is divided equally as seeding money over the eight APH research programs. This means that each research program receives €50,000 annually to distribute internally among all researchers within the program. The amount is earmarked for strengthening cooperation (internally between research groups within the program or outside the program or with external partners), for stimulating cohesion and for promoting the innovation of the program itself. Research programs could divide their budget through open calls for research, writing and travel grants, targeted spending on program innovation or program-specific infrastructure or through organizing program meetings and workshops. In addition to this regular innovation budget of €50,000 per year, each research program could claim a voucher of €50,000 once every four years, which was intended for proof-of-concept research that is difficult to finance elsewhere.

## External funding

In **Table 6a-c** an overview of external funding obtained by APH researchers in the period 2017-2019 is presented. In case a researcher is affiliated with more than one APH research program, the funding is only added to the primary research program. Different overviews are presented per year, research program and funding source. The apparent decline in external funding over the years might be a consequence of the ongoing harmonization of administrative systems and related processes within the merger between VUmc and AMC.

**Table 6a** – External funding obtained by APH researchers in 2017-2019 per year and per funding source*

| | 2017 | 2017 % | 2018 | 2018 % | 2019 | 2019 % |
|---|---|---|---|---|---|---|
| 2nd | € 22,491,419 | 50% | € 25,703,659 | 66% | € 22,441,595 | 69% |
| 3rd | € 20,938,002 | 47% | € 12,227,042 | 31% | € 9,601,265 | 30% |
| 4th | € 1,448,682 | 3% | € 1,220,225 | 3% | € 477,866 | 1% |
| Total funding | € 44,878,103 | 100% | € 39,150,926 | 100% | € 32,520,726 | 100% |

*** Funding sources: 2nd is conditional funding by intermediary public bodies and agencies (NWO, ZonMw, KNAW and EU), 3rd is private funding by non-profit organizations, 4th is private funding from commercial sources (contract-research and clinical research funded by biopharma industry).**

Table 6b – External funding obtained by APH researchers in 2017-2019 per funding source* and program

| | Total | HBCD | MH | SPH | GH |
|---|---|---|---|---|---|
| 2nd | € 70,636,673 | € 8,552,810 | € 17,390,579 | € 4,493,217 | € 2,672,909 |
| 3rd | € 42,766,309 | € 4,342,605 | € 11,253,576 | € 1,708,788 | € 2,438,126 |
| 4th | € 3,146,773 | € 322,257 | € 1,153,707 | € 10,100 | € 0 |
| Total | € 116,549,755 | € 13,217,672 | € 29,797,862 | € 6,212,105 | € 5,111,035 |

| | ALL | QoC | PM | Me |
|---|---|---|---|---|
| 2nd | € 6,046,261 | € 11,651,977 | € 8,046,504 | € 11,782,416 |
| 3rd | € 4,135,397 | € 16,836,698 | € 1,484,652 | € 566,467 |
| 4th | € 0 | € 1,413,001 | € 118,722 | € 128,986 |
| Total | € 10,181,658 | € 29,901,676 | € 9,649,878 | € 12,477,869 |

*** Funding sources: 2nd is conditional funding by intermediary public bodies and agencies (NWO, ZonMw, KNAW and EU), 3rd is private funding by non-profit organizations, 4th is private funding from commercial sources (contract-research and clinical research funded by biopharma industry).**

Table 6c – External funding obtained by APH researchers in 2017-2019 per year and per APH program

| | Total | HBCD | MH | SPH | GH |
|---|---|---|---|---|---|
| 2017 | € 44,878,103 | € 5,597,816 | € 8,359,924 | € 1,764,910 | € 2,727,000 |
| 2018 | € 39,150,926 | € 4,369,092 | € 11,799,945 | € 2,875,975 | € 2,334,288 |
| 2019 | € 32,520,726 | € 3,250,764 | € 9,637,993 | € 1,571,220 | € 49,747 |
| Total | € 116,549,755 | € 13,217,672 | € 29,797,862 | € 6,212,105 | € 5,111,035 |

| | ALL | QoC | PM | Me |
|---|---|---|---|---|
| 2017 | € 6,330,055 | € 11,041,199 | € 4,623,817 | € 4,433,382 |
| 2018 | € 2,313,759 | € 8,558,405 | € 4,532,990 | € 2,366,472 |
| 2019 | € 1,537,844 | € 10,302,072 | € 493,071 | € 5,678,015 |
| Total | € 10,181,658 | € 29,901,676 | € 9,649,878 | € 12,477,869 |

## Personal grants

In 2017-2019 several APH researchers received prestigious personal grants, of which the funding instruments of the Dutch Research Council (NWO) are best-known. The council offers personal grants to talented researchers in various phases of their careers. In total, 12 APH researchers received a Veni grant (for researchers who have recently obtained a PhD degree) and 2 APH researchers received a Vidi grant (for experienced researchers who have already conducted several years of research after obtaining their PhD). See Appendix C for an overview of the awarded researchers.

# STRATEGY FOR THE NEXT THREE YEARS

## Performance measurements

### GAP analysis

To compare APH's current performance with the desired and expected target performance, a GAP analysis was performed. This analysis was carried out as an internal performance assessment. Eight categories - Viability, Open science, PhD Policy and Training, Academic culture, HR policy, Research quality, Societal relevance, Research Infrastructure - that are deemed important on the basis of APH's strategy and the SEP guidelines were chosen and assessed. This analysis is used to formatively assess whether the research institute is meeting its expectations and using its resources effectively, in order to learn how to improve. It is meant to form the basis for dialogue with our program leaders and others. This detailed analysis also provided input for the SWOT analysis.

### SWOT analysis

The research institute performed a SWOT analysis, in which the strengths, weaknesses, opportunities and threats of the research institute were identified. The GAP and SWOT analysis provided input for future action plans and formed the basis of APH's renewed strategic plan for 2020-2023.

### Strengths

- Consistently high quality and volume multidisciplinary research with societal impact building on a longstanding focus on translational research, supported by sustainable collaborations with regional stakeholders, clinical partners, and national and international public health and (primary) health and social care institutions (e.g. our Academic Collaborative Centers).
- Large-scale epidemiological resources such as internationally renowned longitudinal cohort studies and patient registries providing a unique cross-section of society and a wealth of national data facilitating analysis of health challenges as the basis for identifying evidence-based policy and practice recommendations.
- An extensive state-of-the-art methodology program promoting the development, evaluation and implementation of instruments and methods on topics in epidemiology, biostatistics, (bio)-informatics, health services research and clinimetrics/psychometrics in order to optimally facilitate health care innovations.
- Broad coverage of public health research at a regional, national and global level in our research programs, covering the whole lifespan, taking into account diversity, personalized health and advanced research methods.

### Weaknesses

- Incrementally growing number of participants from affiliated entities, with still incomplete coverage of all. Apart from AMC, other UvA faculties do not participate in APH, hampering our growing role in the Metropolitan Area of Amsterdam (MRA).
- Limited success in developing our networks with small and medium-sized enterprises and attracting contract funding for our research themes, despite two years of dedicated business support.
- Diversity of our research staff and research populations is lagging behind to represent national demography and the number of international staff and PhD candidates is modest.
- The website of APH has modest possibilities and hampers visibility and findability of APH researchers and their projects for different stakeholders. Difficult to strengthen our own corporate identity under the strong brand policy of Amsterdam UMC.
- The number of tenured research staff among our participants is small and the mid-career level is thinning, due to national laws on temporary contracts and impoverished career perspectives for postdocs and PhD candidates.

## Opportunities

- Amsterdam UMC's investment in regional collaboration to improve population health by diminishing health inequities brings public health to the core of its strategy. Also the national strategy of the NFU emphasizing the societal and active role of UMC's in the region provides tailwind for public health.
- Further strengthening our translational research collaborations with partners in the 'Amsterdam Vitaal & Gezond' initiative, including universities of applies sciences and secondary vocational education schools, will enhance our strategic position in the MRA making us a natural partner in implementation issues.
- APH research themes are on the National Science agenda and European research agenda. There is a growing focus on personalized health care, shared decision-making, participative research and citizen science.
- Ongoing investment in linking and sharing our rich and valuable longitudinal data increases the value of these assets suiting modern data science opportunities.
- Collaboration between APH scientists with expertise in quantitative methods, ethics and implementation and computer scientists at VU, UvA and technical universities on Artificial Intelligence offers chances to be at the forefront of rapid developments in data science and artificial intelligence and expected investments and funding opportunities in these areas.
- Collaboration with IXA to develop new ways to strengthen economic and societal valorization of scientific results among others through public-private partnerships.

## Threats

- Lack of structural funding and fragmented support and data management put constant pressure on the sustainability and viability of our cohorts and registries. Formal recognition of the cohorts and registries as core facilities within Amsterdam UMC can secure and improve the required infrastructure.
- Imbalance between participants of departments of Amsterdam UMC division 6/J/K (~66%) and participants of other Amsterdam UMC and VU departments in APH may lead to dominance of the largest partners and asks for careful attention to safeguard existing and strengthen new collaborations.
- Cultural and organizational differences between VUmc and AMC hamper our research quality system. For example, different views on internal peer review, audits and guidelines make harmonization and collaboration a challenge.
- Increasing dependence on external funding and increasing competition for these funds threatens sustainability of established research groups as a considerable part of our researchers have large clinical / care or educational tasks jeopardizing their competitive research chances.

## SWOT action plans

- Consistently high quality and volume multidisciplinary research with societal impact building on a longstanding focus on translational research, supported by sustainable collaborations with regional stakeholders, clinical partners, and national and international public health and (primary) health and social care institutions (e.g. our Academic Collaborative Centers).
- Early identification of high potentials to prepare them for future career opportunities through fellowships and leadership programs that equip them to become new leaders in public health needs to be strengthened.
- Increase diversity in our research staff and in our research populations by strategic investments.
- Rebuild and harmonize our scientific quality system based on modern standards for open science, research integrity and data management, with specific attention to integrating the cultural legacy of AMC and VU/VUmc.
- Enhance our strategic focus on implementation of our research findings in the Metropolitan Area of Amsterdam, for example by (i) active participation in and collaboration with regional partners (including universities of applies sciences and secondary vocational education schools) in 'Amsterdam Vitaal & Gezond' initiative, Thrive, Hacking Health Amsterdam and public debates in Pakhuis de Zwijger, (ii) increased presence on (social) media, and (iii) bundling our expertise on implementation science by becoming a Center of Expertise.
- Strengthen quality, reusability and linkage of longitudinal datasets by strategic investments & dedicated support.
- Roll out a new program to increase the identification and the development of economic and societal valorization opportunities by training and dedicated support.
- Guard the equal position and participation of VU faculties, and pay special attention to accommodate diversity and inclusion of our embedded researchers and research population.
- Foster collaboration with UvA colleagues and researchers with an open-door policy.

# Strategic plans

## Strategic Plan 2020-2023

To mark the end of the first building phase of APH at the end of 2019, the APH Management and Program Leaders started a strategy trajectory to recalibrate and update APH's goals and strategic themes. A renewed APH Strategic Plan was written for the next period (2020-2023).[47] Building on a strong reputation and research base of world-leading research, the renewed strategy announces an increased strategic emphasis on seeking partnerships in promoting public health for the citizens of the Amsterdam region, by testing what we learn elsewhere and disseminating what we learn in Amsterdam across the rest of the world. The urban context of the research institute provides a large and richly diverse living lab that may not only inspires new research questions and ideas but that will also foster understanding of effective implementation and dissemination with local public health stakeholders. By stimulating research contributing to and inspired by the young field of implementation science, APH aims to increase the societal impact of the internationally well-recognized research embedded within the institute.

In response to the COVID-19 pandemic, APH shifted emphasis in its strategy, to suit societal and health system demands during the crisis. The major challenges ahead have a severe impact on public health; therefore, the research institute aims to learn from this crisis and pass these lessons on in a long-lasting way. APH continues to contribute to asking and addressing pertinent questions about the pandemic and its counter measures, to support development and evaluation of innovative solutions and strategies, and to contribute to the resilience of individuals and health systems.

## Talent development and PhD policy

In the coming years, APH will further consolidate its policy on talent development that aims to stimulate talented researchers and to support them in developing both their academic competencies and more generic professional (transferable) competencies. This will be achieved by improving peer support to PhD candidates, developing a system improving identification of talented APH researchers, increase support on personal or consortium grants, optimizing professional competencies for early and mid-career researchers, stimulating collaboration with academic and societal partners and improving visibility of early career researchers within the scientific field.

The central APH Think Thank will be transformed in an APH Junior Council for each research program. These councils can provide Program Leaders with solicited and unsolicited advice and support with the organization of research program-specific activities or events. In terms of the central PhD policy, Amsterdam UMC is working on establishing one centralized Doctoral School where all PhD candidates can turn to with questions during their entire PhD trajectory in the future. It is still to be determined to what extent the decentralized roll of the involved research institute for VU/VUmc PhD candidates will change. Within AMC and VUmc, several talent programs are offered. Amsterdam UMC is working on harmonizing the talent policies focusing on the perspectives of researchers throughout the various levels of their career. APH will further strengthen the collaboration with other institutes in the Netherlands School of Public Health and Care Research (CaRe). As part of CaRe, it is intended that APH will offer a CaRe Leadership fellowship to midcareer and senior APH researchers, in order to increase leadership skills.

[47] https://www.amsterdamumc.org/en/research/institutes/amsterdam-public-health/about.htm

## Communication

APH has further updated its communication strategy in 2020. The research institute wants to improve the visibility of her services to the researchers and wants to increase the awareness of the tremendous assets and potential of the APH network to both researchers and external stakeholders. After the research institute's building phase in which the focus was mainly on creating internal cohesion within the research programs, APH's focus will shift to external profiling in the coming years. APH will strengthen its efforts on designing a digital landscape embedded in the APH website on which the expertise of its researchers is made accessible to the internal community and external audience. Moreover, the APH website will be migrated to a renewed research institute specific website within the yet to be developed Amsterdam UMC website. In line with APH's mission and vision, Amsterdam will have an even more prominent role in the communication strategy. The research institute will continue to engage effectively with all stakeholders regionally, nationally and internationally.

## Scientific quality

Over the years 2017-2019, APH was still very much be searching for the right format of embedding and securing quality within the research institute. The former EMGO+ institute consisted of 700 researchers from VUmc and VU (in 2016), whereas APH consists of more than 1,500 researchers from Amsterdam UMC, VU and UvA. Moreover, the years 2017-2019 were largely dominated by merging two research communities of public health researchers as part of the merger between VUmc and AMC. As a result of this increase in scale, the research institute will completely reassess its quality system and its operation in 2020.

APH wants to embed and secure a standard in quality that is systemically and sustainable for the large and diverse research institute. APH is building a quality system where the main pillars are built on continuous improvement, making knowledge easily accessible and becoming a self-learning organization. Furthermore, a Quality Systems Master Plan (QSMP) will be written where the fundamental principles of Good Research Practice will be outlined, in accordance with Netherlands Code of Conduct for Research Integrity (2018) and Amsterdam UMC Research code. The QSMP is a reflection of a commitment to developing and maintaining an effective and comprehensive Quality System. APH will continue to monitor, update and/or modify system components in response to current best practice, regulatory guidelines and law. The coming years attention will be paid to development of sound methods for citizen science. Citizen science is expected to have significant added value to understand and improve public health. Recent studies showed that principle of citizen science does not easily fit with current ethical, juridical and medical principles.

The tasks and organizational structure of the Scientific Quality Committee will be solidified in a SQC charter. To fulfill its tasks the SQC will develop renewed peer-audit protocols for research projects, and will renew, maintain and expand the APH Quality Handbook, a web-based scientific quality manual for APH researchers.

## Cohorts and infrastructure

APH will remain committed to organizing a core facility for its large-scale epidemiological resources such as the more than 25 cohort studies that are embedded in the research institute, as well as for methodological innovation. The coming years APH will prioritize the efforts to strengthen and sustain the tremendous assets formed by APH's cohort studies. This is more pressing than ever before, because of the rapid developments in data science and artificial intelligence and expected investments and funding opportunities in these

areas. APH will assess the scientific and societal value of the cohorts and present the results to major actors involved in building research infrastructure, which is to date lacking for cohort studies. One of the ways in which APH can enrich the infrastructures of the cohort studies is by establishing linkages with regional or national health and care registries. This is a possibility that the research institute will actively explore in the coming years. In addition, APH will support responsible data sharing of cohort data within and outside the research institute.

## Societal impact and valorization

In recent years, experiments and activities have been started to find out what types of valorization support APH researchers need to increase the applicability of the research results and improve their usefulness in society and practice. As a result, APH has developed a number of models with the Innovation Exchange Amsterdam (IXA) that may be suitable, depending on the phase APH is in with regard to valorization ambitions. These models will be implemented, evaluated and further developed the coming years. On top of that, APH continues to stimulate the scientific study, exchange and application of methods and strategies to facilitate the translation of research-based knowledge into better policies and practices and ultimately better health. APH will provide its researchers with better knowledge, skills and tools in order to facilitate translation of research into practice and policy. APH will increase awareness among its researchers for the importance of implementation throughout the research lifecycle (e.g., setting research agenda, developing proposals, selecting study outcomes, collecting data, interpreting findings, formulating recommendations, assessing impact). And APH will develop innovative implementation knowledge to facilitate the field of Implementation Science and be one of the European leading research institutes.

## Open Science

APH is committed to the DORA initiative and the Hong Kong principles.[48,49] Promoting ongoing improvement in research quality is one of the primary goals of APH for the coming years. The scope of these efforts includes all phases of research, that is study conceptualization, design, participant recruitment, data collection, data analysis, reporting, archiving, sharing, and dissemination. Across the research life cycle, the research institute stimulates, supports and facilitates researchers in pursuing the highest degrees of soundness, trustworthiness, honesty, accuracy, and fairness. One way to facilitate researchers to enhance the quality and impact of research according to the approach of Open Science. In the coming years APH would like to organize and facilitate the Open Science practices more. A full approach and roadmap are described in APH Strategic Plan 2020-2023.

## Academic culture

Since academic culture is an integrated part of every step and conduct in scientific field, APH will integrate the principles of Good Research Practices in APH's quality system (including peer-audits) and the guidance of the APH Quality Handbook for the coming years. The principles of Good Research Practice have to be followed by all APH researchers in line with Amsterdam UMC research code (2020), VU research code and UvA research code, Netherlands Code of Conduct for Research Integrity (2018) and all other applicable laws, regulation and guidelines.

Furthermore, one of the APH's directors is part of the workgroup Academic Culture. Through this channel APH drives decision-making on board level. The research institute aims to lower the perceived pressures created by the highly

[48] https://sfdora.org/

[49] https://wcrif.org/guidance/hong-kong-principles

competitive environment and adopt a caring organizational attitude. Unbalanced amount of pressure on short-term achievements or short-term goals, can result in so called ethical-fading. Therefore, APH would like to see more talented researchers to have more steady contracts (longer term contracts). So, we can retain talent and focus on sustainable scientific and societal quality rather than short term impact. On top of that, leadership programs should prepare future leaders to have a right attitude towards ethical–fading, when it comes to researchers within their group. And building and managing trusting, collaborative teams. In this light, we would like to plan more leadership courses and seminars for post-docs and other future leaders.

Trusting teams also are shown to be less inclined to allow unethical or undesired behavior to exist in their group. APH would like to promotes trusting teams more by offering them tools and guidance's. Furthermore, in APH's plans to renew the quality handbook, several chapters have been included on Good Research Practices, managing teams, guidance on supervision and progress talks between supervisors and PhD candidates.

## Human Resources policy

APH will strengthen the commitment of Amsterdam UMC and VU to create a diverse and inclusive research environment. Besides gender equality, attention is also paid to be an inclusive research institute for other underrepresented groups via various programs and groups that were created bottom up. Diversity and inclusion in relation to health and health care is also a research theme within the APH Personalized Medicine research program. In the coming years, this research program will make plans to organize activities and courses on this topic. Moreover, research groups within the program will provide the affiliated organizations with advice based on scientific knowledge on how to perform better, for instance as an academic hospital in serving a broad range of patients and the community.

## Internal and external accountability

For the coming years APH is planning to continue in a transparent manner the internal and external accountability practice with the annual report that APH publishes yearly. Beside this annual accountability, all research institutes of Amsterdam UMC and the parent universities (VU and UvA) are externally evaluated once every six years according to the national Strategy Evaluation Protocol (SEP). In this self-assessment, research institutes are expected to describe a clear mission (goal) and strategy for the coming six years and a reflection on the past six years. In 2023, the external evaluation of APH over the period 2017-2022 is scheduled.

# EXECUTIVE SUMMARY

## Mission and vision

The Amsterdam Public Health research institute (APH) is a network institute that links both intramural and extramural clinical care support and prevention to scientific research on health, wellbeing, and societal participation. The research institute's focus is on the metropolitan area of Amsterdam, but its activities and impact are also global. To tackle complex public health challenges, its research is organized in eight research programs with over 1,500 researchers from multiple disciplines at Amsterdam UMC, location Amsterdam Medical Center (AMC) and location VU Medical Center (VUmc), and VU Amsterdam (VU). APH researchers collaborate with many scientific and societal partners in- and outside the metropolitan area of Amsterdam.

The mission of APH is to conduct high quality research to improve citizen health, reduce health inequalities, transform health care, and empower citizens. Health and health care are undergoing major transformations with rapidly changing expectations of citizens. Therefore, APH aims to generate, disseminate, and translate and implement knowledge, based on sound research to: (1) help decision-makers at all levels to assess health needs, create a healthy environment, strengthen the healthcare system and safeguard its sustainability; (2) assist healthcare professionals in maintaining and improving their performance, and (3) empower patients and citizens in managing their own health.

The eight research programs are aligned with major public health themes: health behaviors & chronic diseases, mental health, societal participation & health, global health, aging & later life, quality of care, personalized medicine and methodology. In these programs APH researchers advance research that contributes to the growing health potential of individuals and communities across the life course.

## Strategic aims and results

The strategic aims of APH of the past three years were divided in the following strategic themes complemented by the Strategy Evaluation Protocol (SEP) accountability assessment criteria.

### Talent development and PhD policy

APH aims to stimulate talented researchers and to support them in developing their competencies to conduct high-quality research with societal impact. APH formed a PhD/Postdoc Committee with the aim to support, guide, train and prepare the next generation of public health researchers. The committee organized introduction meetings, offered assistance to PhD candidates, started a 'APH PhD intervision activities program' and developed PhD manuals. For mid-career researchers career tracks are available which will in the coming years be supplemented with leadership programs, mentoring and targeted funding opportunities.

### Communication

APH aims to create an active branding and public relations strategy using the APH website and other communication materials and built an online research community with descriptions of each researcher and their ongoing projects in each of the research programs. In 2017, we developed an internal and external communication strategy including a communication plan, a matching press plan and a web strategy. APH will further update its communication strategy in the coming years in

which the focus will shift from internal cohesion to external profiling.

## Scientific quality

APH aims to provide a learning community environment that encourages good conduct in research and disincentives misconduct. The Scientific Quality Committee (SQC) contributes to and oversees the development and maintenance of the APH research quality instruments, primarily the APH Quality Handbook, internal quality audits, and internal peer review. During the merger of VUmc and AMC, it took considerable time to build consensus on the quality policy and procedures, which were only formulated by the end of 2019 as part of the overall renewed APH Strategic Plan (2020-2023) and the quality system and its operation were completely reassessed in 2020. Furthermore, a Quality Systems Master Plan will be written where the fundamental principles of Good Research Practice will be outlined.

## Cohorts and infrastructure

Research groups in APH coordinate and maintain many large-scale longitudinal cohorts and health registries. These long-standing projects provide a unique cross-section of society and are a wealth of long-term national data. APH continuously strives to sustainably strengthen the cohorts/registries and their position in the epidemiological field and has also regularly invested resources in the past to boost the cohorts. Over the past three years, APH has set up two working groups to come up with a new booster plan for the coming years. With the current high attention for data science and AI in society, maintaining and strengthening our cohorts will be a central theme in APH strategy in the coming years.

## Societal impact and valorization

In order to have a direct impact on the daily practice of extramural and transmural health care APH has established over the years a number of Academic Collaborative Centers ('Academische Werkplaatsen'). In these collaborative networks, practice, research, education and policy are brought together by direct collaboration between clinicians, teachers, researchers and managers. From the Spring of 2017 until 2019, APH appointed a dedicated business developer. This pilot did not yield what we had hoped for. To gain more insight into which valorization issues are most relevant for public health researchers and how we can better facilitate our researchers in more tailor-made valorization support, we started an exploration in 2019 among a dozen APH researchers. Results of this exploration will shape APH's course on this matter the coming years.

## Open Science

Promoting ongoing improvement in research quality is one of the primary goals of APH for the coming years. One way to facilitate researchers to enhance the quality and impact of research according to the approach of Open Science. In the coming years we would like to organize and facilitate the Open Science practices more.

## Academic culture

APH Management advises Amsterdam UMC and VU Amsterdam in their policies to ensure openness, (social) safety, inclusivity, diversity and research integrity. APH actively promotes awareness and use of the Research Code among their researchers. The coming years, APH will further integrate the principles of Good Research Practices in our quality system (including peer-audits) and our guidance of the APH Quality Handbook.

## Human Resources policy

APH is convinced that science is best pursued with a wide diversity of staff members and teams: talented people who each bring their own knowledge, values and experiences to the task and respect each other, in all levels of research. Diversity and inclusion in relation to health and health care is a research theme as

well within the APH Personalized Medicine research program. The coming years we will stimulate diversity and inclusiveness in our allied organizations with specific actions.

### Internal and external accountability

APH Management collaborates closely with colleagues in the other Amsterdam UMC research institutes to create strong research centers and a strong infrastructure for research in Amsterdam UMC, VU and UvA. Our External Advisory Board provides guidance on the overall strategy of APH including the viability of existing research programs and the need for new research programs. Internal accountability is built through the monthly meetings of APH Management with all 16 Program Leaders, who in turn meet with their Program Council frequently to reflect on achievements and vision of the respective research program. For the coming years we are planning to continue in a transparent manner our internal and external accountability practice. In 2023, the external SEP evaluation of APH over the period 2017-2022 is scheduled.

## Future perspective

For APH, the years 2017-2019 were largely dominated by merging two research communities of public health researchers as part of the merger between VUmc and AMC. As a result of this increase in scale, APH was still searching for its identity and the right fit in a larger and more complex setting than before. The former EMGO+ institute consisted of ~700 researchers (in 2016), whereas APH consists of more than 1,500 researchers. To mark the end of the first building phase of APH at the end of 2019, the APH Management and Program Leaders started a strategy trajectory to recalibrate and update our goals and strategic themes. A renewed APH Strategic Plan was written for the upcoming years (2020-2023).

Building on a strong reputation and research base of world-leading research, APH's renewed strategy announces an increased strategic emphasis on seeking partnerships in promoting public health for the citizens of the Amsterdam region, by testing what we learn elsewhere and disseminating what we learn in Amsterdam across the rest of the world. The urban context of our research institute provides a large and richly diverse living lab that may not only inspires new research questions and ideas but that will also foster understanding of effective implementation and dissemination with local public health stakeholders. By stimulating research contributing to and inspired by the young field of implementation science, APH aims to increase the societal impact of the internationally well-recognized research embedded within the research institute.

## Colophon

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