SELF-EVALUATION REPORT 2017–2022

Amsterdam Public Health

APH is a collaboration between

CONTENT

LIST OF ABBREVIATIONS

Research programs

HB&CD	Health Behaviors and Chronic Diseases
MH	Mental Health
SP&H	Societal Participation and Health
GH	Global Health
A&LL	Aging and Later Life
QoC	Quality of Care
PM	Personalized Medicine
Me	Methodology

Other abbreviations

Amsterdam UMC	Amsterdam University Medical Centers
ABC	Area-based connectedness
ACN	Amsterdam Cohort Network
ACTA	Academisch Centrum Tandheelkunde Amsterdam
AI	Artificial intelligence
AMC	Academic Medical Center
AmsCIS	Amsterdam Center of Implementation Science
APH	Amsterdam Public Health research institute
ARB	Amsterdam Research Board
AVB	Amsterdam Valorization Board
BROK	Introductory Clinical Research Organization Course
CAPHRI	Care and Public Health Research Institute
CaRe	Netherlands School of Public Health and Care Research
CTA	Committee for Talent and Appointments
CWTS	Centre for Science and Technology Studies
DEI	Diversity, equity and inclusion
EMA	Ecological momentary assessment
EMGO+	Institute for Research in Extramural Medicine (forerunner of APH)
FAIR	Findable, accessible, interoperable, and re-usable
GALA	Healthy and Active Life Pact
GGD	Public Health Service of Amsterdam
HvA	Amsterdam University of Applied Sciences
Inholland	Inholland University of Applied Sciences
IXA	Innovation Exchange Amsterdam
IZA	Integrated Healthcare Agreement
KNAW	Royal Netherlands Academy of Arts and Sciences
KWF	Dutch Cancer Foundation
NFU	Netherlands Federation of University Medical Centres
Nivel	Netherlands Institute for Health Services Research
NWO	Dutch Research Council
PHCR	Public Health and Care Research Leadership Program
PI	Principal investigator
RIHS	Radboud Institute for Health Sciences
RIVM	National Institute for Public Health and the Environment
RQV	Research quality visit
SDG	United Nations Sustainable Development Goals
SEP	Strategy Evaluation Protocol
SIG	Special Interest Group
SIGRA	SIGRA interagency cooperative
SQC	Scientific Quality Committee
SWOT	Strengths, weaknesses, opportunities, threats
UNL	Universities of the Netherlands (formerly VSNU)
UvA	University of Amsterdam
UWV	Employee Insurance Agency
VR	Virtual Reality
VU	Vrije Universiteit Amsterdam
VUmc	VU University Medical Center
WMO	Medical Research Involving Human Subjects Act
ZonMw	Netherlands Organisation for Health Research and Development

WORD FROM THE DIRECTORS

The research institute Amsterdam Public Health (APH) is a network institute incorporating over 1,700 researchers from several faculties of the Vrije Universiteit Amsterdam (VU) and the University of Amsterdam (UvA). From the VU, researchers employed in the Faculty of Medicine (henceforth referred to as the VU Medical Center or VUmc), the Faculty of Science, and the Faculty of Behavioural and Movement Sciences are affiliated with our research institute. From the UvA, only researchers from the Faculty of Medicine (henceforth Academic Medical Center or AMC) are affiliated.

APH forms a key link between academic research, outpatient care practices, inpatient clinical care, local community, and policy in the Amsterdam metropolitan area. Much research performed within APH is designed to have a direct impact on society, policy, and practice. Together with our academic and non-academic partners, we promote state-of-the-art research to enhance the health potential of individuals, communities, and populations across the life course. This is implicit in our slogans "Health for all, powered by science" and "Think globally and act locally." We test what has been learned elsewhere, and we disseminate what we learn in Amsterdam across the rest of the world.

As part of the six-year accountability cycle, APH is to be externally evaluated over the period from 2017 to 2022. In the initial years of that period (2017–2019), APH was largely occupied with the merger of two medical centers, VUmc and AMC, into Amsterdam University Medical Centers (Amsterdam UMC), as well as with merging their two public health research communities. Since that organizational reconstruction phase – in which the focus was mainly on creating internal cohesion within our research programs and among researchers – our focus has shifted. In the subsequent years (2020–2022) it was more on knowledge valorization, putting research findings to work, and mitigating the impact that the COVID-19 pandemic was having on the growing inequity in population health – as well as on the health, well-being, and work of our researchers themselves. A revised strategic plan was developed for APH, enabling innovations in our research programs and initiatives to support our researchers and to strengthen our connections with society, policy, and practice, particularly in the Amsterdam metropolitan area.

This self-evaluation report summarizes our chief ambitions, activities, and achievements over the 2017–2022 period, and outlines our strategic plans for the coming years. The data in the report cover the affiliated VU and UvA university faculties (henceforth referred to as VUmc, AMC, VU). Information is structured along the lines of the nationwide Strategy Evaluation Protocol (SEP). Overall, we look back on fruitful years in our research institute, and we embark on the period to come with confidence, enthusiasm, and inspiration.

''Health for all, powered by science''

APH Board of Directors

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

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

Dr. F.C.M. (Frank) van Leth,
Vice Director

GOVERNANCE AND ORGANIZATIONAL STRUCTURE

Introduction

Amsterdam Public Health is a multidisciplinary research institute that was officially launched in 2016. It is one of the eight research institutes within Amsterdam UMC. APH forms an important link between scientific research and inpatient clinical care, outpatient care, society, and policy. Besides our global focus, special attention is paid to the Amsterdam metropolitan area. As an interfaculty research institute, APH connects VUmc and AMC researchers with researchers from two other health-related VU faculties. APH researchers are affiliated with the research institute but are employed in a university department at the VUmc, AMC, or VU. APH pursues an open policy for partner organizations. As a result, researchers working in additional faculties in the VU and the UvA, and in other organizations like the local universities of applied sciences (HvA, Inholland) and the Public Health Service of Amsterdam (GGD), are increasingly joining our network. However, the data in this report cover the in APH formally participating faculties of the VU: Faculty of Medicine (VUmc), the Faculty of Science, and the Faculty of Behavioural and Movement Sciences, and of the UvA: Faculty of Medicine (AMC).

APH also collaborates with three other Dutch research institutes outside Amsterdam in the Netherlands School of Public Health and Care Research (or CaRe). Those institutional partners are the Care and Public Health Research Institute (CAPHRI) at Maastricht University; the Netherlands Institute for Health Services Research (Nivel) in Utrecht; and the departments Eerstelijnsgeneeskunde and IQHealth of the Radboud University Medical Centre in Nijmegen. CaRe enables high-quality training for early- and mid-career researchers and multidisciplinary cooperation between the four institutional partners.

APH building phase

As part of the merger between the medical centers VUmc and AMC, a then-existing research institute known as EMGO+ (Institute for Research in Extramural Medicine), with about 750 researchers from VUmc and VU in four research programs, was expanded in 2016 into the Amsterdam Public Health research institute, affiliating over 1,250 researchers in eight research programs. In 2017 APH began initiating new research efforts, while also completing all of the ongoing EMGO+ activities.

A major focus from 2017 to 2019 was on merging the three public health research communities (from the VU, VUmc, and AMC). As a result of that scale expansion, APH was seeking an identity and a best fit into a larger, more complex academic setting. Subsequent to that building phase, in which internal cohesion was achieved, the focus shifted in 2020 to external profiling and to mitigating the impact of the pandemic on the well-being, health, and work of our researchers. Our efforts included the organization of online APH events on capacity building, work-life balance, and personal and professional resilience. We also sought internal and external financial support to compensate for pandemic related delays in APH research projects. From 2020 to 2022, APH further grew in scale, with eventually more than 1,700 researchers in its academic public health network. APH was built on a strategic plan that formed the basis for innovations and initiatives to support our researchers and to connect with regional partners, society, policy, and practice, in the Amsterdam area in particular.

As part of the six-year accountability cycle, our previous self-evaluation report for 2010 to 2015 pertained to the former EMGO+ Institute, but it looked ahead to the creation of APH. In 2021, we performed an internal mid-term evaluation of the years 2017 to 2019, which resulted in a self-evaluation report discussed with internal and external reviewers. A summary of their recommendations and our previous report can be found on the APH website.

Eight research programs

To tackle the complex current and future public health challenges, APH has organized its research into eight *research programs*. These are aligned with major public health themes: Health Behaviors and Chronic Diseases; Mental Health; Societal Participation and Health; Global Health; Aging and Later Life; Quality of Care; Personalized Medicine; and Methodology. Each of these eight research programs is led by two Program Leaders and supported by a Program Secretary.

The Program Leaders chair their Program Council (composed of 4 to 6 senior researchers), which convenes at least semi-annually to implement or update the program-specific strategies and discuss anticipatory or reactive responses to external developments and opportunities. Each program additionally has an appointed Junior Council (composed of 3 to 5 junior researchers), which provides the Program Leaders with

recommendations (on request or on its own initiative) from the junior researchers' perspective and which helps organize program-specific activities as well as network events. Prior to the creation of the Junior Councils at the research program level, APH had an institute-level Think Tank (2017–2019), composed of appointed junior researchers, which acted as a sounding board toward APH as a whole.

The APH research institute is led by three directors, forming the APH Board of Directors and representing the VUmc, AMC, and VU. Daily operations of the institute are delegated to APH support staff. The organizational structure of the research institute is depicted in **Figure 1**. A full overview of the institute's governance, including the Board of Directors, Program Leaders, committee members, and affiliated departments during the 2017–2022 time frame, is provided in tables in **Appendix A**.
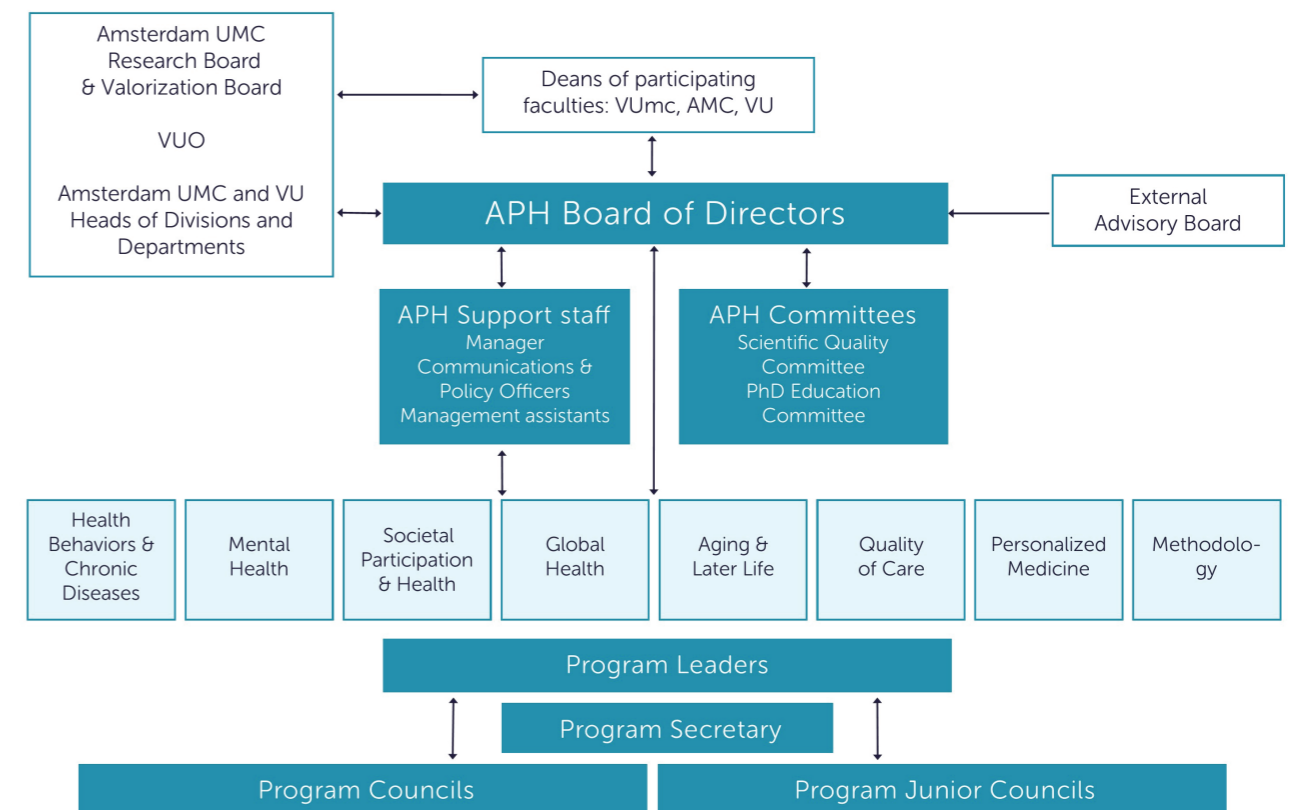

Figure 1 – Organizational structure of the research institute Amsterdam Public Health

Joining forces in committees

APH has established two committees: the Scientific Quality Committee (SQC) and the PhD Education Committee. The SQC co-develops and supports the implementation of APH-specific policies on research quality, as well as monitoring policies of Amsterdam UMC and the VU pertaining to the quality and integrity of academic research. The PhD Education Committee coordinates APH-specific doctoral education activities, provides guidance and support to PhD candidates (for instance for adherence to specific university education policies and guidelines), and also supports the network of postdoctoral researchers within the institute.

In late 2017, APH created an External Advisory Board composed of six to eight external advisers with senior positions in other organizations in the field of public health. The board regularly provides guidance on the overall strategy of APH, such as on the viability of

research programs or with respect to strategic discussion points or complex issues. Members are selected on the basis of administrative, academic, or policy experience deemed relevant to public health research, as well as an affinity with outpatient and integrated healthcare and research. Members are to have no direct interest in the APH research institute; they are invited either to represent a particular organization or on grounds of their professional expertise.

The APH Board of Directors is represented on the Amsterdam Research Board (ARB) and the Amsterdam Valorization Board (AVB), which advises the Amsterdam UMC Executive Board on issues of research policy and valorization policy, respectively. The APH Board of Directors is also represented on the VUO, which advises the VU Executive Board on research policy throughout the Vrije Universiteit.

STRATEGY OVER THE PAST SIX YEARS

Mission and vision

In the period 2017 to 2022, the mission of Amsterdam Public Health was to conduct high-quality research to improve population health, reduce health inequalities, transform healthcare, and empower individuals. Health and healthcare are undergoing major transformations, accompanied by rapidly changing expectations from the population. APH has therefore endeavored to generate, translate, disseminate, and implement knowledge based on rigorous research, while pursuing the following aims: (i) to aid decision makers at all levels of the healthcare system in assessing health needs, fostering a healthy environment, strengthening the healthcare system, and safeguarding its sustainability; (ii) to support health professionals in maintaining and improving their performance; (iii) to empower patients and other persons in managing their health. Strategic priority has been assigned to implementation science, as well as to seeking partnerships to promote public health for residents of the Amsterdam metropolitan area. Although APH has a global focus, we also leverage the urban context of our institute, as it provides a large, richly diverse living lab that inspires new research questions and ideas. This also helps to foster understanding of how to effectively implement and disseminate knowledge by working with local public health stakeholders. Together with our academic and non-academic partners, we promote state-of-the-art research to enhance the health potential of individuals, communities, and populations across the life course.

In 2021, after the internal midterm evaluation, APH's strategy was expanded with two new strategic themes: digitalization and environmental sustainability. Moreover, in light of the COVID-19 pandemic, health system resilience will be a theme to be pursued in the future, in order to strengthen our responsiveness to rapid societal changes and to future health needs and behaviors.

Strategic aims, policy, and results

The ambitions and activities of Amsterdam Public Health in the past six years were driven by our strategic themes. These include Communication and public relations; PhD and postdoctoral policy; Scientific quality (including Open Science); Cohort studies and research infrastructure; Societal impact, implementation and valorization; Digitalization; Environmental sustainability;

Human resources policy (including talent development); and Academic culture (including research integrity, inclusivity and diversity). These are discussed in more detail in the sections to follow.

Communications and public relations

APH has aimed to create a network of researchers and research support staff having comparable interests, stemming from different disciplines and research traditions, and deriving from multiple university faculties. We have sought to improve the visibility of past, ongoing, and future APH activities to all affiliated members, and to increase awareness of the APH network's tremendous assets and potential among internal researchers, support staff, and external stakeholders. APH has therefore developed a comprehensive communication and public relations strategy, including a matching media plan and web strategy. Complementary activities and platforms are employed to facilitate an active research community, such as the APH website, e-newsletters (both institution-wide and research program–specific), and other communication materials. In 2020, the APH stand-alone website was migrated to a renewed APH-specific website within the overarching Amsterdam UMC website. In 2021, personal pages for all APH researchers from affiliated faculties became available through our new website.

To engage effectively with internal researchers and external stakeholders, we organized multiple internal and external APH events during the 2017–2022 period. The APH Spring Meeting was convened each year – an internal event dedicated to strengthening the internal cohesion within the research programs. During the COVID-19 lockdowns, we transformed that meeting into a digital Spring Week with a wide range of online presentations and workshops. Every year during the Autumn, the APH Annual Meeting was held. It is an event for all APH researchers, research support staff, and external stakeholders, with an overarching theme and with internal, external, or international keynote speakers. In 2021, APH Junified was launched, an event organized for and by junior and mid-career researchers, offering workshops and interesting presentations around specific themes (incl. "the next generation of researchers," "boost your balance," and "self-development"). Other external networking activities supported by APH included the WeMakeTheCity festival in 2019 and the innovation event Hacking Health Amsterdam in 2019 through 2022. For more information

about a selection of APH conferences and external network activities, see our Case Studies section in **Appendix B**. Much has also been done in each research program to improve connections and cohesion within and between programs and with external stakeholders.

PhD and postdoctoral policy

The APH research institute works to support, guide, train, and prepare the next generation of public health researchers. PhD candidates affiliated with APH are subject to the doctoral regulations of either the University of Amsterdam (for candidates from AMC and UvA) or the Vrije Universiteit (VUmc and VU candidates). Differences in procedures applying to those respective PhD pathways continue to exist. The launch of the Amsterdam UMC Doctoral School in 2022 has increasingly harmonized services for AMC and VUmc candidates, notwithstanding their different university regulations. The Doctoral School offers courses on general academic skills (like academic writing, presenting, personal development, research ethics, academic integrity, and scientific methods), research skills (broadening and deepening of scientific understanding), and social and personal competencies. The Doctoral School also provides services to their academic supervisors.

At the VU and VUmc locations, additional support for PhD education is provided by the faculty or research institute involved. APH provided this support while also setting additional educational requirements. To facilitate this, APH has begun collaboration with the Amsterdam UMC's epidemiology and data school (EpidM) to enable reduced fees for all APH PhD candidates for courses in epidemiology and advanced methodologies.

In the summer of 2015, the PhD Education Committee was created. It supports and guides PhD candidates in procedures for compliance with training requirements, assesses training plans and portfolios, develops PhD training manuals, coordinates a peer supervision facilitation program, and provides informative presentations at APH onboarding events. To strengthen support for postdoctoral researchers in APH, the PhD Education Committee broadened its mission in 2022, helping create a *postdocs network* within APH that includes a mentorship program and fellowships. Moreover, APH has supported the creation of a postdoc network within Amsterdam UMC, where postdocs from all research institutes are connected. The aim is to improve support for this potentially vulnerable group (concerning funding and temporary positions) of researchers and to retain talented mid-career and senior researchers. APH helped with setting-up a vision for the postdoc network, and has funded the development of a

website to increase findability and exposure. APH encourages postdoc and PhD researchers to join one of the active PhD or postdoc networks (Association of Amsterdam UMC PhD Candidates (ASAP), Postdoc Network in the Amsterdam UMC, or Forum for Young Scientists at the VU). These offer training and development programs, social events, and information databases on procedures and courses. More details on APH's postdoctoral policy, can be found in the section 'Human resources policy', where talent development activities are described for postdoctoral and midcareer researchers.

Scientific quality

APH seeks to provide a learning community environment that encourages transparency and good conduct in research and discourages misconduct. To that end, APH has created a Scientific Quality Committee (SQC), which aids and monitors the development and maintenance of a range of instruments to facilitate *research integrity* and *scientific quality* at all stages of APH research. The SQC advises the APH Board of Directors, on request or otherwise, about all policy matters relating to scientific quality. In the past, APH had a Quality Officer who acted as principal investigator for potential violations of research integrity within APH. That role was transferred to the academic integrity officers of the respective universities after a new nationwide Code of Conduct was implemented by the Universities of the Netherlands (UNL) in 2018.

Historically, institution-level scientific quality monitoring procedures at the VU, VUmc, and AMC differed to some extent. The EMGO+ and APH research institutes continually anticipated and implemented additional instruments to support scientific quality in their research projects. For example, the SQC of APH provided opportunities for reviewing project proposals and embedding projects into research programs. That was particularly relevant for research projects involving non-WMO and WMO light-risk categories, since reviews of such projects were not covered by centralized Amsterdam UMC procedures. The categories refer to degrees of risk to research participants as defined by the Dutch Medical Research Involving Human Subjects Act, or WMO. After the AMC–VUmc merger, the two quality systems were integrated, enabling centralized Amsterdam UMC quality monitoring of both non-WMO and WMO light- and high-risk research projects. From 2020, the APH-facilitated reviewing instrument was hence no longer needed.

From 2020 to 2022, a number of new strategic procedures and instruments were developed to further shape and define the fundamental quality structure and culture within APH. For example, a comprehensive update of the APH *Quality Handbook* was carried out in 2021, and the *research quality visits* (RQVs) were initiated in late 2022. The purpose of such activities is to provide guidance in areas not directly subject to central-level scientific quality monitoring by the Amsterdam UMC or VU.

APH Quality Handbook

Over the years, the APH *Quality Handbook* (based on the former *Kwaliteitshandboek* from the EMGO[+] Institute) has been a valuable source of information for APH researchers and served as an example for other Amsterdam UMC research institutes. In 2021, our renewed Quality Handbook was published, with 86 new or revised chapters. To propose a standard for all researchers in the structuring and accessibility of information, we employed the *research life cycle* to navigate the user through the handbook. In 2021, the Amsterdam UMC took our Quality Handbook as a model in developing its research life cycle–based roadmap for research that is subject to WMO regulation.

Research quality visits

The *research quality visits* (RQVs) offered by APH since late 2022 as a pilot introduction, are peer-led interviews that can take place at any point during the life cycle of a research project, upon request of the researcher. The interviews are conducted by an SQC member and an APH peer researcher with the aim of identifying potential barriers to carrying out good-quality research and discussing possible solutions to overcome such barriers. The RQVs also are intended to collect best practices to share within the APH research community. The peer feedback provided during and after an RQV are expected to be of added value, since peer feedback otherwise occurs only at the proposal preparation and the reporting stages in most research projects. Openness to colleagues about research practices in the course of ongoing research is expected to foster a culture of transparency, trust, mutual support, and continuous improvement. That is in line with the Open Science principles and academic culture that are part of APH's strategic aims.

To date, a total of 5 visits took place to APH researchers (2 from the VU, 1 from the AMC, 2 from the VUmc). Content, challenges, and accomplishments of the research project were reviewed, and research quality was discussed along the lines of the research life cycle as described in the APH Quality Handbook. Overall, the scientific quality of the five research projects was

positively evaluated. The visitors and visitees found the RQVs interesting and mutually educational. Researchers from different university locations, departments, and areas of expertise discuss scientific quality from their own perspectives in the RQVs, leading to new insights. Recommendations on reproducibility and on data management were considered particularly useful, as well as referrals to relevant APH Quality Handbook chapters. To further explore the added value of the RQVs, APH now plans to arrange more of such visits to projects at all stages of the research life cycle. Eventually, best practices emerging from the RQVs will be collated and disseminated to further enhance scientific quality within the institute.

Open Science

APH fully supports Open Science principles, which are designed to maximize scientific quality and impact by fostering transparency, cooperation, reproducibility, and the sharing of research methods, data, and products. APH has endorsed the Open Science guidance from Amsterdam UMC and the VU and encourages researchers to make research data, methods, and other research processes freely available, under terms that enable the reuse, redistribution, and reproduction of the research. APH strongly believes that Open Science enhances trust among researchers, promotes the building of new collaborations with researchers and societal partners, and helps reduce research waste among others by enabling the reuse of data.

Open Science principles have been integrated throughout the research life cycle as set out in the APH Quality Handbook. The publishing of research output by APH researchers in an open-access format is enabled by institution-level open-access agreements with academic publishers signed by the Amsterdam UMC and the VU. A prerequisite for the reuse of data is that research data be stored in a FAIR (findable, accessible, interoperable, and re-usable) manner. Research data management support made available by the Amsterdam UMC and the VU at central levels has facilitated the adaptation of FAIR principles in research. It provides APH researchers with tools and support for drawing up data management plans. APH-affiliated Amsterdam UMC researchers, for instance, make use of various open data repositories (including Figshare for AMC, DANS for VUmc, PURE for VU) to publish and share their FAIR datasets. Support for storage and archiving is provided by the Amsterdam UMC's research data management helpdesk and its medical library and by the VU university library. The APH Quality Handbook facilitates FAIR data production with guidance on issues such as requesting informed consent for data sharing, metadata standards, and good data management practices. In late 2022, the

APH's Scientific Quality Committee began exploring development of a peer review system whereby research proposals can be reviewed beforehand, prior to pre-registration.

Cohort studies and research infrastructure

Research groups within APH coordinate and maintain more than 25 large- or smaller-scale longitudinal cohort studies and health and healthcare registries. These long-standing studies provide access to unique cross-sections of society and include a wealth of (often) nationwide long-term data. APH has prioritized its efforts to strengthen and sustain the tremendous assets formed by such cohort studies. That is necessary because the sustainability and viability of cohort studies and registries are under constant pressure due to a lack of long-term funding to safeguard and improve infrastructure. In recent years, APH has invested resources and funds to support cohort studies. One successful example is the Geoscience and Health Cohort Consortium (GECCO), in which six large-scale, ongoing cohort studies within APH have been enriched with a broad range of existing geodata. GECCO has become a national consortium due to an financial investment by NWO and is incorporated in Exposome-NL. An overview of all cohort studies and registries within APH can be found in **Appendix C**. A selection of these is described in more detail in our Case Studies in **Appendix B**.

In late 2019, APH created a working group incorporating representatives of the cohort studies and registries, in order to come up with a booster plan. The focus was on developing a blueprint for linking cohorts to external data registers (such as for microdata obtainable from Statistics Netherlands) and to data from general practitioners, hospitals, and pharmacists. The purpose was to make cohort data more findable and accessible through advanced data management and meta-coding, in line with FAIR data principles. In 2022, that development accelerated as a result of financial investments provided by the Dutch Ministry of Education, Culture and Science for the coming years. This enabled APH to initiate development of an Amsterdam Cohort Network (ACN), which will accommodate long-running, active, and sustainable cohort studies and registries from its constituents. Creation of a single umbrella organization will facilitate the building of a central research infrastructure as well as improving (data) visibility. The future will show whether our efforts are sufficient to achieve cohort sustainability.

Implementation, societal impact, and valorization

APH supports researchers in producing high quality research, but such research can only fulfill its potential if it benefits society at large. Efforts to achieve societal impact by implementing and valorizing research knowledge not only help justify the use of public funding, but they also sharpen the focus of APH research projects and give direction to the institute's policy.

Amsterdam Center of Implementation Science

Much of the research carried out in APH potentially has a direct impact on clinical, non-clinical, and preventive care and support. Like other knowledge institutions, APH is expected to produce knowledge appropriate for addressing societal health challenges and suitable for utilization in healthcare policy, practice, and beyond. Yet the path from the academic setting to practice is often unpaved, and many factors can influence the uptake of research findings. Factors that hinder or promote the implementation and scale-up of research knowledge from public health research play a role at all levels. To improve the science of implementation within our research institute, APH established the Amsterdam Center of Implementation Science (AmsCIS) in 2020. It operates as a knowledge hub, providing APH researchers with an overview of tools, resources, and guidance in the world of implementation studies and practices. This has also heightened researcher's awareness of the importance of implementation throughout the research life cycle. Researchers are stimulated to consider intended results in practice settings at an early stage for potential research applications, and to develop appropriate strategies for stakeholder engagement and research inclusivity and diversity (e.g., of study participants).

Academic collaborative centers

To ensure a more direct impact on healthcare policy and practice, APH researchers have established considerable numbers of *academic collaborative centers* (academische werkplaatsen) over the years. In such centers, practice, research, education, and policy are brought together with mutual benefits in direct collaboration between clinicians, teachers, researchers, and policymakers, with an emphasis on care settings outside academic medical centers. Such collaboration is an important vehicle for achieving societal impact. An overview of the academic collaborative centers associated with APH is provided in **Appendix D**.

Valorization of public health research

In the period 2017 to 2019, APH employed a dedicated business developer who, in cooperation with the Innovation Exchange Amsterdam (IXA), was asked to draw up a valorization strategy to enable collaboration with partners in industry and small- and medium-sized enterprises to create sustainable solutions in healthcare. That endeavor did not yield what APH had hoped for. Possibly the public health domain's characteristic focus on prevention and its more system-wide approach may have hampered development of a profitable, sustainable business model. To gain more insights on how to provide more tailor-made valorization support to researchers, APH conducted an exploratory survey among a selection of its researchers in 2019. It revealed a need for more targeted support to enable timely recognition and preparation of valorization opportunities. Such support might focus on issues of stakeholder engagement or on developing digital tools such as software and apps. Additional focuses might be on the importance of organizational embedding and a systematic shift in culture toward implementation and practice. Together with IXA, APH has consequently developed a phased valorization model containing targeted activities that might be deemed suitable depending on the phase in which APH finds itself in terms of valorization maturity. An example of such an activity at an early stage of valorization maturity was the Valorization and Entrepreneurship workshops that APH organized for its researchers together with IXA and the Amsterdam Center for Entrepreneurship (ACE) in 2020 and 2021. Another example to boost capacity building for valorization is the strategic funding that APH has provided over the years for several "embedded" PhD candidates, which was financially matched by a non-academic, private partner in order to promote collaboration and stimulate societal or economic valorization.

In 2021, a Valorization Board (AVB) was set up within Amsterdam UMC. It is charged with developing strategies for optimal implementation and execution of valorization policy throughout the Amsterdam UMC. The AVB also serves as a sounding board for policy recommendations, for example with respect to our collaboration with IXA and ACE on valorization. APH is represented in the AVB by two members of its Board of Directors and joined by fourteen translational and clinical officers from the other Amsterdam UMC research institutes. This has strengthened learning across research institutes and the formulation of a common vision and ambition with respect to research valorization. Within the AVB, APH has been a strong advocate for broadening the view and scope of economic valorization to include societal impact – now successfully embedded in the Amsterdam UMC's strategic valorization plans.

Digitalization

Digital solutions, technological innovations (e.g., Artificial Intelligence), and big data offer new opportunities in the areas of diagnostics and treatment, prevention, and the organization and management of healthcare services at individual, institutional, and system levels. Digitization is pivotal for addressing the health and healthcare challenges our society faces today. Innovations can help to curb healthcare costs and keep healthcare manageable and responsive. Digital technology and big data can play a decisive or catalytic role in predictive medicine and personalized disease prevention, in decision support tools for healthcare practitioners and policymakers, and in supporting people in self-managing their health through wearable technology and health apps. Despite the many promising applications of digital technology in healthcare, there are still many limitations and challenges to overcome from medical, ethical, legal, and social perspectives before sustainable implementation can take place. To anticipate the transition toward more digitally supported health and healthcare that will also be socially, environmentally and financially sustainable, APH decided to create a new research program specifically dedicated to digitalization and its underlying research themes. In 2022, we formulated the strategy and aims of our new Digital Health research program, to be officially launched in January 2023. The aims are to help prevent disease from occurring and to support people in current need of healthcare by proactively stimulating research on the development, evaluation, and implementation of digital tools and by fostering the smart, fair, and ethical use of data that can ensure health equity for all. The purpose is to support individuals, patients, providers, and healthcare systems in their respective roles and responsibilities. Research intentions of the new research program include the following topics: e-health systems and solutions to improve preventive and curative care tailored to the person and patient; data science and FAIR data storage principles; better use of tools such as ones that can employ artificial intelligence, virtual and augmented reality, simulation, and mobile health applications. Alongside the new research program, APH has initiated a PhD project on ethics and digital health from January 2023.

Environmental sustainability

Climate change has been identified by the World Health Organization as the greatest threat to human health in the 21st century. Currently, the provision of preventive and curative care involves processes with a huge climate footprint, especially when new interventions are developed. This creates a paradox: improving individual health comes at the expense of our collective health. A large number of players in the Dutch healthcare sector recently signed the national-level Healthcare Green Deal 3.0. One of its ambitions is to reduce the climate footprint of healthcare by 55% by 2030. How to achieve that is still largely unclear. Partly for that reason, a knowledge agenda has recently been developed in which the Dutch university medical centers (including Amsterdam UMC) are explicitly called upon to develop knowledge and skills focused on sustainability.

In autumn 2021, APH organized a networking afternoon entitled Sustainability and Health. It formed the kick-off for active APH involvement in promoting research on environmental sustainability, health, and healthcare in Amsterdam UMC and the VU. The session was followed by an inventory among APH researchers to identify ongoing research activities and research gaps relating to sustainability. Overall, this research field is still clearly in its infancy. To further stimulate such research, several APH research programs have included sustainability in their priority themes for funding opportunities. APH has also partnered with the Centre for Sustainable Healthcare established by the Amsterdam UMC in 2022. One result has been the formation of an online community of researchers and health professionals who share interests in health-related environmental sustainability and who exchange activities and developments on that topic. To further boost awareness across organizations of the environmental footprint of the healthcare sector, APH initiated a PhD project in 2021 on assessing and mitigating the environmental footprint of clinical care pathways. APH researchers are also increasingly taking part in internal and external activities and discussions (such as Amsterdam UMC Green Teams, the Amsterdam Sustainability Institute, or network meetings in organizations like Royal Netherlands Academy of Arts and Sciences (KNAW) and Netherlands Federation of University Medical Centres (NFU)) to prioritize sustainability on research agendas. We expect it to be one of the prominent ambitions on the Amsterdam UMC research agenda. APH has played a leading role in placing it high on the agenda.

Human resources policy

APH seeks to encourage talented APH researchers and to support them in developing both academic competencies and transferable professional competencies to conduct high-quality public health research with a societal impact. Over the years, APH has improved its system for identifying talented researchers and facilitating their nomination for prizes, awards, and funding opportunities. To improve the visibility and impact of early- and mid-career APH researchers, we have also encouraged international exchanges via travel grants and researcher collaboration with academic and societal partners by awarding targeted research grants and co-organizing network events. APH Program Leaders and Program Council members are diverse in terms of seniority, gender, and institutional affiliation (VUmc, AMC, VU), and all APH research programs have appointed Junior Councils. Such an environment can strengthen leadership skills.

Together with partners in our collaboration with the research school CaRe, APH developed the internationally oriented Public Health and Care Research Leadership Program (PHCR), launched in 2021. It is a two-year program for high-potential mid-career researchers who have ambitions to refine their knowledge and skills so as to qualify as distinguished leaders in public health. The program was positively evaluated by its first cohort, enabling its continuation with a new cohort of researchers every year. By late 2022, first steps had been taken to create an alumni group of program completers.

Alongside such APH talent development initiatives, the Amsterdam UMC, VU, and UvA now offer several central-level talent programs that APH researchers can benefit from, including the Amsterdam UMC Fellowship, the Diversity and Inclusion Talent Fellowship (AMC and VUmc), the Amsterdam UMC Postdoc Career Bridging Grant (AMC and VUmc), the Amsterdam UMC Talent Mentoring Program (AMC, UvA, VUmc, VU), and the VU mentoring scheme and leadership courses. Fellowship laureates have been embedded into the tenure track schemes of the Amsterdam UMC and VU, which have guided limited numbers of very talented mid-career researchers to tenured positions within five years. Amsterdam UMC has a Committee for Talent and Appointments (CTA), whose tasks are to shape the talent policies for academic staff and to give advice on appointments of mid-career and top-level academics. The CTA also provided advice on the implementation of the Recognition and Rewards (Erkennen en Waarderen) program, which advocates a broader evaluation of academic staff, in line with the current national and international debate on that topic. In line with this broader evaluation of academic staff, also the VU re-shaped its rewarding system for academic career tracks with a central role for leadership at different levels and team science. APH researchers and members of the APH Board of Directors have participated in multiple evaluation committees in these talent development initiatives.

Amsterdam UMC has a *principal investigator* (PI) system that stimulates individual researchers to take

up leadership, develop their own research lines, and gain visibility. The PI system originated at the AMC location, was adopted by the VUmc location in 2017, and has been harmonized within the Amsterdam UMC since 2019. Recognition and visibility as principal investigators has benefited APH researchers in forming collaborations and applying for research grants.

Academic culture

The Amsterdam UMC and VU have policies in place to ensure openness, safe working environments, research integrity, and inclusivity and diversity. APH complies with such institution-level policies and, where possible or needed, develops additional policies or activities. The Amsterdam UMC and VU have established ombuds offices to ensure a safe social environment, to combat unethical or undesirable behavior, to increase employees' and managers' sense of ownership and responsibility in response to evidence of misconduct, and to promote an open reporting culture and a caring organizational attitude. Since all conduct and behavior in academia is an integral part of *academic culture*, APH has integrated the principles of *good research practice* into its quality system (including the new research quality visits) and its Quality Handbook, which prescribes a range of tools and procedures for APH researchers. The principles of good research practice must be adhered to by all APH researchers in line with the Amsterdam UMC Research Code (2020), the VU and UvA Research Codes, as well as all other applicable national and international laws, regulations, and guidelines.

APH complies with the European and Netherlands Codes of Conduct for Research Integrity to ensure an academic culture in which researchers are encouraged and supported in performing research to the highest ethical standards. The principles of good research practice, including those applying to research integrity, are a recurrent theme in APH events, workshops, and e-newsletters. At centralized levels, dedicated Research Support Teams are in place in the Amsterdam UMC and VU to provide hands-on support and to aid researchers in complying with integrity and quality requirements. The VU and UvA executive boards have appointed several independent confidential counselors focusing on research integrity. These also provide research integrity training, for instance within the Introductory Clinical Research Organization course (BROK) for clinical investigators. Research integrity training is mandatory for all APH candidates as part of their PhD pathways.

With regard to inclusivity and diversity, APH is convinced that science is best pursued with a wide diversity of staff members and teams: different people who bring their own knowledge, values, and experiences to the task and who respect one another within the context of team science. This implies an environment in which people are treated equally and are all included. By signing the Talent to the Top charter, Amsterdam UMC and its research institutes have committed to ensuring that more women are in top and sub-top levels. An example of how this is promoted is the UMC's Female Career Development program. Both Amsterdam UMC locations use their institutions' portions of the NWO Aspasia Grants to help female researchers progress to higher career levels. Beyond gender equality, efforts are also made by APH to ensure an inclusive organization for other underrepresented groups, via a number of initiatives such as a working group on *intersectionality* that were created bottom-up. *Diversity, equity, and inclusion* with respect to health and healthcare is also an important theme in APH programs themselves, for instance in Personalized Medicine. Moreover, APH strives to ensure a diverse and inclusive research environment by targeting and working with diverse populations in society.

RESEARCH PROGRAMS AND HIGHLIGHTS

APH has concentrated its research efforts into eight research programs. In the sections to follow, we outline the focuses and aims of each program and describe some highlights from the past six years.

Health Behaviors and Chronic Diseases

Chronic diseases – most of them non-communicable health conditions like diabetes, cardiovascular diseases, and cancer – now account for the bulk of the total disease burden worldwide. Such chronic conditions are largely preventable through the promotion of healthy lifestyle behaviors. Unhealthy behaviors are shaped by a complex interplay of factors, whereby individual personal characteristics interact with the conditions in which people are born, grow up, live, work, and grow older. Promoting healthy behaviors requires multifactorial interventions within the complexity of real-life settings. Interventions must address both the environment and the individual, and they therefore demand close collaboration between a broad range of disciplines.

The aims of APH's Health Behaviors and Chronic Diseases (HB&CD) research program are to create, disseminate, and exchange knowledge about health-related behaviors and interventions. The program focuses in particular on the mechanisms shaping these behaviors, their impact on health, and appropriate health promotion strategies. The program thereby strives to reduce the burden of chronic diseases and related functional limitations and to improve quality of life and well-being. Research prioritizes groups with a high risk of developing long-term diseases across the life course, including lower socioeconomic and ethnic minority groups.

The research program has initiated several thematic working groups. Such as Participatory Research and Systems Science. HBCD provided seeding

grant, for example for a Delphi study Consensus-Based Process Evaluation Reporting Guidelines for Public Health Intervention Studies (CONPHES). Multiple events and workshops were organized, including a writing retreat.

Mental Health

That "there is no health without mental health" is undisputed. Mental health encompasses a wide spectrum of issues, ranging from mental well-being to severe mental illness. Mental health problems such as depression and anxiety are widespread in the general population, ranking among the conditions with the largest disease burden worldwide. Following the COVID-19 crisis, an increase has been identified in mental health problems, especially in youth. Less common conditions, such as psychotic and bipolar disorders, have a heavy impact on the lives of those affected. Mental health disorders influence not only the well-being and quality of life of individuals, but also their physical health, their utilization of healthcare, and their functioning in work and daily life. Mental health conditions thus have a profound impact on society as a whole.
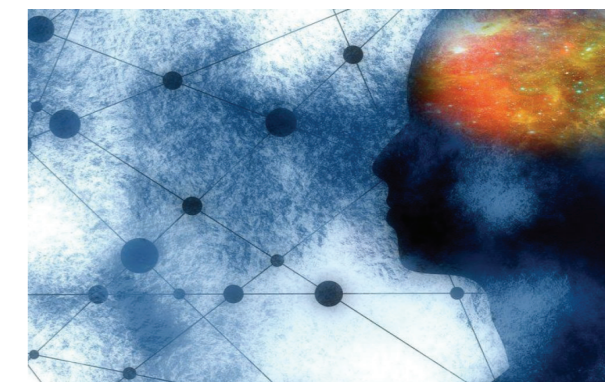
To understand the entire spectrum of mental health, the APH's Mental Health (MH) research program explores the development of both chronic and acute mental disorders, and its research also extends to mental well-being and quality of life. This wide focus has produced insights into resilience factors that can avert mental ill-health, thus generating new keys to designing preventive strategies. The program also works to develop approaches in personalized medicine that can lead to adaptations in existing or new treatments tailored to individual patient profiles.

The research program has organized a variety of events, meetings, and workshops and has taken active part in societal mental health initiatives on local,

regional, or national levels, including the programs Thrive and MIND Us. With support from seeding grants, MH researchers developed and updated the Dutch manual for *ecological momentary assessment* (EMA), which provides an overview of EMA instruments, outcomes, methods, and analytic techniques, as well as guidelines for EMA studies and a catalogue of EMA research within APH. With input from APH researchers and external stakeholders, the program recently developed a newly defined research agenda that can help researchers to identify research priorities, to improve visibility of research activities by APH researchers amongst stakeholders, and to strengthen the impact of their research.

Societal Participation and Health

Participation in society is important to everyone. It is a source of purpose in life, structure, and social contacts; it fosters better health and quality of life; and it often delivers an income. Societal participation is defined as the opportunity for individuals to optimally participate in as many social roles as desired, including paid work, voluntary work, informal caregiving, and digital activities.

The APH's Societal Participation and Health (SP&H) research program aims to improve societal participation and avoid early exits from participation. Special focuses in the program have been on vulnerable groups, including people with disabilities, long-term diseases, frequent health issues, or low socioeconomic status; on workers with occupational diseases or other complex work-related health issues; and on older workers. The program further seeks to improve preventive and medical assessments in occupational contexts. SP&H has therefore developed long-standing collaborations with societal partners, such as corporations (Tata Steel), occupational health and safety providers (ArboNed, Arbo Unie), the Dutch Employee Insurance Agency (UWV), and the City of Amsterdam.

The program also funded the MEES project, in which a selection of SP&H researchers worked to develop a core outcome set to assess societal participation. Funded by seeding grants, SP&H researchers helped to draw up a large grant application for the Dutch Cancer Foundation (KWF), which was approved in 2022; researchers also developed a database that enables analysis of Arbo Unie data in research projects. The research program has organized multiple meetings and workshops, including a workshop on implementation science.

Global Health

Global health is about worldwide health improvement, reduction of disparities, and protection against global threats that disregard national borders. Historically, a major focus has been on infectious diseases like HIV, tuberculosis, and malaria. Today, non-communicable diseases, environmental determinants such as climate change, and conflicts and migration increasingly require attention. Factors affecting maternal health and health in early life are also key focuses; such factors include poverty, malnutrition, low education, poor access to healthcare services, and low healthcare quality.

The APH's Global Health (GH) research program seeks to promote health for all in a global context. It thereby engages in interdisciplinary and transdisciplinary research collaboration that fosters interaction between theory, policy, and practice. The program has gained insights into the effects of urbanization on health in low-resource settings and in vulnerable migrant populations globally, including those in high-income countries. Additional focuses are on disease surveillance, disease program evaluations, transmission models, antimicrobial resistance, and preventive strategies for a number of communicable diseases.


The program has organized a range of workshops, webinars, and symposia on topics including "intersectionality in global health research," "re-imagining global health research," "challenges and realistic solutions to migrant health burdens in Europe," "global mental health," and "global oncology." Seeding grants to GH led to the development of a voice-response mobile health app to support cancer patients in Uganda.

Aging and Later Life

An aging population affects everyone. Young people and older generations take care of each other, while medical and care services must respond to new societal and scientific developments. Older people are not a homogeneous cultural group, and the process of aging affects different people in different ways. But what many older people do have in common is a desire to grow old gracefully and live well, to enjoy their twilight years, and then die with dignity.

The APH's Aging and Later Life (A&LL) research program works to help people grow old and be old in the best possible way. One focus is on promoting a dynamic health approach in which older people and their loved ones are supported in their ability to adapt and self-manage. Research has explored the complex process of aging, the experience of being old, and the experience of the last years of life. The program has applied such knowledge to develop evidence-based strategies to promote a healthy and meaningful old age for all. Central concepts are resilience, quality of life, and personalized care.
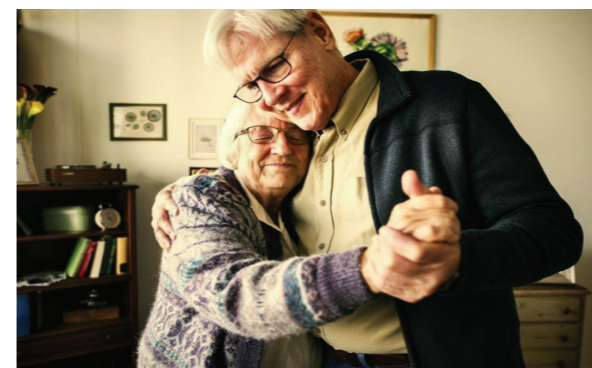
The program has organized varied meetings and events, including multiple debate and knowledge exchange evenings for older people on the topics of "loneliness," "fall prevention and vitality," and "meaning and resilience." A panel has been set up to actively involve older people in research proposals, design, participation, and communication of findings. The program has also developed a newly defined research agenda for urban aging, which opens new opportunities for funding and collaboration with stakeholders in the Amsterdam area.

Quality of Care

Demographic changes, shifting expectations about health and healthcare, technological advances, and limited resources put pressure on healthcare systems all over the world. To respond to such societal changes, and to make healthcare more person-centered, sustainable, and accessible to all, both the organization and the content of healthcare systems need to be substantially altered, while quality must be maintained or improved.

In the context of major changes in the healthcare system, the APH's Quality of Care (QoC) research program is designed to optimize quality of care for patients throughout the life cycle. The program aims to make healthcare more person-centered, sustainable, and available to everyone, while taking ethical issues and legal aspects into account. The program focuses on citizen and patient engagement, and it encourages and ensures private and public collaboration and the translation of research findings into activities with a societal impact.

The program has organized multiple meetings and webinars on topics such as "implementation science," "patient participation in research," "decision aids and vulnerable groups," and "sustainable elder care for clients and practitioners." Since the program is rather large and heterogeneous, the program has also invested in maturing its own identity and ambitions. This has fostered a stronger sense of coherence within the program and closer connections between individual researchers that have similar research interests.

Personalized Medicine

In light of the current conjunction between ongoing technological and biotechnological developments and the perceived need for person-centered decision-making, 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 now guide stratification and personalization in healthcare. Importantly, in response to societal changes, there is increased recognition that healthcare must also be more responsive to the cultural, ethnic, socioeconomic, gender, genetic, and psychological diversity in the

population as well as to people's social identities across those intersections.

The APH's Personalized Medicine (PM) research program has been designed to sharpen the focus on those dimensions of diversity in the population and on the diverse identities of individuals. It addresses the following themes: mapping diversity in healthcare needs, risk profiling, stratified interventions, training for diversity, and innovative research methods.

The research program has established Special Interest Groups (SIG) on Patient-Centered Care, Responsible Innovation in Personalized Medicine, and Intersectionality. A SIG is a smaller community within the research institute (open to all APH researchers) with a shared interest in advancing a specific area of research. A two-day, entry-level training course for early-career researchers has also been developed to offer an introduction to intersectional thinking and doing. The research program has also organized various gatherings, including a debate series on the topics of "pharmacogenetics" and "shared decision making," and during the COVID-19 pandemic it held an essay competition for early-career researchers.

Methodology

Research instruments and methods require continuous refinement and improvement to address evolving and new research questions. Methods need to be considered broadly and to include focuses on statistical techniques, theories, instruments, and frameworks. Research projects cover methods in epidemiology, biostatistics, mathematical modeling, informatics, bioinformatics, artificial intelligence, clinimetrics, and psychometrics. Research on methodology is dedicated to the understanding of methods, which means that it overarches research fields, patient groups, and geographical regions.

The APH's Methodology (Me) research program works 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 program has attained a leading international role in *research-on-research integrity*. It has brought together methodologists from Amsterdam UMC, the VU, and the UvA, and it is strongly connected to national and international academic partners and networks, as well as to societal partners such as the Dutch Ministry of Health, Welfare and Sport, Statistics Netherlands, and World Health Organization.

The program has organized multiple tutorials, sometimes monthly, in which methodological experts from differing backgrounds have shared their knowledge on a topic of choice. Other meetings and activities have also been organized, including writing retreats. The program funded a project that performed a multiverse analysis to assess the robustness of the effect estimates from a mediation analysis. With funding from a seeding grant, an online application previously developed by Methodology researchers was evaluated and improved in terms of user-friendliness and scope. It was a sample size app to aid researchers in deciding on an optimal design for reliability studies.

EVIDENCE AND ACCOMPLISHMENTS
RESEARCH QUALITY AND SOCIETAL RELEVANCE

The narratives in this chapter are supported by both quantitative and qualitative data, which are depicted in tables and figures in the main text and appendices. Accomplishments are further showcased by a selection of case studies presented in **Appendix B**. The indicators for research quality and societal relevance chosen for APH's self-evaluation can be found in **Appendix E**. These are based on the nationwide Strategy Evaluation Protocol (SEP), set out by the Dutch universities, the Dutch Research Council (NWO), and the Royal Netherlands Academy of Arts and Sciences (KNAW). Researchers affiliated with APH are employed by Amsterdam UMC (VUmc or AMC) or by the Vrije Universiteit (Faculty of Behavioural and Movement Sciences and Faculty of Science). The data shown in all tables pertain to those institutions, which are officially affiliated in the research institute APH.

APH researchers

The number of researchers from Amsterdam UMC (VUmc and AMC) and the Vrije Universiteit (henceforth VU) who were affiliated with APH in the 2017–2022 period varied from around 1,600 to 1,750 (see **Table 1**). The apparent decline in the years 2019, 2020, and 2021 may be explained by inconsistencies in researcher affiliations as recorded in research output systems. This arose from the harmonization of administrative and output systems during the VUmc–AMC merger. The impact of the COVID-19 pandemic could also be a partial explanation.

Tables in **Appendix F** show the distribution of researchers across the research programs and the affiliated institutions. Researchers may be affiliated with a maximum of two APH research programs. **Appendix G** gives an overview of the 61 full and visiting professors affiliated with APH from 2017 to 2022.

Research output

Publications or other forms of research output are considered to be APH output if APH is stated in the affiliations of one or more of the authors, provided that that author was an APH researcher in the year of publication. Research output data from Amsterdam UMC (VUmc and AMC) and the VU departments were compiled from entries in the Dutch research information system known as PURE, on the basis of the stated author affiliations. In the 2017–2022 period, information from the systems was not always correctly processed and integrated. To minimize bias, APH has made some manual modifications.

Table 1 – Total numbers of researchers affiliated with research institute APH, 2017–2022*

	2017	2018	2019	2020	2021	2022
Core research staff	321	346	353	362	351	366
PhD candidates	710	739	689	650	638	654
Other research staff	649	662	629	608	604	699
Total	1680	1747	1671	1620	1593	1719

* Core Research Staff includes full professors, associate professors, assistant professors, professors emeriti, and visiting professors. The category PhD Candidates encompasses standard candidates (employed) and adjunct candidates (externally or internally funded, but not officially employed at APH's affiliated institutions). Other Research Staff includes senior researchers, postdocs, junior researchers, visiting fellows, medical specialists or physicians, and other research support staff.

Table 2 summarizes the numbers of peer-reviewed journal articles authored or co-authored by APH researchers that were published from 2017 to 2022, as well as other types of research output. Although the bulk of the output was in the form of scientific articles in academic journals, APH researchers also produced many book chapters and professional publications in clinically oriented journals, thus enabling knowledge transfer to professionals in various healthcare settings. The tables in **Appendix H** differentiate the research output by APH research program and by academic institution.

Table 2 – Research output of the APH research institute in 2017–2022*

	2017	2018	2019	2020	2021	2022
Peer-refereed articles	2,971	3,142	3,341	3,249	3,487	3,027
Non-refereed articles	131	170	130	165	178	139
Books and book chapters	62	66	60	38	34	40
PhD theses**	135	152	148	147	210	188
Professional publications	326	299	326	304	234	154
Publications aimed at general public	13	20	19	16	15	9
Other research output	142	124	161	111	133	81
Total	3,780	3,973	4,185	4,030	4,291	3,638

* Part of the research output (books, publication aimed at general public, other research output (abstracts, letters to editor, and editorials)) is (only) available after researchers' manual entry in the PURE system, therefore the numbers might be underestimated.
** PhD theses produced from graduations at VU or UvA are included provided that the author and/or supervisor(s) are affiliated with APH.

PhD theses

During the 2017–2022 period, more than 100 PhD theses per year, from the VU or the UvA, were produced with an APH affiliation (see **Table 2**). The increase in theses completed in 2021 may be explained by the COVID-19 pandemic, which had a major impact on thesis preparation and prompted postponement of some thesis defenses planned for the year before. Tables in **Appendix H** differentiate the APH-affiliated theses by research program and by academic institution.

Table 3 shows enrollment and completion rates in APH-affiliated PhD pathways. For APH PhD candidates, doctoral regulations apply from the University of Amsterdam (AMC) or the Vrije Universiteit Amsterdam (VUmc and VU). Differences in procedures for PhD pathways exist due to differences in the doctoral regulations of the two universities, such as their differing registration systems for PhD pathways. Moreover, due to a transition to a digital registration system and the VUmc–AMC merger, the available data on pathways is not of optimal quality. Nevertheless, the table illustrates the substantial number of PhD pathways pursued within APH, and the corresponding completion rates, with completions occurring predominantly within 4 to 5 years. As expected in the public health field, a significantly larger number of women than men were enrolled in the PhD programs, as illustrated in **Table 3** for the VU and VUmc PhD candidates (for whom the gender data were available). A similar pattern is assumed for AMC (UvA) candidates. **Appendix I** shows a small selection of book covers from APH theses, illustrating the diversity of doctoral research topics within our research institute.

Table 3 – Enrollment and completion rates for PhD pathways in the research institute, 2015–2022

| | Enrollment | | | | | Completion rates | | | | | | |
| | Gender* | | Total** | | | Completion time in years*** | | | | | | |
Start year	Male	Female	APH total	VU/ VUmc	AMC	<4	4 - <5	5 - <6	6 - <7	≥7	Not yet finished	Discontinued
2015	13	43	113	56	57	14	19	25	16	8	22	9
2016	5	36	117	41	76	14	28	18	7	-	44	6
2017	14	55	145	69	76	11	38	15	-	-	69	12
2018	9	72	130	81	49	8	12	-	-	-	103	7
2019	13	47	94	60	34	4	-	-	-	-	86	4
2020	6	55	98	61	37	-	-	-	-	-	90	8
2021	11	43	96	54	42	-	-	-	-	-	95	1
2022	12	40	92	52	40	-	-	-	-	-	92	-
Total	83	391	885	474	411	51	97	58	23	8	601	47

* For the AMC candidates, information on gender distribution was lacking and therefore not included in the table.
** The registration system for VUmc and AMC PhD candidates was in transition in previous years, resulting in an incomplete data source and hence underestimation in the results shown.
*** Extended PhD trajectories, such as combined tracks where researchers are also trained as specialist, and sick or maternity leaves, could not have been identified and are therefore not excluded from the data, resulting in an overestimation of the completion time in years.

Funding and grants

Internal funding

In the 2017–2022 time frame (partially spanning the four-year budget periods 2016–2019 and 2020–2023), APH received €3,000,000 in innovation funding, spread over 6 years, from the AMC and VUmc executive boards to support the building-up phase and the further development of the research institute. This was supplemented by financial contributions from the main division Primary Care, Public Health and Methodology in Amsterdam UMC (former division 4 at VUmc and former division J/K at AMC) where most APH researchers are employed and the officially affiliated VU faculties, in proportion to the numbers of their researchers affiliated with APH. The funding provided the APH research institute with sufficient support for its operational costs, its research infrastructure, and its facilitation of societal and scientific impact during the building phase.

The innovation funding from the AMC and VUmc boards was put to work in institute-wide strategic grants (**Appendix J**) and was divided proportionally as seeding money over the eight research programs. This meant that each program received €30,000 to €50,000 annually for its innovation budget, to be distributed internally within the program. The amount was earmarked for strengthening cooperation (internally between research groups within or outside that program or with external partners), for fostering cohesion, and for facilitating innovation of the program itself. Research programs allocated their seeding budgets by issuing open calls for research grants (see APH website for a selection of examples), proposal-writing grants (for example to prepare an EU consortium proposal), or travel grants. Their budgets were also spent on program innovation or program-specific infrastructure or on organization of research program meetings, workshops, and writing retreats. In addition to the standard innovation budget per year, each program claimed a voucher of €50,000 once every four years, intended for proof-of-concept research for which funding is difficult to obtain.

External funding

Table 4 provides an overview of external funding obtained by APH researchers during the 2017–2022 period. This shows a substantial reliance on conditional funding from intermediary public bodies and agencies (designated in the Netherlands as "2nd-flow funding") and on private funding from non-profit organizations ("3rd-flow funding"). In the event that researchers were affiliated with two research programs, the funding is accounted to their program of primary affiliation only. In **Appendix K**, the external funding is further differentiated in tables by year, research program, and funding source.

Table 4 – External funding obtained by APH researchers from 2017 to 2022, by year/funding source*

	2017	2018	2019	2020	2021	2022
2nd flow	€ 22,791,021	€ 28,648,051	€ 27,962,295	€ 24,987,032	€ 21,343,618	€ 24,601,828
3rd flow	€ 22,069,161	€ 14,197,883	€ 11,743,825	€ 17,861,419	€ 14,544,742	€ 16,252,236
4th flow	€ 1,615,345	€ 1,393,963	€ 591,892	€ 887,581	€ 1,194,827	€ 1,757,771
Total	€ 46,475,527	€ 44,239,897	€ 40,298,012	€ 43,736,032	€ 37,083,187	€ 42,611,835

* Funding sources: "2nd flow" involves conditional funding by intermediary public bodies and agencies (NWO, ZonMw, KNAW, EU); "3rd flow" concerns private funding by non-profit organizations; "4th flow" refers to private funding from commercial sources.

Grants awarded

From 2017 to 2022, a number of APH researchers received prestigious national or international personal or consortium grants, the best known of which derive from the national funding instruments of the Dutch Research Council (NWO). NWO provides personal grants to talented researchers in various phases of their careers, in talent schemes bearing the names Veni, Vidi, Vici, and Rubicon. A total of 17 APH researchers received a Veni grant (for those recently awarded a PhD); 9 APH researchers obtained a Vidi grant (for researchers with several years of postdoctoral research experience), and 2 researchers received a Vici grant (for those with demonstrated ability to develop their own line of research). A total of 7 APH researchers obtained a NWO Rubicon grant (for recent PhD recipients to gain experience at foreign knowledge institutes). An additional 4 APH research projects received NWO Gravitation funding as part of a research consortium. Gravitation funding is intended for academic consortia with a potentially high ranking in their field worldwide. For an overview of the awarded grants, including European funding, see **Appendix J**.

Bibliometric results

The Centre for Science and Technology Studies (CWTS) has performed bibliometric analyses on APH-affiliated publications from 2017 to 2022, assessing the institute's scientific impact in terms of publication performance. Indicators included numbers of publications, performance in open-access publishing, national and international collaborations, and citation impact. Such indicators provide information on the relative status of APH's publication performance in comparison to the worldwide average in the field of public health research.

The analysis also examined societal impact of APH publications in a number of different areas.

Publication performance

Table 5 shows substantial numbers of APH publications in a trend increasing over the years. The numbers of publications published in open-access journals grew. In the period from 2020 to 2022, as many as 87% of APH's publications were published with open access. Other results show stable trends, such as in the proportions of collaborative publications and of publications in the top 10% of most frequently cited journals.

Table 5 – APH research institute publication performance, 2017–2022

	All years	2017–2019	2020–2022
Total number of publications	17,294	8,443	8,851
Number of publications (in citation analyses)*	13,685	7,985	5,700
Number of open-access publications	13,304	6,066	7,238
Proportion of publications involving collaborations	91%	90%	92%
Proportion of publications involving international collaborations	56%	55%	56%
Proportion of publications in top-10% journals**	18%	18%	18%
Mean normalized citation score***	1.76	1.74	1.80

* Citation information of publications in 2022 is not yet know, and therefore not included in these analyses.
** Proportion of publications in the top 10% of most frequently cited journals, compared with others in same field and publication year.
*** Normalized for field and publication year, with a score above 1 indicating an above-average citation impact.

Science mapping

Term map visualizations were created by CWTS using a VOSviewer, on the basis of keywords extracted from titles and abstracts of APH publications from 2017 to 2022. On the basis of the term maps, heat maps were generated by color-coding the relative uptake of the terms as compared with a worldwide reference database. Figure 2 depicts a keyword-based network of APH publications reflecting the predominant research topics of the institute. The colors indicate clusters of terms that co-occur in publications. This term map illustrates that the research performed within APH concerns a wide range of topics over time, from fundamental research in the red cluster to differing types of research studies, results, and outcome measures in the purple and blue clusters. The whole cycle from bench to bedside is covered. As the green cluster illustrates, chronic diseases and mental health–related disorders are prominent topics within APH.
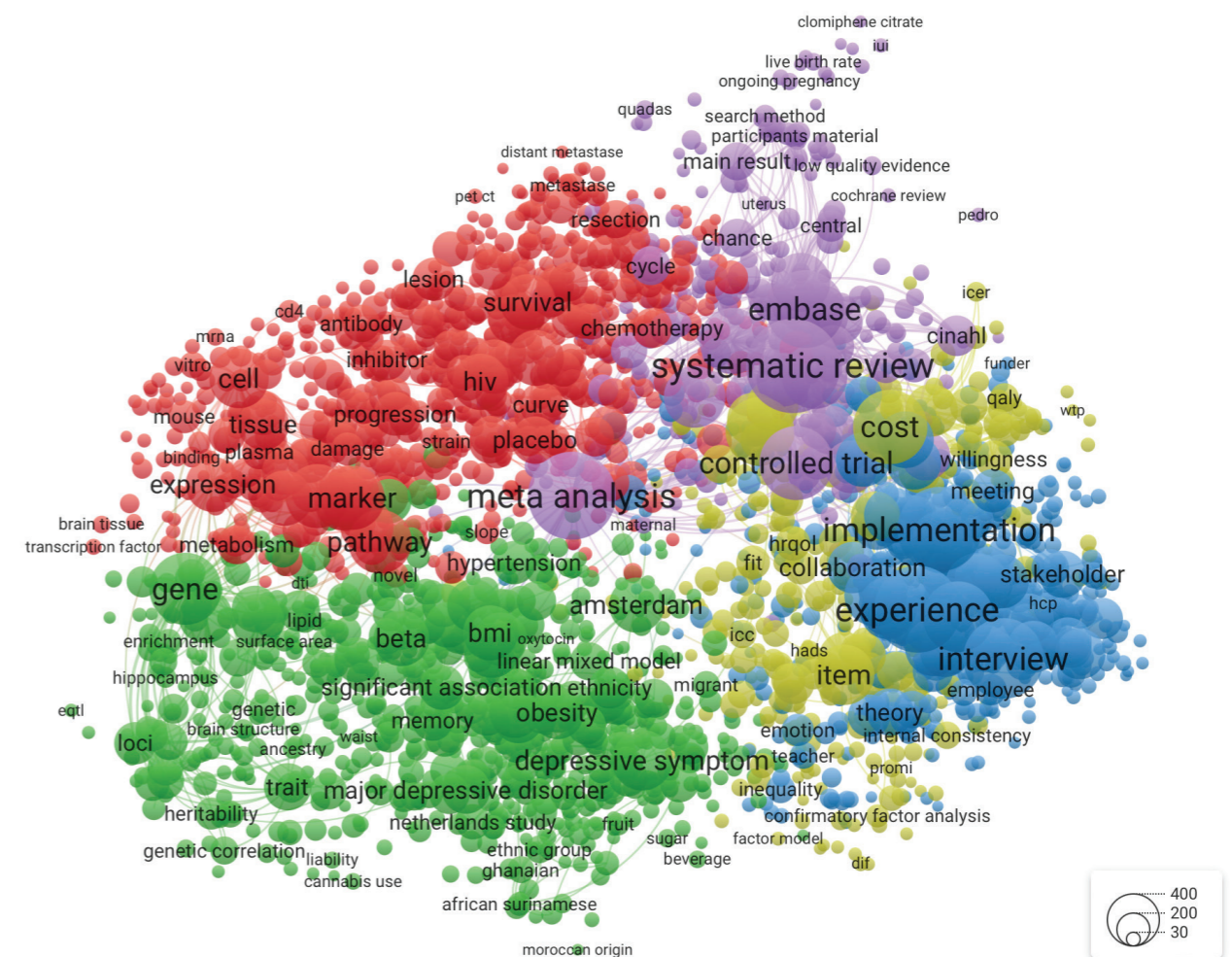
Figure 2 – The research landscape of the Amsterdam Public Health research institute (APH)

Collaboration profile

APH is a multidisciplinary and interfaculty research institute in which collaborations are essential. Researchers in APH work closely with researchers in organizations at home and abroad and they frequently co-publish with other researchers. **Appendix L** contains two tables showing the top 20 organizations in the Netherlands and the top 15 organizations abroad with which APH researchers most frequently co-published from 2017 to 2022. **Figure 3** gives an overview of APH's collaborative agreements worldwide, illustrating the geographical scope of APH research. This underlines our slogan "Think globally, act locally" – testing what has been learned elsewhere and disseminating what we have learned in Amsterdam across the rest of the world.
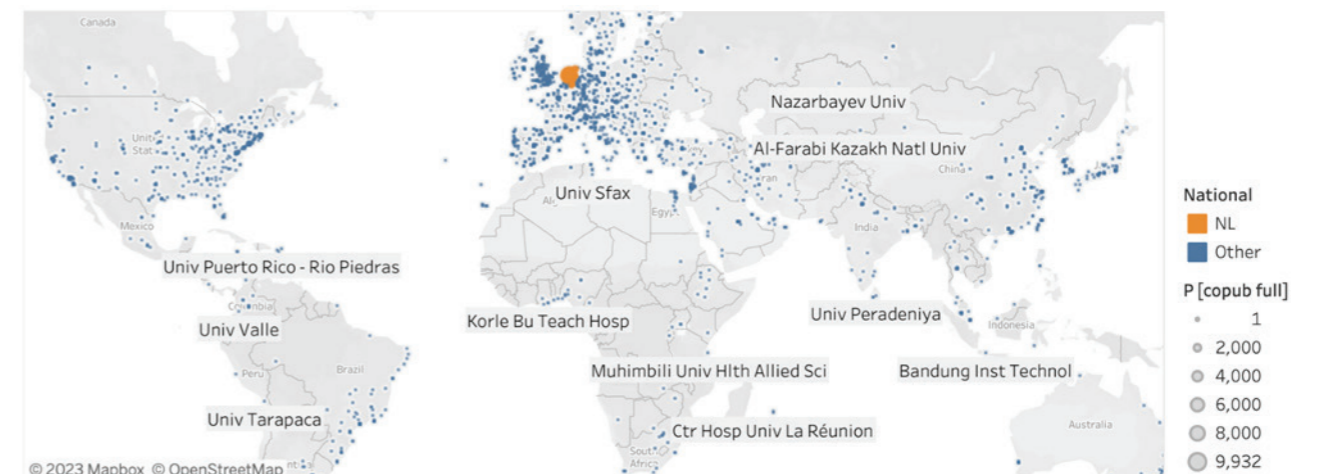
Figure 3 – Overview of APH's collaborations worldwide

Societal impact

In order to illustrate the societal impact of APH, CWTS carried out area-based connectedness (ABC) analyses, assessing the potential contribution to society made by various research areas. Figure 4 shows the relative connectedness in APH's publication clusters, as measured by the share of research output that gets cited in six societal impact areas: industry, patent citations, media, policy documents, clinical guidelines, and collaborations in non-academic hospitals. The uptake of terms is compared to the average within a reference database (assigned a value of 1). A value above 1 in a particular societal impact area means that a keyword was cited more frequently than average there. The figure shows that the connectedness of APH publications is most prominent in clinical guidelines and in collaborations with hospitals. Relative connectedness is also evident in policy documents and in the media. Societal impact areas where APH is less prominent were

industry and patent citations, conforming to our expectations in the light of APH's research focuses.

To illustrate the societal impact in heat maps, CWTS first created the term map shown in **Figure 2** containing the most-used keywords in APH publications, thereby depicting the APH research landscape. They then assessed how often those terms were being used in the various societal impact areas, in order to estimate relations between the research performed at APH and the society as a whole. This resulted in color-coded heat maps. **Appendix L** shows various heat maps that illustrate the societal impact that APH potentially had in the prominent impact areas clinical guidelines, collaborations with non-academic hospitals, policy documents, and the media. The coloring in the heat maps indicates the relative uptake of the terms in question in the respective impact areas. In **Appendix M** a selection of different types of societal impact indicators, including prizes, memberships, media performances, outreach activities and contributions to (policy) guidelines from APH researchers are presented.
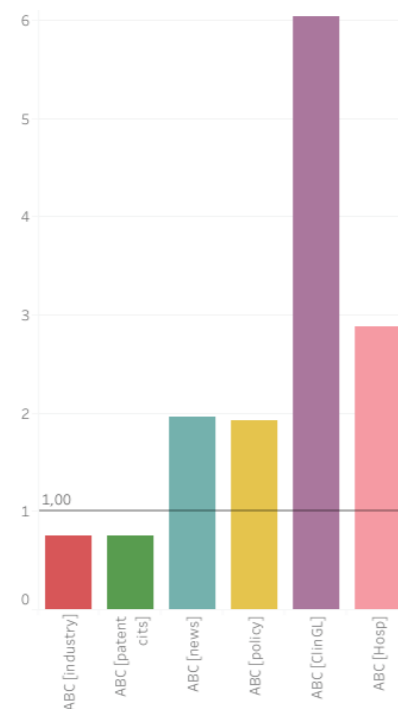
Figure 4 – Area-based connectedness of APH publications in societal impact area

Sustainable Development Goals

Because sustainability has become an increasingly important theme for APH, we had additional analyses performed on APH publications by the university library of the VU to assess the pertinence of APH publications to the Sustainable Development Goals (SDGs) as developed by the United Nations. Titles and abstracts of APH publications from 2017 to 2022 were searched for pre-defined keywords for each SDG. A total of 1,259 publications pertained to one of the 17 SDGs. **Figure 5** shows the SDGs with the highest numbers of pertinent APH publications. As expected, most research performed within APH was related to SDG 3, 'Good Health and Well-Being'. An additional figure in **Appendix N** shows the results for all 17 SDGs.
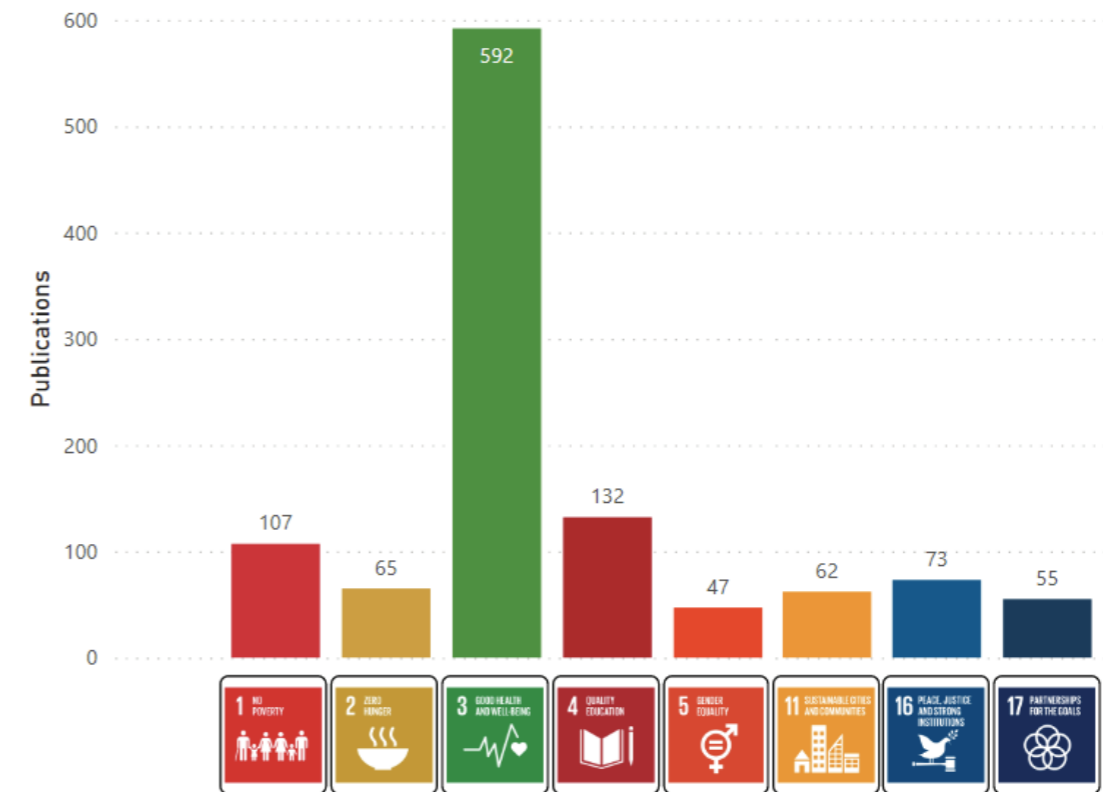
Figure 5 – Pertinence of APH publications to the UN Sustainable Development Goals (SDGs)

STRATEGY FOR THE COMING SIX YEARS

In 2020, APH launched a new strategy with the slogan "Health for all, powered by science." It reflects our strong focus on implementing the knowledge gained from Dutch and international research in our direct surroundings. In 2022, we expanded our strategy with two additional strategic themes: *environmental sustainability* and *digitalization*. These focuses complement the previously set strategic priorities with respect to implementation science and to seeking partnerships to promote public health for all residents of the Amsterdam area. The urban context of APH consistently provides a large, richly diverse living lab that not only inspires new research questions and ideas, but also enables understanding of how to effectively implement and disseminate the findings in collaboration with local stakeholders. The emphasis on the Amsterdam metropolitan area does not, however, preclude a wider national and international view of public health, as evidenced by the broad nationwide and international networks maintained by APH researchers (see **Figure 3** and **Appendix L**).

Having evaluated our strategic plans and accomplishments of the past six years in the previous chapters, we will now look forward. First, we synthesize the six-year evaluation in a SWOT analysis. Next, we identify relevant grand external challenges and describe how APH plans to respond. Finally, we identify key internal challenges and ambitions and describe how we intend to address them. In doing so, APH assumes responsibility to contribute to promoting the transformations needed to respond to urgent societal challenges. This will ensure high quality research evidence to support researchers, patients and other individuals, healthcare providers, and policymakers.

SWOT analysis

Building on the midterm evaluation of the period 2017–2019, APH updated the internal SWOT analysis (strengths, weaknesses, opportunities, threats) in dialogue with the APH Board of Directors and with Program Leaders.

Strengths	Weaknesses
Research institute level	**Research institute level**
▪ Strong foundation in Amsterdam UMC and Vrije Universiteit Amsterdam ▪ High-quality and -volume interdisciplinary research with societal impact, supported by sustainable collaborations ▪ Large-scale multimodal and epidemiological data resources (cohort studies and registers) facilitating evidence-based policy and practice ▪ Establishment of considerable numbers of academic collaborative centers ▪ State-of-the-art methodological expertise ▪ Strong focus on talent development ▪ Expertise center on implementation science	▪ Limited collaborations with other UvA faculties ▪ Diversity in staff and research populations lags behind ▪ Relatively small number of tenured research staff ▪ Insufficient infrastructure (such as technical, managerial, privacy and legal support aspects) for large-scale longitudinal data, hampering the use and re-use of available data ▪ APH's solid scientific quality reviewing system was challenged by Amsterdam UMC merger, which resulted in reviewing processes at central level
Research program level	**Research program level**
▪ Coverage and expertise of public health research throughout the life course ▪ Junior Councils for each research program ▪ Leading roles for mid-career researchers	▪ Visibility and findability of expertise within the programs is suboptimal ▪ Large programs make it difficult to keep all researchers involved and engaged ▪ Solid connections with heads of departments are lacking

| Opportunities	Threats
Research institute level	**Research institute level**
▪ Expertise center on implementation science. Growing external recognition of public health among policymakers and general public ▪ Strengthening APH's translational research collaborations with partners in Amsterdam metropolitan area, including universities of applied sciences ▪ Prospects for being at forefront of developments in data science and artificial intelligence in public health ▪ Sustainable budget for cohort studies and growing opportunities for data linkage ▪ Co-investment with IXA in dedicated impact development for APH ▪ Embedding of a dedicated Diversity, Equity, and Inclusion committee ▪ Rebuilding of APH's scientific quality system, for instance with Research Quality visits	▪ APH branding in the shadow of corporate branding ▪ Loss of a sense of belonging and connection for researchers due to rapid growth of APH ▪ Increasing complexity and competition with respect to centralized and government funding, increasingly directed at very large (public-private) consortia ▪ Non-inclusive academic culture, high turnover of young researchers, and scarcity of suitable personnel in research ▪ Lack of financial and policy support and awareness for concrete actions for more diversity, inclusiveness, integrity, and safe environments
Research program level	**Research program level**
▪ Special Interest Groups to respond to innovative research topics (across programs) ▪ Expanding collaboration opportunities between research programs and external organizations	▪ Competition for internal and external resources ▪ Understaffing in program-related support staff roles hampers commitment to the research program

Figure 6 – SWOT analysis for the APH research institute

Grand external challenges

Urgent environmental threats, growing health disparities, and the COVID-19 pandemic have heightened recognition among policymakers and the general public for the importance of public health knowledge and expertise. That awareness has recently spawned new opportunities for project funding for public health research and implementation. It is incumbent on APH to act on such opportunities, so as to ensure an optimal, sustainable response to these grand societal challenges.

Fighting climate change through translational research aimed at system-wide changes

The climate change is the greatest public health challenge for the 21st century and future generations. The healthcare system plays a complex and ambiguous role in this regard. Through multiple, interconnected pathways, the climate crisis and the healthcare system have triggered both a "positive" and a "negative" feedback loop. The positive loop worsens the problem at hand. In the negative feedback loop, behavioral and systemic changes may lead to lifestyle improvements, thus helping to prevent health problems from arising, while simultaneously tempering the climate impact – both directly through behavioral change and indirectly by reducing healthcare needs in the longer term.

Another pertinent sustainability topic is the food system, which has the potential to play both a preventive and a curative role – for individuals and healthcare patients as well as for the food industry and the economic system in our society.

Since 2021, APH has been actively building a research network in Amsterdam with its partners Amsterdam UMC, VU, and UvA – for instance by funding an interdisciplinary PhD project; actively stimulating *green research* in the Center for Sustainable Healthcare at Amsterdam UMC; and appointing a visiting professor on that topic in cooperation with the research school CaRe from 2023. Overall, APH will stimulate efforts in the coming years on three interrelated categories: (i) research toward a green, sustainable healthcare system; (ii) research on the interactions between climate change, health, and healthcare; (iii) sustainable approaches to conducting medical, biomedical, and public health research. Given the dynamics in the field of green sustainability, health and healthcare, and the importance of increasing researcher involvement, there is an all-embracing need to ensure financial, methodological, and research support to researchers. APH will closely work with the Center for Sustainable Healthcare to fulfill that need, and will redirect funding to the research areas in question. APH will also focus on greener practices of researchers themselves. For example, we will adopt the tighter transport guidelines

of Amsterdam UMC for APH's travel grants that are provided to most often junior and mid-career APH researchers for conferences and work visits abroad. This is an examples of the measures APH will take to reduce our climate footprint.

Creating value by digitalization of healthcare while overcoming risks

Health professionals in clinical practice are insufficiently leveraging digital tools, including artificial intelligence–driven decision support. This limits the potential efficiency gains and impedes delivery of appropriate care at the right place and time. APH will search for the added value of efficient implementation of technological instruments for health and care services, while seeking to overcome the inherent risks, by optimally engaging health practitioners, policymakers and the public.

APH sees opportunities to be at the forefront of rapid developments in data science and artificial intelligence, making use of the expected funding potentials. To this end, we will build on collaborations of APH researchers with expertise in quantitative methods, ethics, and implementation with computer scientists at the VU, UvA, and technical universities. From January 2023, APH launched a new research program called Digital Health. It will connect together strong research groups in the UvA Department of Clinical Information Science – which can contribute specialist expertise in FAIR and interoperable data management and a design lab – with principal investigators in artificial intelligence. These will include experts from the NWO Gravitation project Hybrid Intelligence (VU) and the NWO Gravitation project Stress in Action (VUmc); innovative health professionals in acute hospital care (using VR tools developed at the UvA); and experts in networked care (the EU Tools4Teams project). APH is additionally funding a PhD project on the ethical requirements for the use of digital technology in healthcare.

Strengthening health system resilience

The COVID-19 crisis and its countermeasures revealed the importance of ensuring a resilient healthcare system. Locally, it became clear that the vast expertise on infection epidemiology and medicine that was present in the Amsterdam region was seriously scattered across organizations and needed stronger linkage. Moreover, a certain lack of public trust in politicians and scientists was exposed, hampering the ability of health decision makers to develop evidence-based interventions with public support. This could adversely affect responses to future health crises. Overall, it became clear that

addressing health inequalities and societal dissatisfaction is essential in a health crisis. To do so, public health researchers need to collaborate with societal partners at all levels – including the general public, practitioners, managers, and policymakers.

During the pandemic, APH researchers took part in crisis management teams and made ample use of cohort and other longitudinal studies to swiftly investigate the impact of the disease. APH will sustain these assets in anticipation of future health crises. The APH organizational structure also facilitates rapid strategic adaptation of research themes when needed. For instance, the research programs' seeding budgets and options for forming Special Interest Groups across programs can foster a resilient response to new societal and research challenges. Currently, there is a growing focus on themes such as prevention, aging populations, integrated healthcare, participatory research, citizen science, and system science. Moreover, the research themes of APH programs are continually re-aligned with the national and European research agendas.

Embracing diversity by promoting inclusiveness and equity

The Dutch population is highly diverse and will become more diverse in coming decades. Diversity is more than differences in ethnicity. It extends to many attributes such as gender, sexuality, beliefs, and political views. People working in health and care sectors need to acknowledge that such differences can lead to inequalities in health, care, and well-being. Public health programs must strive for equity in all their activities, so as to ensure equal participation and benefits for all people in the Amsterdam area and beyond. Research often fails to take the diversity of populations and societies into sufficient account. Inclusiveness in research must be improved.

The public health research workforce will be increasingly diverse, and it therefore requires diverse and inclusive working environments offering equal chances and opportunities to all. APH is committed to intensifying its efforts on the issue of diversity, equity, and inclusion (DEI) in the coming years, for example by fostering more awareness of DEI within the institute. In late 2022, a group of APH researchers created a dedicated DEI committee that will implement various DEI activities and events in the coming years. In 2023, the overarching day theme of the APH Annual Meeting will highlight DEI, thus forming an official starting point for this important focus.

Implementing and disseminating research knowledge to society

In view of today's urgent societal problems, action in public health is now needed more than ever. Academic policy in the KNAW, VU, and UvA increasingly acknowledges the societal impact that can be achieved on the basis of systematic research evidence. APH is building a strong infrastructure to disseminate and implement its research knowledge in society. In 2020, the Amsterdam Center of Implementation Science (AmsCIS) was launched, offering an online knowledge hub and master classes. AmsCIS is increasingly recognized at a national level and collaborates with the Netherlands Organisation for Health Research and Development (ZonMw). APH intends to enhance its strategic focus on the implementation of our research findings in the Amsterdam area in several ways. These include (i) active collaboration with regional partners (incl. universities of applied sciences and vocational schools) in the Amsterdam Vitaal en Gezond (AV&G) initiative in the context of the Integrated Healthcare Agreement (IZA); the Thrive initiative; Hacking Health Amsterdam; and public debates; (ii) increased presence in published and social media; and (iii) bringing together our expertise on implementation science by becoming a center of expertise.

After redirecting our focus on public health business development toward societal valorization, APH appointed a dedicated impact developer in late 2022. In cooperation with the Innovation Exchange Amsterdam (IXA), APH will further develop new ways to strengthen economic and societal valorization of public health research findings, including public–private partnerships and tailored support for initiatives.

Internal organizational challenges

This section discusses a selection of APH's most important internal organizational challenges for the coming years.

Strengthening the growing APH network

Due to the rapid growth of the research institute in recent years, there is a risk of losing a sense of belonging and connection within the institute and its research programs. Moreover, the establishment of our new Digital Health research program, and our ambition to explore collaborations with other UvA faculties in the near future, have heightened our need to safeguard the network function of our research institute. In the coming years, APH will therefore invest in strengthening its

growing network. Some intentions are to align APH's strategic plans and ambitions with those of all network participants, including Program Leaders, committee members, heads of affiliated departments, and university faculties. Such a joint effort should enhance the sense of connection and commitment within the APH institute. We will also continue to organize network events where researchers can connect with one another, as well as encouraging program-specific events to create smaller community connections. To stimulate collaborations within and between the research programs and beyond, APH will improve the visibility and findability of the expertise in the programs. Finally, APH will continue the yearly monitoring of its internal organizational environment, including the viability of each research program.

Stimulating informal and formal collaboration with regional knowledge partners

APH wants to further strengthen its translational research collaborations with partners in the Amsterdam area, thus enhancing our strategic position in the region and making our institute a natural partner in issues of implementation and valorization. An example is our collaborative arrangement with the Amsterdam Vitaal en Gezond (AV&G) initiative. AV&G engages all regional stakeholders that are essential to the urgent transformation of the healthcare services coordinated by the interagency cooperative SIGRA. That transformation is stimulated and funded by the national-level Integrated Healthcare Agreement (IZA). The need to unite all knowledge institutions working in public health is also recognized by the Public Health Service of Amsterdam (GGD), the UvA Faculty of Social and Behavioural Sciences, the universities of applied sciences, and regional schools for vocational education. In the years to come, APH will invest in further strengthening sustainable informal and formal collaborations with our regional knowledge partners in research, practice, and policy.

Identifying and fostering new leaders in public health

APH will intensify its efforts toward early identification of high potential researchers, in order to prepare them for future career opportunities through APH fellowships and the Public Health and Care Research Leadership Program (PHCR). Also by offering positions within APH, for instance as Program Leaders or Junior Council members, our institute will encourage talented researchers to become the new leaders in public health. Efforts will be made to recognize and reward diverse

talents, thereby supporting diversification with respect to academic career pathways. Close cooperation with institution-level agents for talent identification (such as Amsterdam UMC's Committee for Talent and Appointments) will stimulate development and implementation of a more appropriate research policy in terms of the Recognition and Rewards program. We will continue to offer capacity-building events and training. These will support researchers of varied experience in a range of proficiencies: embracing flexibility; increasing their internal and external visibility; building clear profiles and areas of expertise; seeking mentorship; leveraging interdisciplinary opportunities; diversifying their skills and experience; and engaging in continuous learning and professional development.

Securing the sustainability and viability of cohort studies

By virtue of the increased recognition of APH's cohorts and registries as core facilities within Amsterdam UMC and VU, and having ensured stable external funding, APH can now secure the infrastructure required for the support and management of its longitudinal data in the coming years. This will ease the persistent pressure on the sustainability and viability of those datasets. Ongoing investment will now be made in linking and sharing the data according to FAIR data principles, thereby enhancing the value of these assets and ensuring modern data science opportunities.

The Amsterdam Cohort Network (ACN), initiated in 2021, is building a research infrastructure that will improve visibility through a single umbrella organization. This will provide a valuable strategic network to facilitate long-running, active, and sustainable cohort studies and registries for its constituents. Building on the mission and vision of the ACN, APH has led the development of a strategic plan for a *cohort coordination hub*, funded by the Dutch Ministry of Education, Culture and Science and also including dedicated financial support for cohort research. As planned, the hub will be operational by late 2023 and will offer state-of-the-art support for FAIR data management and linkage, multimodal longitudinal data analysis, findability of research expertise and data, and visibility of research results and their impact. In addition, connections with the primary cohorts in Amsterdam will be sustained by the shared employment of data stewards and researchers. APH will have a leading role in the implementation and monitoring of the cohort coordination hub and will create and maintain a strong network of cohort researchers in Amsterdam.

Facilitating and supporting scientific quality in APH research projects

APH seeks to provide research output of the highest quality, which adheres to the prevailing standards of openness, transparency, and integrity. The Scientific Quality Committee (SQC) provides instruments for APH researchers to monitor and improve the quality of their research projects, alongside the centralized quality systems at Amsterdam UMC and VU.

In late 2022, the SQC began implementing research quality visits (RQVs). The idea behind them is that discussion on scientific quality and the barriers to achieve it is more effectively conducted in a peer-to-peer conversation than in a formal auditing process. In these voluntary consultations, the starting point involves questions on challenges the researcher is facing in connection with their research projects. These are then complemented by topics tabled by the SQC that are pertinent to the research project at hand. Initial experiences from the visits show that research quality was being taken seriously within the projects in question, that the researchers were provided with valuable insights they could implement in their research projects, and that researchers felt better equipped for acquiring and maintaining research projects of the highest quality. Such experiences will subsequently be shared as good practices throughout the research institute.

A future activity of the SQC is to provide a platform where APH researchers can avail themselves of peer-review services with respect to their study protocols or pre-registrations. In addition, the APH Quality Handbook needs to be adapted in line with the research quality activities newly employed by Amsterdam UMC. `

APH is committed to continue promoting Open Science and FAIR data principles. The developments in the field of data management at Amsterdam UMC, VU, and UvA necessitate that consideration be given within APH to how such activities can be best supported and complemented to the benefit of our own researchers.

EXECUTIVE SUMMARY

The research institute Amsterdam Public Health (APH) is a network institute incorporating over 1,700 researchers from several faculties of the Vrije Universiteit Amsterdam (VU) and the University of Amsterdam (UvA). Founded in 2016, APH forms an important link between academic research, outpatient care practices, inpatient clinical care, local communities, and government policy in the Amsterdam metropolitan area.

Much of the research conducted within APH is designed to have a direct impact on society, policy, and practice. Together with our academic and non-academic partners, we promote state-of-the-art research to enhance the health potential of individuals, communities, and populations across the life course. This is implicit in our slogans "Health for all, powered by science" and "Think globally, act locally." We test what has been learned elsewhere, and we disseminate what we learn in Amsterdam across the rest of the world. Our research efforts in the 2017–2022 period were concentrated in eight research programs, covering major public health themes along the life course: Health Behaviors and Chronic Diseases; Mental Health; Societal Participation and Health; Global Health; Aging and Later Life; Quality of Care; Personalized Medicine; and Methodology.

Strategic themes and accomplishments from 2017 to 2022

Our main strategic themes and activities in the past six years are reflected in a series of accomplishments:

- We strengthened our research network by organizing institute-wide and program-specific or career-level–specific events and by stimulating collaborations and knowledge exchange.
- We created translational research collaborations with partners in the Amsterdam area, often sustained in *academic collaborative centers*. We thereby enhanced our strategic position in the region and made our research institute a natural partner in issues of implementation and valorization. From 2020 onwards, those efforts were supported by our Amsterdam Center of Implementation Science (AmsCIS).
- We supported, guided, trained, and equipped the next generation of public health researchers. We identified and fostered new leaders in public health by encouraging active participation in the Public

Health and Care Leadership Program (PHCR) and by awarding strategic postdoctoral fellowships.

- We secured the sustainability and viability of cohort studies as core facilities within Amsterdam UMC and the Vrije Universiteit. Guided by the Amsterdam Cohort Network (ACN), which we initiated in 2021, APH has led the development of a strategic plan for a *cohort coordination hub*, funded by the Dutch Ministry of Education, Culture and Science.
- We fostered high scientific quality and open science, focusing on an open academic culture and FAIR data management.

We look back on a fruitful period that was characterized largely by building a new research institute, creating social cohesion, and mitigating the impact of the COVID-19 pandemic on our researchers and their work. During the 2017–2022 period, more than 100 PhD theses per year were published. Over 3,000 peer-reviewed academic publications were produced per year (18% of which appeared in top-10 international journals), as well as some 800 publications for a wider public. More than €40 million of research funding per year was acquired. APH research had considerable societal impact, which was most prominent in clinical guidelines and in collaborations with societal stakeholders and hospitals, and which was additionally evident in policy documents and in the media.

Ambitions and future plans

We look forward to continuing growth and fruitful accomplishments in the coming years. This will necessitate the creation of several new strategic priority areas. Urgent environmental threats, growing health disparities, and the COVID-19 pandemic have heightened recognition among policymakers and the general public of the importance of public health knowledge and expertise. That awareness has recently spawned new opportunities for project funding for public health research and implementation. It is incumbent on APH to act on such opportunities, in order to ensure an optimal, sustainable response to these grand societal challenges. For the coming years, APH will concentrate its efforts on the following themes:

- We will be fighting the climate crisis through translational research aimed at system-wide changes.
- We will put effort in strengthening health system resilience and will strengthen our own crisis resilience by consolidate the learnings from the

COVID-19 pandemic. Herewith we will adapt to prepare for future public health crises. We will stimulate our researchers to provide expertise to outbreak management teams and will encourage the use of our cohort studies and other longitudinal studies to swiftly investigate health impacts to inform mitigation strategies.

- We will create value through the digitalization of healthcare while overcoming inherent risks.
- Building on our new APH research program, Digital Health, we will strive to be at the forefront of the rapid developments in data science and artificial intelligence.
- In all our activities, we will put more emphasis on our ongoing efforts to improve diversity, equity, and inclusion (DEI), with the aims of ensuring equal participation and health benefits for all people in

the Amsterdam area and beyond. This will be supported by a new dedicated APH DEI committee, which will help implement various DEI-related activities and events in the coming years.

- Last but not least, we will extend our efforts to implement and disseminate research knowledge to society, policy, and practice, supported by our Amsterdam Center of Implementation Science (AmsCIS) and our dedicated Impact Developer, and through the attention we devote to stakeholders at local and national levels.

APH thereby assumes responsibility for promoting the transformations needed to enhance and sustain the health potential of individuals, communities, and populations across the life course.

APPENDICES

APPENDIX A
OVERVIEW OF GOVERNANCE

Table A1 – Overview of governance in the APH research institute, 2017 to 2023

APH MANAGEMENT

Name	Role	From	Until	Location
APH Board of Directors				
Martine de Bruijne	Director	2017	Present	VUmc
Dionne Kringos	Vice-director	2019	Present	AMC
Frank van Leth	Vice-director	2021	Present	VU
Carlo Schuengel	Vice-director	2019	2021	VU
Judith Sluiter	Director	2017	2019	AMC
APH support staff				
Danielle van der Laan	Policy advisor and manager	2019	Present	VUmc
Moira Goeman	Policy advisor	2023	Present	VUmc
GeertjeMarije Takkenberg	Communication advisor	2017	Present	VUmc
Diane Schöller	Impact developer	2022	Present	VUmc
Lisa van Veen	Secretary	2023	Present	VUmc
Tamara Versluis	Management assistant	2023	Present	VUmc
Evelien de Boer	Policy advisor and manager	2017	2023	VUmc
Anouk Weverling	Management assistant	2022	2023	VUmc
Angela van Weert	Policy advisor	2022	2022	VUmc
Youssef el Ghouch	Management assistant	2020	2023	VUmc
Annabel de Groot	Management assistant	2020	2022	VUmc
Seta Jahfari	Quality officer	2020	2022	VUmc
Sjaak Molenaar	Quality officer	2019	2020	VUmc
Simone van der Riet	Management assistant	2019	2022	VUmc
Anneke Bottelier	Secretary	2017	2022	VUmc
Corien Meijer	Management assistant	2017	2019	AMC
Davey Groothoff	Business developer	2017	2019	VUmc
Miranda Bos-Pronk	Quality officer	2017	2019	VUmc
Evelien Bos	Management assistant	2017	2019	VUmc

APH RESEARCH PROGRAMS

Health Behaviors and Chronic Diseases (HB&CD)			
Name	From	Until	Location
Program Leaders			
Hidde van der Ploeg	2019	Present	VUmc
Carry Renders	2022	Present	VU
Marcel Adriaanse	2020	2022	VU
Karien Stronks	2017	2020	AMC
Mai Chin A Paw	2017	2019	VUmc
Program Council			
Ingeborg Brouwer	2017	Present	VU
Bas van den Putte	2019	Present	UvA
Teatske Altenburg	2020	Present	VUmc
Joreintje Mackenbach	2020	Present	VUmc
Wilma Waterlander	2020	Present	AMC
Janneke Harting	2017	2020	AMC
Tessa Roseboom	2017	2020	AMC
Hidde van der Ploeg	2017	2019	VUmc
Program Junior Council			
Judith Visser	2022	Present	Vumc
Gian-Lee Hernandez	2022	Present	UvA
Jelle Arts	2022	Present	VUmc
Thao Minh Lam	2022	Present	VUmc
Noreen Siddiqui	2022	Present	VUmc
Heike Garritsen	2019	2022	AMC
Lena Sialino	2019	2022	VU
Anne Vos	2020	2022	UvA
Monique Alblas	2019	2020	UvA
Program Secretary			
Joske Nauta	2022	Present	VUmc
Léonie Uijtdewillige	2020	2022	VUmc
Martine Lanting	2019	2020	VUmc
Eline Vos	2017	2019	VUmc
Annabel de Groot	2020	2021	AMC

Mental Health (MH)			
Name	From	Until	Location
Program Leaders			
Femke Lamers	2021	Present	VUmc
Arne Popma	2021	Present	VUmc
Aartjan Beekman	2019	2021	VUmc
Jos Bosch	2017	2021	UvA
Brenda Penninx	2017	2019	VUmc
Program Council			
Aartjan Beekman	2022	Present	VUmc
Ruth van Holst	2022	Present	AMC
Anja Lok	2022	Present	AMC
Rudolf Ponds	2022	Present	VUmc
Marit Sijbrandij	2022	Present	VU
Brenda Penninx	2020	Present	VUmc
Claudi Bockting	2019	Present	AMC
Arnoud Verhoeff	2019	Present	VU
Dorret Boomsma	2017	Present	VU
Lotte Haverman	2017	Present	AMC
Patricia van Oppen	2017	Present	VUmc
Jos Bosch	2021	2022	UvA
Annemieke van Straten	2020	2022	VU
Mirjam Sprangers	2019	2021	AMC
Lieuwe de Haan	2019	2022	AMC
Arne Popma	2017	2021	VUmc
Pim Cuijpers	2017	2020	VU
Anneke Goudriaan	2017	2019	AMC
Karen Nieuwenhuijsen	2017	2019	AMC
Program Junior Council			
Joost Gulpen	2022	Present	AMC
Tessa van Gastel	2022	Present	AMC
Noralie Schonewille	2022	Present	VUmc
Sjanne van der Stappen	2021	2021	AMC
Chiara Jongerius	2020	2021	AMC
Camille Souama	2020	2021	VUmc
Anouk Gathier	2020	2022	VUmc
Maud van Muilekom	2019	2021	AMC

Laura Nawijn	2019	2021	VUmc
Marieke Buil	2019	2021	VU
Irina Motoc	2019	2020	VUmc
Anke Hammerschlag	2019	2020	VU
Marjolein Missler	2019	2020	VU
Eshim Shahid	2019	2020	VU
Jentien Vermeulen	2019	2020	AMC
Marlies Brouwer	2019	2021	AMC
Trees Juurlink	2019	2020	VUmc
Program Secretary			
Anouk Weverling	2022	Present	VUmc
Simone van der Riet	2020	2022	VUmc
Marissa Kok	2017	2021	UvA

Societal Participation and Health (SP&H)			
Name	From	Until	Location
Program Leaders			
Angela de Boer	2017	Present	AMC
Cécile Boot	2020	Present	VUmc
Allard van der Beek	2017	2020	VUmc
Program Council			
Astrid de Wind	2022	Present	AMC
Sietske Tamminga	2022	Present	AMC
Christine Dedding	2020	Present	VUmc
Jan Hoving	2020	Present	AMC
Maayke Sluman	2020	2022	AMC
Edwin Boezeman	2017	2022	AMC
Carel Hulshof	2017	2022	AMC
Maaike Huysmans	2017	2022	VUmc
Henk van der Molen	2017	2022	AMC
Frederieke Schaafsma	2017	2022	VUmc
Tineke Abma	2017	2020	VUmc
Leendert Blankevoort	2017	2020	AMC
Cécile Boot	2017	2020	VUmc
Han Anema	2017	2020	VUmc

Program Junior Council			
Lima Emal	2022	Present	AMC
Donny Kreuger	2022	Present	AMC
Carlien Straat	2021	Present	VUmc
Kristina Thompson	2021	2022	VU
Rosanne Schaap	2019	2022	VUmc
Art van Schaaijk	2019	2021	AMC
Program Secretary			
Michiel Greidanus	2021	Present	AMC
Pieter Coenen	2019	2021	VUmc
Gerben Hulsegge	2017	2019	VUmc

Global Health (GH)			
Name	From	Until	Location
Program Leaders			
Marianne van Elteren	2022	Present	VUmc
Frank Cobelens	2017	Present	AMC
Marjolein Dieleman	2021	2022	VU
Jacqueline Broerse	2017	2020	VU
Program Council			
Jacqueline Broerse	2022	Present	VU
Chris Hoeboer	2022	Present	AMC
Martin Grobusch	2020	Present	AMC
Charles Agyemang	2017	Present	AMC
Maiza Campos Ponce	2017	2022	VU
Marianne van Elteren	2017	2021	VUmc
Ronald Cornet	2017	2019	AMC
Katja Polman	2017	2019	VU
Christine Fenenga	2017	2019	AMC
Program Junior Council			
Philip Elders	2021	Present	VUmc
Eva van der Linden	2021	Present	AMC
Somphos Vicheth Som	2021	Present	VU
Nguyen Viet Hai	2021	Present	AMC
Marlies Visser	2021	Present	VU

Program Secretary			
Sabina Beeke	2019	Present	AMC
Ellen Hand	2017	2019	VU
Hilde van den Engel	2017	2019	VU

Aging and Later Life (A&LL)			
Name	From	Until	Location
Program Leaders			
Hein van Hout	2023	Present	VUmc
Janet MacNeil-Vroomen	2021	Present	AMC
Martijn Huisman	2020	2022	VUmc
Natalie van der Velde	2017	2021	AMC
Cees Hertogh	2017	2020	VUmc
Program Council			
Nathalie van der Velde	2022	Present	AMC
Cees Hertogh	2020	Present	VUmc
Marjolein Broese van Groenou	2019	Present	VU
Susan de Rooij	2019	Present	AMC
Julia van Weert	2019	Present	UvA
Bianca Buurman-van Es	2017	Present	AMC
Roeline Pasman	2017	Present	VUmc
Martijn Huisman	2017	2020	VUmc
Kitty Jager	2017	2019	AMC
Program Junior Council			
Sara van de Schraaf	2022	Present	VUmc
Esther de Groot	2022	Present	VUmc
Eline Kroeze	2022	Present	AMC
Sophie Renckens	2021	Present	VUmc
Kelly de Wildt	2021	Present	AMC
Milou Angevaare	2019	2022	VUmc
Marthe Ribbink	2019	2022	AMC
Gizem Yilmaz	2019	2022	UvA
Carmen van Dam	2019	2021	VUmc
Marlene van Schaik	2019	2021	VUmc

Program Secretary			
Joost Wammes	2022	Present	AMC
Fadime Kursun	2020	2022	VUmc
Najada Stringa	2020	2021	VUmc
Bernadette Jurriën-Zaal	2017	2020	VUmc
Birgit Damoiseaux	2019	2020	AMC

Quality of Care (QoC)			
Name	From	Until	Location
Program Leaders			
Ruth van Nispen	2021	Present	VUmc
Ellen Smets	2020	Present	AMC
Sophia Kramer	2017	2021	VUmc
Michèle van Vugt	2017	2019	AMC
Program Council			
Olga Damman	2017	Present	VUmc
Carla van El	2017	Present	VUmc
Mirjam Fransen	2017	Present	AMC
Bert Molewijk	2017	Present	VUmc
Adriana Zekveld	2017	Present	VUmc
Michele van Vugt	2020	Present	AMC
Pauline Slottje	2021	Present	VUmc
Dionne Kringos	2017	2020	AMC
Pim Teunissen	2017	2020	VUmc
Ellen Smets	2017	2020	AMC
Nynke van Dijk	2017	2020	AMC
Janine Meijerink	2017	2020	VUmc
Reinie Gerrits	2017	2020	AMC
Program Junior Council			
Siham Azahaf	2022	Present	VUmc
Rosa Bogerd	2022	Present	AMC
Bo Schouten	2020	2022	VUmc
Maarten Debets	2019	2022	AMC
Janine Meijerink	2019	2020	VUmc

Program Secretary			
Wieke van Dijk	2022	Present	VUmc
Esther Veenman	2021	2022	VUmc
Danique Bos	2020	2022	AMC
Vanessa Feenstra	2021	2021	VUmc
Bernadette Schutijser	2019	2020	VUmc
Nienke Boogaard	2017	2019	VUmc
Loan Ngo	2017	2019	AMC

Personalized Medicine (PM)			
Name	From	Until	Location
Program Leaders			
Baudewijntje Kreukels	2023	Present	VUmc
Tessel Rigter	2021	Present	VUmc
Kristel van Asselt	2020	2023	AMC
Meike Bartels	2017	2021	VU
Dick Willems	2017	2020	AMC
Program Council			
Meike Bartels	2022	Present	VU
Petra Verdonk	2017	Present	VUmc
Martina Cornel	2017	Present	VUmc
Jeanine Suurmond	2017	Present	AMC
Dick Willems	2020	2021	AMC
Martijn van Oijen	2020	2022	AMC
Baudewijntje Kreukels	2020	2023	VUmc
Henk van Weert	2017	2021	AMC
Program Junior Council			
Daphne Boucherie	2022	Present	AMC
Nadia van Silfout	202	Present	AMC
Menno Maris	2022	Present	AMC
Steven Kuijper	2021	Present	VUmc
Chiara Jongerius	2020	2021	AMC
Marieke Bak	2019	2022	AMC
Tessel Rigter	2019	2022	VUmc
Marleen Jansen	2019	2020	VUmc

Bart Baselmans	2019	2020	VU
Program Secretary			
Anouk Weverling	2022	Present	VUmc
Simone van der Riet	2019	2022	VUmc

Methodology (Me)			
Name	From	Until	Location
Program Leaders			
Wouter Peyrot	2023	Present	VUmc
Miranda Langendam	2022	Present	AMC
Judith Bosmans	2019	2022	VU
Mariska Leeflang	2017	2022	AMC
Hans Berkhof	2017	2019	VUmc
Program Council			
Veerle Coupé	2020	Present	VUmc
Barbara Groot-Sluijsmans	2020	Present	VU
Martijn Schut	2019	Present	AMC
Wessel van Wieringen	2019	Present	VUmc
Minne Bakker	2022	2022	VUmc
Mariska Leeflang	2022	2022	AMC
Miranda Langendam	2020	2022	AMC
Hans Berkhof	2019	2020	VUmc
Judith Bosmans	2017	2019	VU
Mark van de Wiel	2017	2019	VUmc
Antoine van Kampen	2017	2019	AMC
Program Junior Council			
Astrid Kramer	2022	Present	VUmc
Annelinde Lettink	2021	Present	VUmc
Michiel Luijten	2019	Present	AMC
Jonas Esser	2022	2022	VU
Laura van Dongen	2019	2022	AMC
Yasaman Vali	2019	2022	AMC
Anita Varga	2019	2021	VU
Stijn de Jonge	2019	2020	VUmc

Mona Ghannad	2019	2021	AMC
Bart Seppen	2019	2020	VUmc
Noah Schuster	2019	2020	VUmc
Program Secretary			
Kim Francken	2023	Present	AMC
Anouk Weverling	2022	2023	VUmc
Simone van der Riet	2019	2022	VUmc
Mieke Leenheer	2017	2019	VUmc
GeertjeMarije Takkenberg	2017	2019	VUmc

APH COMMITTEES AND ADVISORY BOARDS

Name	From	Until	Location
Internal Think Tank			
James Mills	2017	2019	AMC
Yayouk Willems	2017	2019	VU
Elise Slob	2017	2019	AMC
Jentien Vermeulen	2017	2019	AMC
Maria Altendorf	2017	2019	UvA
Ellen Elsman	2017	2019	VUmc
Gerben Hulsegge	2017	2019	VUmc
Marjolein Greuter	2017	2019	VUmc
Susan Peters-Woelders	2017	2019	VUmc
Maarten Kok	2017	2019	VU
Aydın Şekercan	2017	2019	AMC

Name	From	Until	Organization
External Advisory Board			
Marith Volp	2021	Present	RIVM (National Institute for Public Health and the Environment)
Bert van der Hoek	2020	Present	Trimbos Institute
Herman Kroneman	2020	Present	UWV Employee Insurance Agency)
Henriette Treurniet	2020	Present	Former director NSPOH (Netherlands School of Public and Occupational Health)
André Knottnerus	2017	Present	Maastricht University
Dianda Veldman	2017	Present	Patiëntenfederatie Nederland

Paul van der Velpen (chair)	2017	Present	Former director, Public Health Service of Amsterdam
Louise Gunning-Schepers	2017	Present	University of Amsterdam
Rutger Engels	2017	2022	Erasmus University Rotterdam
Annemiek van Bolhuis	2017	2021	RIVM (National Institute for Public Health and the Environment)
Aad Koster	2017	2020	University of Amsterdam, WGV Zorg en Welzijn
Petrien Uniken-Venema	2017	2020	Former director NSPOH (Netherlands School of Public and Occupational Health)

Name	From	Until	Location
Board of Deans of affiliated faculties			
Hans van Goudoever	2021	Present	AMC
Aletta Kraneveld	2022	Present	VU (Faculty of Science)
Maurits van Tulder	2020	Present	VU (Faculty of Behavioural and Movement Sciences)
Chris Polman (chair)	2017	Present	VUmc
Hans Romijn	2017	2021	AMC
Peter Beek	2017	2021	VU (Faculty of Behavioural and Movement Sciences)
Guus Schreiber	2017	2022	VU (Faculty of Science)

Name	From	Until	Location
Scientific Quality Committee			
Carlo Schuengel (chair)	2021	Present	VU
Wouter van Ballegooijen	2021	Present	VU
Yuri Milaneschi	2021	Present	VUmc
Mariska Bot	2021	Present	VUmc
Ruben Duijnhoven	2021	Present	AMC
Astrid de Wind	2020	Present	AMC
Joske Nauta	2017	Present	VUmc
Hans Knoop	2017	Present	AMC
Pauline Slottje	2017	2023	VUmc
Hans van der Wouden	2017	2022	VUmc

Anja van 't Hoog	2017	2021	AMC
Femke van Nassau	2017	2021	VUmc
Femke Lamers	2017	2021	VUmc
Janneke Harting	2017	2020	AMC
Hilde van der Aa	2017	2020	VUmc
Minne Bakker	2017	2020	VUmc
Kitty Jager	2017	2020	AMC
Helma Ijzelenberg	2017	2020	VU
Maaike Huijsmans	2017	2020	VUmc
Roeline Pasman	2017	2019	VUmc
Barbara Regeer	2017	2019	VU
Charles Agyemang	2017	2019	AMC
Treatske Altenburg	2017	2019	VUmc
Tara Donker	2017	2019	VU
Henrike Galenkamp	2017	2019	AMC
Hamdi Mbarek	2017	2019	VU
Marian Smeulers	2017	2019	AMC
Angela de Boer	2017	2019	AMC

Name	From	Until	Location
PhD Education Committee			
Mariska de Wit	2022	Present	AMC
Elmi Zwaan	2022	Present	AMC
Maartje van Stralen (chair)	2021	Present	VU
Eefje Sizoo	2021	Present	VUmc
Trynke Hoekstra	2017	Present	VU
Liselotte van Dijk	2021	2022	VUmc
Lisette van Leeuwen	2017	2022	VUmc
Evelien Bos	2017	2019	VUmc
Ruth van Nispen (chair)	2017	2021	VUmc
Kiki Lombarts	2019	2019	AMC
Hanneke van Dongen	2018	2019	VU
Janet MacNeil-Vroomen	2018	2019	AMC
Susanne Vijverberg	2018	2019	AMC
Marianne van Elteren-Jansen	2017	2019	VUmc

Emiel Hoogendijk	2017	2019	VUmc
Karen Nieuwenhuijsen	2017	2019	AMC
Cornelieke van de Beek	2017	2019	AMC
Wieke van der Borg	2017	2019	VUmc
Nynke van Dijk	2017	2019	AMC
Deborah Gibson-Smith	2017	2019	VUmc
Hanneke Smaling	2017	2019	VUmc
Maiza Campos Ponce	2017	2019	VU
Esther Vermeulen	2017	2019	AMC
Felix Bolinski	2017	2019	VU
Nicole den Braver	2017	2019	VUmc

Table A2 – Overview of participants per department affiliated with APH, 2017–2022*

	Total**	2017	2018	2019	2020	2021	2022
VUmc							
Epidemiology and data science	132	78	73	63	57	45	80
Ethics, law and medical humanities	65	41	41	41	45	44	45
General practice and Elderly care medicine	111	62	72	62	65	64	74
Human genetics	23	14	13	11	9	15	15
Internal medicine	67	29	29	32	35	40	41
Midwifery science	37	22	24	27	27	21	20
Neurology	12	3	3	5	8	10	12
Ophthalmology	22	9	10	11	12	11	16
Otolaryngology	49	31	27	25	27	29	30
Pediatrics	48	32	30	27	17	15	15
Plastic, reconstructive and hand Surgery	18	9	12	14	14	15	16
Psychiatry	216	113	134	134	135	145	160
Public and occupational health	187	140	122	104	89	79	76
Rehabilitation medicine	20	14	14	15	10	10	8
AMC							
Anesthesiology	138	24	24	21	23	21	125
Biomedical engineering and physics	16	5	8	9	13	11	10
Center for evidence based education	15	4	4	6	5	8	3
Dermatology	15	12	10	9	9	10	9
Ear, nose and throat	15	12	11	10	10	10	10
Epidemiology and data science	51	25	35	32	33	34	38
Ethics, law and medical humanities	11	0	0	0	9	10	11
Experimental immunology	13	12	11	10	11	11	11
General practice and elderly care medicine	67	49	52	48	46	44	44
Global health	54	27	31	26	28	35	41
Internal medicine	92	29	40	52	61	68	71
Medical informatics	62	34	33	36	39	34	49
Medical microbiology and infection prevention	11	4	5	4	7	6	7
Medical psychology	42	22	27	31	32	32	33
Neurology	12	5	5	6	7	8	9
Obstetrics and gynecology	52	28	32	31	28	31	34
Orthopedics	20	13	15	15	16	15	12
Pediatrics	54	28	36	34	30	36	38
Pathology	10	7	8	9	10	7	5
Psychiatry	88	56	57	63	51	64	61
Public and occupational health (incl. Coronel institute)	142	47	52	49	52	103	103
Pulmonology	12	4	8	6	5	8	7
Radiology and nuclear medicine	14	10	10	8	8	9	6
Surgery	13	6	8	7	9	6	6
Urology	19	18	15	12	12	11	9
VU							
Faculty of Behavioural and Movement Sciences							
Biological Psychology	52	28	31	34	36	39	39
Clinical, Neuro- & Developmental Psychology	112	61	75	73	80	66	63
Clinical Child And Family Studies	54	21	28	31	30	36	43
Faculty of Science							
Athena	42	7	10	14	30	22	19
Health Sciences	104	63	66	65	63	61	55

* Disclaimers: (i) Due to the lack of departmental information in one of the output systems, for a part of APH researchers their affiliated department could not have been identified; (ii) The merger of AMC and VUmc departments and formation adaptations of some departments (for instance splitting General practice & Elderly care medicine department, and the reformation of Human genetics to Clinical genetics) during the evaluation period has not be included in this table; (iii) Sub-department or sections within departments are not displayed; (iv) In several departments only a small amount of APH researchers participate. Departments with less than ten APH researchers are not presented in the table.
** The total represents the total number of unique researchers appointed at the department in the period 2017-2022.

APPENDIX B
CASE STUDIES: A SELECTION OF APH HIGHLIGHTS

Cohort studies
- Amsterdam-Born Children and Their Development (ABCD)
- Netherlands Twin Register (NTR)
- Longitudinal Aging Study Amsterdam (LASA)
- Healthy Life in an Urban Setting (HELIUS)

Academic collaborative centers
- Health for Children and Adolescents
- Academic Network for General Practice Medicine (ANHA)
- University Network for Healthcare to Older Adults (UNO Amsterdam)
- eHealth Living and Learning Lab at Amsterdam UMC
- Viveon ('s Heeren Loo and VU Amsterdam)
- Amsterdam Collaboration on Health and Safety in Sports (ACHSS)

APH research projects
- LIKE
- SUPREME NUDGE
- My Little Moves
- EuroFIT
- Kids in Action
- ikHerstel
- Canteen Scan

Consortia and collaborations
- MooDFOOD
- Stress in Action (SiA)
- Geoscience and Health Cohort Consortium (GECCO)
- Research on Obesity and Diabetes among African Migrants (RODAM)

Social initiatives and events
- @EASE
- WeMakeTheCity festival
- Hacking Health Amsterdam
- Thrive initiative
- Amsterdam Vitaal en Gezond (AV&G)

Conferences organized by APH
- Annual Meeting on Sustainability
- Spring Meeting on Personalized Medicine
- Annual Meeting on Implementation
- Annual Meeting on Digitalization
- Junior Meeting on Boosting Your Balance

Communication and branding
- Communication channels
- APH Brochure and Video

Cohort studies

Amsterdam-Born Children and Their Development (ABCD)

ABCD is a large-scale, long-term cohort study of children's health from their very beginning. Some 8,000 children are to be monitored from pregnancy to adulthood. The chief goal is to identify and analyze factors in early life – during pregnancy and at early childhood ages – that may explain later health status and health disparities. The study uses periodic questionnaires, blood tests, and health assessments to investigate whether the children's health is influenced by living conditions and lifestyles. Initiated by researchers in the AMC and VUmc in 2003, the ABCD study is unique in its design, its multi-ethnic composition, the comprehensiveness of the study sample, and the cost-effectiveness of its data collection and analysis.

Netherlands Twin Register (NTR)

NTR is a national registry, initiated by the Vrije Universiteit Amsterdam, in which twins, multiples, and their parents, siblings, spouses, and other family members participate. Since the early 1980s, the NTR has enrolled around 120,000 twins and a roughly equal number of their relatives. The majority of families have taken part in survey studies, and smaller subsamples participate in the collection of biomaterial like DNA, or in dedicated projects such as analyses of neuropsychological, biomarker, and behavioral traits. The research performed by NTR focuses primarily on the role of heritability in mental and physical health.

Longitudinal Aging Study Amsterdam (LASA)

LASA is a prospective cohort study of older adults in the Netherlands, initially based on a nationally representative sample of people aged 55 to 84. It focuses on the determinants, trajectories, and consequences of physical, cognitive, emotional, and social functioning in later life; on connections between those variables; on changes in and between respondents over time; and on consequences of such changes (for instance in terms of care and social participation). The LASA study has been ongoing since 1992. It was initiated by the Ministry of Health, Welfare and Sport and is now coordinated by Amsterdam UMC and the VU..

Healthy Life in an Urban Setting (HELIUS)

The HELIUS study is a prospective cohort study on health and healthcare in an urban multi-ethnic population. Some 25,000 Amsterdam residents of Turkish, Moroccan, South-Asian Surinamese, African Surinamese, Ghanaian, and Dutch ethnic background participate in the study. The aim is to gain insights into biological, psychological, and social causes of unequal burdens of disease across ethnic groups. HELIUS is an initiative of Amsterdam UMC and the Public Health Service of Amsterdam (GGD). Data collection has taken place so far from 2011 to 2015 and from 2019 to 2021, employing questionnaires, interviews, physical examinations, and biological samples.

Academic collaborative centers

Health for Children and Adolescents

Health for Children and Adolescents is an academic collaborative center that works to develop and improve preventive health services for children and young people. It is a collaboration with public health services and local governments in Amsterdam, North-Holland, and Flevoland. The aim is to create better opportunities for youngsters to grow up happy and healthy, by ensuring that they and their families have access to preventive care that works. Practice, policy, and research are integrated into the collaborative design, resulting in service innovation and in implementation of research, education, and training.

Academic Network for General Practice Medicine (ANHA)

ANHA provides an inspiring meeting place for general practitioners, researchers, and educators with the goal of improving community healthcare. It is a collaboration between 65 general practices with over 250,000 patients in the Amsterdam region and a variety of other organizations. It provides a testing ground where health practitioners and academics can shape new developments. It has also created a database as a source of knowledge for integrating research, education, and service innovation.

University Network for Healthcare to Older Adults (UNO Amsterdam)

UNO Amsterdam is an academic network of organizations for geriatric care, founded by Amsterdam UMC. It collaborates with practice settings in 23 associated agencies to link research knowledge with daily practice. Services for older people are developed and improved with input from researchers, practitioners, and clients alike. Solutions to practice issues are sought through systematic and practical investigation.

eHealth Living and Learning Lab at Amsterdam UMC

The eHealth Living and Learning Lab offers facilities for user-experience research, tailored education, and practical training to student communities. Communities include students in the bachelor's program in Medical Information Science, the master's programs in Medicine and Medical Informatics, the second-master's program in Health Informatics, and doctoral programs. The Lab intends to inspire positive energy in education and healthcare settings, with a particular focus on digital transformation in healthcare services. It promotes improved, sustainable digital patient care by supporting design, implementation, and evaluation projects for digital tools.

Viveon ('s Heeren Loo)

In the Netherlands there are about 1.1 million people with mild intellectual disabilities and 400 thousand with moderate to severe ones. Surrounding them is an even larger group of loved ones and caregivers who deal with the intense care needed by those people and their families. In Viveon, practitioners and researchers work together to develop academic research on developmental pathways, personalized treatment, and quality of care for people with intellectual disabilities. Viveon was formerly known as 's Heeren Loo (VU Amsterdam).

Amsterdam Collaboration on Health and Safety in Sports (ACHSS)

ACHSS is an initiative by two leading Amsterdam UMC academic groups to integrate research and clinical practice for the protection of athletes' health. Their aim is to ensure lifelong healthy, injury-free participation in sports and exercise, from the recreational to the Olympic level. ACHSS is one of eleven Research Centers for Prevention of Injury and Protection of Athlete Health that have been recognized by the International Olympic Committee.

APH research projects

LIKE

In view of the complex nature of the societal disparities in health status and chronic diseases, researchers in the Netherlands and abroad are increasingly focusing on participatory methods and system approaches to address those issues. Such methods and approaches have been developed and applied by APH researchers, both locally and in international consortia. A good example is the LIKE project: Lifestyle Innovations Based on Youth Knowledge and Experience (Karien Stronks et al.). The project promotes healthy habits among young people aged 10 to 14 in multi-ethnic and lower socioeconomic groups living in Amsterdam. LIKE is carried out in a partnership between APH research groups and participants from other universities, the City of Amsterdam, and the Public Health Service of Amsterdam (GGD). Children and other local stakeholders, such as welfare agencies, supermarkets, and sport clubs, play key roles in both the development and the evaluation of interventions.

SUPREME NUDGE

SUPREME NUDGE (Joline Beulens et al.) was a five-year research project, funded by the Netherlands Heart Foundation and ZonMw, focusing on adults of lower socioeconomic status. It was designed to facilitate healthier lifestyle choices by adjusting the contexts where such choices were made. Researchers from Amsterdam UMC collaborated with partners from the VU, UvA, Utrecht University, UMC Utrecht, the Netherlands Nutrition Centre, and the Coop supermarket chain to create healthier supermarket environments through nudging and price promotions. The project was accompanied by an m-health intervention that encouraged walking. The resulting data will be used to investigate the effects of the interventions in terms of lifestyle behaviors and cardiometabolic disease risk.

My Little Moves

Adequate physical activity and sleep are essential for children's healthy growth and development and should be stimulated from an early age. Screen use has become habitual at increasingly younger ages, but high-quality evidence to inform guidelines is lacking for the youngest age group (aged 0 to 4). The research project My Little Moves (Mai Chin A Paw et al.) aims to develop valid, reliable, and user-friendly assessment instruments to assess young children's 24-hour movement behaviors (physical activity, sedentary behavior, sleep). The instruments will provide data on young children's movement patterns over time and on longitudinal associations with growth, motor, and socioemotional development.

EuroFIT

The European Fans in Training (EuroFIT) project (Hidde van der Ploeg et al.) seeks to improve physical activity and reduce sedentary time in overweight male football fans. EuroFIT supports them for 12 weeks in weekly group sessions at their football club, with trained coaches guiding the men toward healthier lifestyles. The EuroFIT project has achieved the highest recognition of effectiveness in RIVM's healthy lifestyle database Loket Gezond Leven.

Kids in Action

The Kids in Action project (Manou Anselma et al.) conducted participatory action research to help children aged 9 to 12 in a neighborhood with low socioeconomic status to improve their lifestyle behaviors. The children were co-researchers in the project, which started with a needs assessment and continued in the development and implementation of co-created activities. Parents, school staff, and other community partners (including professionals working with neighborhood children) were also involved in the design and implementation. The project was a collaboration between researchers of Amsterdam UMC (VUmc Location), directors of the sports-based daycare agency Kids Aktief, and policymakers in local government.

ikHerstel

An APH research project (Han Anema and Judith Huirne) developed the evidence-based mobile application ikHerstel 2.0 ("I recover"), in collaboration with healthcare professionals and patients' organizations. The app provides post-surgical personalized advice on resuming activities defined by the patient as important. It thereby supports the patient during the recovery process, with a doctor remotely monitoring progress. The app has been shown to cost-effectively stimulate work participation and has been adapted and implemented for use in other patient groups. It has received multiple awards.

Canteen scan

The Guidelines for Food Environments at schools aim to make healthy food choices easier by stimulating school canteens towards a healthier offer and healthy incentives. A research project at VU (Carry Renders et al.) aimed to increase implementation of these guidelines by developing and evaluating implementation materials in collaboration with experts of science, policy and practice. Amongst others this project developed the 'Canteen Scan', which is a digital tool that can be used to gain insight in how healthy a school canteen is.

Consortia and collaborations

MooDFOOD

The MooDFOOD project (Marjolein Visser et al.) is designed to develop innovative, effective, feasible, and sustainable nutritional strategies for the prevention of depression. Research on the dietary modifications has enabled development of digitally accessible, evidence-based materials explaining the relationship between diet and depression. These have been made available free of charge to healthcare professionals (dieticians, general practitioners, psychologists) and to researchers, policymakers, and the general public. The data also enabled novel research findings, from real-life rather than hypothetical settings, on the impact of dietary changes on the natural environment.

SiA

The Stress in Action (Brenda Penninx et al.) consortium enables synergistic collaborations to discover (i) how responses to daily life stress arise from the temporal, dynamic interplay between context and person-specific factors; (ii) how daily life stress can be reliably measured in a specific individual in real-time; and (iii) how and when potential beneficial stress-response mechanisms turn into detrimental effects on mental and cardiometabolic health. This enables the development of novel monitoring and intervention strategies to track and reduce daily life stress and its health impact.

GECCO

In the Netherlands there are many existent sources of high-quality longitudinal data at both individual and socio-environmental levels. A great variety of geodata and other environmental data are available, but these are currently scattered and were measured at different spatial scales. Multidisciplinary longitudinal research combining high-quality individual- and environmental-level data is urgently needed to identify and better understand their complex relationships with one another and with disease risk across the life course. The aim of the Geoscience and Health Cohort Consortium (GECCO) (Jeroen Lakerveld et al.) is to provide an infrastructure that will enable research in multiple disciplines into the role of environmental factors on cardiometabolic health.

RODAM

The overall goal of the Research on Obesity and Diabetes among African Migrants (RODAM) cohort study (Charles Agyemang et al.) is to understand the reasons for the high prevalence of cardiovascular diseases and risk factors among sub-Saharan Africans in diaspora. To achieve this, it aims to (i) study the complex interplay and relative contributions of environmental (including lifestyle), healthcare, biochemical, and genetic and epigenetic factors in the high disease prevalence; (ii) identify specific risk factors within those broad categories to guide intervention programs; and (iii)

provide a knowledge base for improving diagnosis and treatment.

Social initiatives and events

@EASE

About 75% of all psychological problems have their onset at ages younger than 25, but only 30% of young people facing such problems receive help at the right time. The threshold for reaching out for help is often too high. Many young people feel ashamed, do not know where to seek help, or are waitlisted for long periods. It is also difficult to get help when symptoms come and go and are not yet diagnosable. APH researchers have worked to provide change for young people in such situations by setting up the @EASE initiative in Amsterdam (Arne Popma et al.). It enables people aged 12 to 25 to walk in or chat online to discuss their feelings. Participation is anonymous, requires no appointment, and is free of charge. The volunteers at @EASE work together with trained professionals from local healthcare and mental health agencies to avert psychological and social problems in the young participants. Multiple @EASE locations have opened in Amsterdam.

WeMakeTheCity festival

During the WeMakeTheCity festival in 2019, APH researchers took part in the program Living Ten Years Longer in Amsterdam, focusing on lifestyle factors that contribute to longer and healthier lives. How can we help vulnerable groups in Amsterdam onto a road to healthier lifestyles? Where do things go wrong? And what works? Among the participants were APH researchers, neighborhood professionals, and local residents.

Hacking Health Amsterdam

From 2019 onwards, APH researchers have participated each year in the innovation hackathon Hacking Health Amsterdam. Extraordinary multidisciplinary teams composed of people from a variety of backgrounds – from scientists to creative designers and from doctors to data managers – work together to clarify a specific urgent problem in healthcare and find a solution. Examples of solutions for which APH researchers received awards and funding are the screen instrument Uit Je Hoofd ("out of your head"), which can detect early signs of depression in children of parents with depression; a tool called HartMaatje ("heartmate"), which helps cardiac patients maintain healthy lifestyles after hospital discharge to prevent recurrence; and the

TEAM-ME tool, which helps schoolchildren recognize when they feel unhappy at school.

Thrive initiative

Thrive is a social movement for mental health promotion that connects Amsterdam residents, researchers, healthcare practitioners, policymakers, and people with personal experience of mental health issues, in order to strengthen the mental health and resilience of people living in Amsterdam. A particular focus is on three groups: young people, people with immigrant backgrounds, and employers and business owners. Thrive's ambition is to ensure by 2030 that fewer people withdraw from education, work, or society due to mental problems. Residents, professionals, and researchers from APH and other institutes will seek and apply insights into factors that foster strong mental health and resilience.

Amsterdam Vitaal en Gezond (AV&G)

Amsterdam Vitaal en Gezond is a collaborative effort to successfully implement the nationwide Integrated Healthcare Agreement (IZA) and Healthy and Active Life Pact (GALA). The purpose is to support vulnerable groups in Amsterdam in achieving equal opportunities for good health and ten additional life years by 2040. Particular focuses are on mental health, youth and families, people with long-term illness, and the elderly. Specific themes are acute care, the labor market and education, digital care, and the growth of the city. The project is a collaboration between APH and a range of stakeholders, including the City of Amsterdam, Zilveren Kruis health insurance company, the SIGRA interagency cooperative, and the client advocacy group Cliëntenbelang Amsterdam.

Conferences organized by APH

APH organizes several recurring events for its researchers and external stakeholders. These include the Junior, Spring, and Annual Meetings. We highlight some examples of these events from recent years.

Spring Meeting on Personalized Medicine

About 300 researchers and other professionals and stakeholders in the field of public health gathered for the 2019 APH Spring Meeting held at the VU Amsterdam. The focus was on the fascinating field of personalized medicine for health and disease prevention. Keynote presentations by Professors Paolo Villari (University of Rome) and Harald Schmidt (Maastricht University) provided two different perspectives on the near future of personalized medicine. Three excellent early-career

APH researchers delivered an inspiring PechaKucha pitch on their work in personalized medicine.

Spring Week on Implementation

APH researchers were connected in online sessions for the APH Spring Week of 2021. It was a very successful week with a variety of sessions and workshops. These ranged from an entertaining opening – a guitar-accompanied introduction by APH's visiting professor David Chambers, Deputy Director for Implementation Science at the National Cancer Institute, USA – to a pitch competition and a pub quiz. Our goal of the week, to get connected with fellow researchers online, was achieved.

Annual Meeting on Sustainability

The 2021 APH Annual Meeting was an inspiring networking afternoon for APH researchers to learn about and discuss strategies on the UN Sustainable Development Goals from a public health perspective. Astronaut André Kuipers gave a keynote presentation on the challenges we face in developing and maintaining a healthy and sustainable living environment.

Junior Meeting on Boosting Your Balance

The 2022 Junior Meeting, named Junified, is an annually recurring event exclusively for and by APH's early-career researchers (including PhD candidates and postdocs). This day's theme focused on mental health and strength. Dai Carter, a former Dutch Special Forces soldier, provided a keynote presentation on mental strength. Workshops were provided on lifestyle and stress, performing under pressure, and making impact with science communication.

Annual Meeting on Digitalization

The 2022 APH Annual Meeting addressed the theme of digitalization. Two keynote speakers – André Marquand (Donders Institute for Brain, Cognition and Behaviour) and Emma Beauxis-Aussalet (VU) – respectively discussed machine learning methods to help predict and assess mental disorders and issues of privacy and ethics in digitalization. During lunchtime, attendees could acquaint themselves with the use of virtual reality (VR) in health and healthcare in our "VR experience room."

Communication and branding

Communication channels

APH has made use of varied communication channels on a regular basis to reach its network and beyond. Examples are the APH website, internal e-mails, LinkedIn pages, Twitter, Instagram (for Junior Councils), YouTube (video channel), and APH-wide and program-specific newsletters. APH also developed an information brochure and a video to publicize the research institute to a broader audience.

APH Brochure

The first edition of APH's brochure *Gezamenlijk werken aan een gezonde stad* ("working together for a healthy city") was published in 2019. It presented a selection of the institute's research efforts to avert or mitigate public health challenges in the Amsterdam metropolitan area. The purpose was to inform a broad audience and promote collaboration with external partners, stakeholders, and residents in and around Amsterdam. A second edition will be published in 2023.

Video

APH has also developed an animated pitch video to inform the general public about the research institute, its mission and vision, and a selection of research projects it conducts. The purpose is to reach a wider audience and encourage collaboration by external stakeholders. Watch the video on the APH website.

APPENDIX C
COHORTS AND REGISTRIES

Table C1 – Cohorts and registries associated with research institute APH, 2017–2022

Name	Description and aim
Amsterdam-Born Children and Their Development Cohort (ABCD)	Monitors health, growth, and development in approximately 8,000 children born in Amsterdam. The main goal is to identify and analyze factors in early life that may explain later health status and health differences.
Amsterdam Cohort Studies (ACS)	Investigates the natural course, onset, and development of HIV-1 infections in men who have sex with men and in drug users. In recent years the focus has been broadened to the epidemiology and natural course of other blood and sexually transmitted infections among ACS participants.
AGEHIV Cohort Study	Assesses aging and aging-related diseases in people living with and without HIV. The study systematically assesses the development of various comorbidities over time and identifies risk factors in individuals living with HIV.
Amsterdam Growth and Health Longitudinal Study (AGHLS)	Multidisciplinary cohort to examine growth and health among teenagers. The study assesses relationships between anthropometric development, lifestyle, and health from adolescence into adulthood.
Dutch Famine Birth Cohort Study	Investigates effects of exposure in utero to the 1944–45 Dutch wartime famine (*Hongerwinter*) on health in adulthood. Cohort includes men and women born as singletons at Wilhelmina Gasthuis hospital, November 1943–February 1947.
European Quality (EQUAL) Study	European prospective cohort study of elderly patients with chronic kidney disease, stages 4 and 5. It studies how the levels of renal function and uremic signs and symptoms can be used to determine when dialysis should be initiated.
Generations² Cohort Study	Long-term cohort study investigating the development of parenting and mental health. About 2,000 women pregnant with their first child were recruited.
Healthy Life in an Urban Setting Study (HELIUS)	Prospective cohort study on health and healthcare among an urban multi-ethnic population. The aim is to gain insights into the biological, psychological, and social causes of unequal burdens of disease across ethnic groups.
Hoorn Diabetes Care System	These monitor the course of development and progression of diabetes over a period of years. The aim is to investigate what factors (psychological, social, biological, and genetic) play roles in the onset and progression of diabetes.
Longitudinal Aging Study Amsterdam (LASA)	Prospective cohort study of older adults in the Netherlands (aged 55 to 84). The focus is on determinants, trajectories, and consequences of physical, cognitive, emotional, and social functioning.
Netherlands Autism Register (NAR)	Longitudinal registry including approximately 3,500 individuals with autism. The purpose is to monitor the course of development of individuals with autism over time, primarily through online questionnaires.
Netherlands Twin Register (NTR)	The NTR is a nationwide registry in which twins, multiples, and their parents, siblings, spouses, and other family members participate. The purpose is to study the role of heritability in mental and physical health.
Netherlands Study of Depression and Anxiety (NESDA)	Investigates the courses of depression and anxiety disorders, and in particular the psychological, social, biological, and genetic factors that influence the development and long-term prognosis of anxiety and depression.
Netherlands Study of Depression in Older Persons (NESDO)	NESDO is a multi-site naturalistic prospective cohort study to examine determinants, course, and consequences of depressive disorders in older persons and make comparisons with episodes of depression earlier in adulthood.
Netherlands Obsessive-Compulsive Disorder Association Study (NOCDA)	NOCDA is a multicenter naturalistic cohort study of the biological, psychological, and social determinants of chronicity in a clinical sample of patients with obsessive-compulsive order.
Netherlands Longitudinal Study on Hearing (NL-SH)	Examines the relationship between hearing impairment and aspects of life in adults aged 18 to 70.
Pharmacogenetics of Asthma Medication in Children: Medication with Anti-Inflammatory Effects Study (PACMAN)	An observational retrospective pharmacy-based cohort study to examine asthma treatment response.
Research on Obesity and Diabetes among African Migrants (RODAM)	Seeks to understand reasons for the high prevalence of cardiovascular diseases and risk factors among sub-Saharan Africans in diaspora.
Sarphati Amsterdam Cohort	The Sarphati Cohort collects data about the health and development of children up to age 18 to gain insights into causes of certain non-communicable health conditions, including diabetes, obesity, and cardiovascular diseases.
WOMB Cohort Study	The WOMB project is a study to follow up on a preconception lifestyle intervention among women with obesity and an unfulfilled desire for offspring, focusing on cardiovascular and metabolic health in particular.
European Renal Association European Dialysis and Transplant Association Registry (ERA-EDTA)	Collects data about patients on dialysis and kidney transplant recipients from about 35 national and regional renal registries in Europe. The aim is to perform epidemiological research and to complement and build on analyses carried out by the individual registries.
European Project on Osteoarthritis (EPOSA)	Focuses on the personal and societal burdens and their determinants in people with osteoarthritis in the aging European population. EPOSA is a collaborative study, including pre-harmonized data from six ongoing cohort studies of older community-dwelling persons aged 65 to 85.
Dutch InterRAI Registry	Databases encompassing over 20,000 unique persons and 80,000 observations, spread over routine care cohorts of residents in long-term care facilities, home-care recipients, and older adults with frail health served in general practice.
Leren van Data – Peilstations	The network of sentinel stations within the nationwide Learning from Data program comprises nursing homes that can systematically register data in electronic health records about specific topics (e.g. antibiotics for urinary and lower respiratory tract infections, use of psychotropics).
National Heart Registry (NHR)	Collects data on all cardiac interventions performed in the Netherlands. The aim is to serve interests of heart patients by monitoring and improving the quality of Dutch cardiology care in a high-quality, innovative integrated approach.
National Intensive Care Evaluation (NICE)	Performs continuous, complete registration of all available data from participating intensive care units in the Netherlands in order to monitor and optimize the quality of intensive care services.
Surveillance Epidemiology of Coronavirus under Research Exclusion – Atopic Dermatitis (SECURE-AD)	SECURE-AD is a secure, online, de-identified international reporting registry for healthcare providers to report outcomes of COVID-19 in patients with atopic dermatitis. This enables description of the impact of COVID-19 on such patients and of how factors such as age, comorbidities, and atopic dermatitis systemic immunomodulation treatments may influence COVID-19 outcomes.

TREAT NL registry	The TREAT NL registry is a nationwide registry of children and adults with moderate-to-severe atopic eczema, gathering data on their photo- and systemic immunomodulation therapies.
Amsterdam Cohort of Gender Dysphoria (ACOG)	Seeks to better understand the DSM condition gender dysphoria, trace its development from childhood to adulthood, identify effects and side-effects of treatment, and improve quality of care for individuals of all ages with gender dysphoria.

APPENDIX D
ACADEMIC COLLABORATIVE CENTERS

Table D1 – Academic collaborative centers associated with research institute APH, 2017–2022

Name	Description and aim	Partners
Sarphati Initiative	Seeks to produce research knowledge to inform local government policies for improving health, particularly in high-risk groups in the population.	Amsterdam UMC, GGD, UvA, HvA
Health for Children and Adolescents	Seeks to improve the quality of preventive services to young people, particularly in youth-oriented health services.	JGZ Kennemerland, GGD, Youth and Family Gooi and Vechtstreek
Research Center for Insurance Medicine	Promotes healthy labor force participation; the quality and the systematic knowledge base of insurance medicine; the focus on insurance medicine in education and training; and a broad participation in research, education, and innovative care services through collaboration with research institutes.	UMC Groningen, UWV, AMC, VUmc
Arbo Unie	Promotes the quality of occupational medicine by providing medical training and internships, sharing data, and developing new methodologies and care pathways.	Arbo Unie
Tata Steel	Seeks to prevent or reduce health problems among Tata Steel employees.	Tata Steel Human Resources and Health and Safety Departments
Work, Participation and Income	Amsterdam UMC's Department of Public and Occupational Health collaborates with the City of Amsterdam to improve the employment rates of people with disabilities.	City of Amsterdam Department of Work, Participation and Income
Healthcare Practice and Policy	Aims to assess all factors involved in implementing quality policy.	NZI, NFU Quality of Care Consortium
Amsterdam Collaboration on Health and Safety in Sports (ACHSS)	Two leading Amsterdam UMC academic groups on research and clinical practice in athlete health protection collaborate with a range of Dutch sports associations to promote lifelong healthy, injury-free sport and exercise participation for all, from recreational to Olympic level.	Amsterdam UMC, NOC*NSF (TeamNL), VU, ACES, AISS, SportArtsen Group, KNLTB, AFC Ajax
North-Holland and Flevoland Palliative Care Consortium	Facilitates the highest possible quality of life for all people in their last phase of life.	Ten regional networks for palliative care, Amsterdam UMC, Netherlands Association for Palliative Care
Ethical Support and Training in Healthcare and Educational Institutions	Sustainable provision and co-development of ethics support tools and training in healthcare contexts, dissemination of research findings in education and training contexts, and getting the developed services and products included in academic publications.	Amsterdam UMC, CURA Network, Cordaan, Custodial Institutions Agency, Reinier van Arkelgroep, Arkin, Dimence, Moral Deliberation Network
High and Intensive Care in Psychiatry (HIC)	Develops and implements high and intensive care in psychiatry. Activities include validating	24 Dutch mental health services

	the HIC monitoring scheme, training auditors, conducting research, and establishing two national HIC platforms in cooperation with the Dutch Association of Mental Health and Addiction Care (GGZ Nederland).	
Active and Healthy Ageing Consortium	Develops and implements innovations to promote health in a super-diverse society by combining knowledge and skills from various agencies.	110 partners in the metropolitan region, from civil society organizations, governments, health and welfare agencies, knowledge institutions, and business community
Ben Sajet Center	The main goal is to ensure quality of life for elderly people and people with cognitive disabilities. The center works to renew and sustainably improve long-term care by intertwining research, practice, and education.	Amstelring, Amsta, ROC van Amsterdam, Amsterdam Health and Technology Institute, Cordaan, HvA, Inholland, VU, UvA, Stichting Actief Burgerschap, Ons Tweede Thuis, Zonnehuisgroep Amstelland
Center for Client Experiences (CvC)	Strives to improve the quality of life of people in vulnerable situations through participatory research, as well as to boost the quality of future policy making and evaluation relating to healthcare and support services.	Cliëntenbelang Amsterdam, GGD, Philadelphia, Amstelring, SIGRA, Levvel, Elaa, ROHA, HvA, Windesheim, Willem Schrikker Group, Leyden Academy on Vitality and Ageing
Academic Network for General Practice Medicine (ANHA)	Offers an inspiring meeting place for family physicians, researchers, and educators to improve community healthcare. Provides a testing ground for practitioners and academics to shape new developments. Integrates research, education, and service innovation, employing a dedicated database as a source of knowledge.	65 Amsterdam GP practices and 10 in Haarlem East, SAB Health Care Centers Stichting GEZZuid
University Network for Healthcare to Older Adults (UNO Amsterdam)	In 23 associated healthcare agencies, researchers, practitioners, and clients link systematic research knowledge with daily practice. Solutions to practical questions are sought through systematic investigation or other efforts, and findings are applied to improve client services. Healthcare for older people is thus developed with input from researchers, practitioners, and clients.	HvA, Inholland, ROC Amsterdam, Tilburg University, GGD, NIVEL, Verenso, SKILZ, Vilans, Ministry of Health, Welfare and Sport, RIVM
eHealth Living and Learning Lab at Amsterdam UMC	The Lab offers user experience research facilities, tailored education, and practical training to the communities of PhD and other students. The aims are to initiate positive energy and to focus within the educational programs of Amsterdam UMC on a digital transformation of care services. By supporting design, implementation, and evaluation projects for	RIVM, TNO, Nictiz, KSYOS, Chipsoft, Adapcare, Vital10, Utrecht University, HU University of Applied Sciences Utrecht
	digital tools, the Lab promotes improved and sustainable digital patient care.	
Childbirth Network (CBN)	Informs and connects research, education, and practice by exchanging knowledge and experiences to promote evidence-based midwifery practice. Encourages collaboration between clients, practitioners, and researchers.	Amsterdam Groningen Midwifery Academy (AVAG), Inholland, 27 midwifery practices, EVAA and LEO midwifery associations
Urban Vitality Center of Expertise (CoE-UV)	Education and knowledge institutions, government, healthcare agencies, companies, and private individuals work together on creative solutions and sustainable innovations in line with developments in the professional field. The goal is to improve the vitality of all Amsterdam residents.	Amsterdam UMC, HvA, healthcare centers, sports institutions, immigrant and refugee centers, associations of patients and healthcare professionals
Viveon	Practitioners from the 's Heeren Loo institute and researchers from VU Amsterdam work together to develop academic research on developmental pathways, personalized treatment, and quality of care for people with intellectual disabilities.	VU Amsterdam, LEARN!, Radboud University, Hogeschool Windesheim, University Utrecht

APPENDIX E
SEP OUTPUT INDICATORS

As its primary guideline in this self-evaluation for the period 2017–2022, the APH research institute employed the nationwide Strategy Evaluation Protocol (SEP) 2021–2027 from the Universities of the Netherlands (UNL), Dutch Research Council (NWO), and Royal Netherlands Academy of Arts and Sciences (KNAW). The protocol allows a certain latitude in choosing research output indicators for the evaluation. APH has chosen indicators that it believes best demonstrate the excellence and translational nature of its quantitative research. These are listed in the table below, with referrals to relevant chapters and appendices.

Table E1 – SEP output indicators for research quality and relevance to society of APH research

Assessment dimensions	Quality domains	
	Research quality	**Relevance to society**
	1. Research products for peers Indicators: • Published research articles (refereed vs. non-refereed), including open-access publications • Academic books and book chapters • Other research output (instruments, infrastructure, datasets, software tools, or designs developed by a unit) • Theses • Organization of lectures and lectures held at conferences *see Chapter 4 and Appendices B, H and I*	**4. Research products for societal groups** Indicators: • Reports (such as for policymaking and guidelines) • Articles in professional journals, books and book chapters, and other output for professional audiences or the general public • Media attention, patents, and licenses • Conference/outreach activities for general public *see Chapter 4 and Appendices B, H, L, and M*
	2. Use of research products by peers Indicators: • Citations • Use of datasets, software tools, and other resources by peers • Use of research facilities by peers • Co-authorships *see Chapters 2–4 and Appendices B, C, and L*	**5. Use of research products by societal groups** Indicators: • Use of research facilities by societal groups • Projects in cooperation with societal stakeholders *see Chapters 2 and 3 and Appendices B–D*
	3. Marks of recognition from peers Indicators: • Research grants and prizes awarded to individuals and collaborative research projects • Memberships in academic advisory committees, editorial boards, and other bodies *see Chapters 3–4 and Appendix K, M*	**6. Marks of recognition by societal groups** Indicators: • Public prizes • Memberships in civil society organizations *see Appendix M*

APPENDIX F
APH RESEARCH STAFF

Table F1 – Research staff affiliated with APH research institute, 2017–2022*

	2017	VU	VUmc	AMC	2018	VU	VUmc	AMC	2019	VU	VUmc	AMC	2020	VU	VUmc	AMC	2021	VU	VUmc	AMC	2022	VU	VUmc	AMC
Core research staff	321	71	118	132	346	80	121	145	353	80	128	145	362	84	129	149	351	78	125	148	366	86	132	148
PhD candidates	710	72	171	467	739	72	194	473	689	83	180	426	650	85	174	391	638	85	185	368	654	83	220	351
Other research staff	649	67	322	260	662	86	312	264	629	72	280	277	608	63	279	266	604	61	264	279	699	52	284	363
Total	1,680	210	611	859	1,747	238	627	882	1,671	235	588	848	1,620	232	582	806	1,593	224	574	795	1,719	221	636	862

* Core Research Staff includes full professors, associate professors, assistant professors, professors emeriti, and visiting professors. The category PhD Candidates encompasses standard candidates (employed by APH institutions) and adjunct candidates (externally or internally funded, but not officially employed by APH institutions). Other Research Staff includes senior researchers, postdocs, junior researchers, visiting fellows, medical specialists or physicians, and other research support staff.

Table F2 – Research staff affiliated with APH research institute in 2017 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Core research staff	321	61	91	33	30	80	92	50	76
PhD candidates	710	112	166	51	114	129	230	168	151
Other research staff	649	111	149	65	47	137	219	99	86
Total	1,680	284	406	149	191	346	541	317	313

* The sum of researchers in the programs is greater than the APH total, because a researcher can be affiliated with one or two programs.

Table F3 – Research staff affiliated with APH research institute in 2018 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Core research staff	346	64	96	33	35	84	100	56	82
PhD candidates	739	112	181	52	113	135	240	169	150
Other research staff	662	109	163	67	52	145	211	95	94
Total	1,747	285	440	152	200	364	551	320	326

* The sum of researchers in the programs is greater than the APH total, because a researcher can be affiliated with one or two programs.

Table F4 – Research staff affiliated with APH research institute in 2019 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Core research staff	353	59	94	34	38	84	108	56	85
PhD candidates	689	93	183	46	105	127	221	146	131
Other research staff	629	94	169	66	42	132	197	98	91
Total	1,671	246	446	146	185	343	526	300	307

* The sum of researchers in the programs is greater than the APH total, because a researcher can be affiliated with one or two programs.

Table F5 – Research staff affiliated with APH research institute in 2020 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Core research staff	362	64	97	33	39	82	104	57	82
PhD candidates	650	77	180	38	99	114	203	139	121
Other research staff	608	87	162	70	38	128	190	93	92
Total	1,620	228	439	141	176	324	497	289	295

* The sum of researchers in the programs is greater than the APH total, because a researcher can be affiliated with one or two programs.

Table F6 – Research staff affiliated with APH research institute in 2021 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Core research staff	351	61	91	33	41	75	101	57	76
PhD candidates	638	72	185	36	96	109	191	141	109
Other research staff	604	80	168	78	35	106	182	88	101
Total	1,593	213	444	147	172	290	474	286	286

* The sum of researchers in the programs is greater than the APH total, because a researcher can be affiliated with one or two programs.

Table F7 – Research staff affiliated with APH research institute in 2022 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Core research staff	366	62	98	31	40	69	102	66	88
PhD candidates	654	75	192	40	86	101	194	125	113
Other research staff	699	75	169	74	38	112	265	90	102
Total	1,719	212	459	145	164	282	561	281	303

* The sum of researchers in the programs is greater than the APH total, because a researcher can be affiliated with one or two programs.

APPENDIX G
PROFESSORSHIP APPOINTMENTS

Table G1 – Full and visiting professorship appointments within APH research institute in 2017–2022

Name	Title of chair	Appointment	Location
2017			
Hans Berkhof	Biostatistical modeling and health-economic modeling	Full professor	VUmc
Marcel Dijkgraaf	Health technology assessment	Full professor	AMC
Martijn Huisman	Epidemiology of aging	Full professor	VUmc
Martine de Bruijne	Social medicine, specifically quality of care	Full professor	VUmc
Arne Popma	Child and adolescent psychiatry	Full professor	VUmc
Bianca Buurman	Acute elderly care	Full professor	AMC
Sander Koole	Botox for the soul: The importance of embodied emotion regulation for well-being and health	Full professor	VU
Marjolein Zweekhorst	Education is opportunity for change	Full professor	VU
Majon Muller	Internal medicine, particularly cardiovascular aging	Full professor	VUmc
Antoine van Kampen	Medical bioinformatics	Full professor	AMC
2018			
Joline Beulens	Epidemiology of lifestyle and cardiometabolic diseases	Full professor	VUmc
Charles Agyemang	Global migration, ethnicity, and health	Full professor	AMC
Evert Verhagen	Sports, exercise, and health	Full professor	VUmc
Peter Weijs	Nutrition and exercise with a special focus on protein	Full professor	VUmc
Conor Dolan	Genetic multivariate modeling	Full professor	VU
Gonneke Willemse	The role of genes and environment in behavior and health	Full professor	VU
Mark van de Wiel	Biostatistics for high-dimensional data	Full professor	VUmc
Dirk Ubbink	Evidence-based medicine and shared decision-making	Full professor	AMC
Harrie Beerlage	Urology	Full professor	VUmc
2019			
Ron Herings	Pharmacoepidemiology and care optimization	Visiting professor	VUmc/PHARMO
Bert Molewijk	Clinical ethics support and quality of care	Full professor	VUmc
Hein van Hout	Primary care of vulnerable elderly	Full professor	VUmc

Sylvia Burg-Vermeulen	Social insurance medicine	Visiting professor	AMC/NSPOH
Karin Proper	Labor, health promotion and policy	Visiting professor	VUmc/RIVM
Danielle Timmermans	Risk communication and public health	Full professor	VUmc
Ank de Jonge	Midwifery science	Full professor	VUmc
Renske van den Berg-Vos	The organization of stroke care	Visiting professor	AMC/OLVG
Nathalie van der Velde	Geriatrics, particularly fall prevention	Full professor	AMC
Maarten Schim van der Loeff	Epidemiology of sexually transmitted infections	Full professor	AMC
Aura Timen	On global epidemics and society: A journey beyond the next crisis	Endowed professor	VU/RIVM
Paula Sterkenburg	Developing in social relationships	Full professor	VU
Frank Bloemers	Trauma surgery	Full professor	VUmc
Monique Steegers	Pain medicine and palliative care	Full professor	VUmc
2020			
Cécile Boot	Social participation and health	Full professor	VUmc
Mark Bouman	Plastic surgery	Full professor	VUmc
Petra Elders	General practice medicine with special focus on diabetes care	Full professor	VUmc
Lidewij Henneman	The patient perspective in the development of genetic testing around pregnancy and birth	Full professor	VUmc
Sandra Kooij	ADHD in adults	Full professor	VUmc
Paul Merkus	Otology	Full professor	VUmc
Frederieke Schaafsma	Occupational and business medicine	Full professor	AMC
Nynke van Dijk	Medical education and training, particularly the application of research findings in general practitioner training	Full professor	AMC
Jettie Bont	General practice medicine	Full professor	AMC
Edo Richard	Neurology, particularly clinical scientific research on the vascular component of dementia from the population perspective	Full professor	AMC
Judith Bosmans	Methodology in health technology assessment	Full professor	VU
2021			
Mariëtte van den Hoven	Medical philosophy and ethics	Full professor	VUmc
Ruth van Nispen	Visual functioning and health	Full professor	VUmc
Rudolf Ponds	Medical psychology	Full professor	VUmc

Christiaan Vinkers	Stress and resilience in psychiatry	Full professor	VUmc
Eric Moll van Charante	Cardiovascular risk management in a multiethnic population	Full professor	AMC
Marc van der Valk	Internal medicine, in particular treatment of HIV infection	Full professor	AMC
Angela de Boer	Labor and health, particularly of employed persons with chronic illnesses	Full professor	AMC
2022			
Baudewijntje Kreukels	Medical psychology in particular of gender and sex variations	Full professor	VUmc
Rashmi Kusurkar	Inclusion and motivation in medical education and training	Full professor	VUmc
Margriet Mullender	Plastic surgery, particularly implementation and evaluation of innovations in gender surgery	Full professor	VUmc
Rebecca Painter	Obstetrics with a focus on maternal health, nutrition, and pregnancy	Full professor	VUmc
Martijn Schut	Translational artificial intelligence in laboratory medicine	Full professor	VUmc
Martin Smalbrugge	Geriatrics in special education and training	Full professor	VUmc
Caroline Terwee	Outcome measurement and healthcare	Full professor	VUmc
Eric van Exel	Elderly psychiatry	Full professor	VUmc
Lucres Nauta-Jansen	Translational forensic child and adolescent psychiatry	Full professor	VUmc
Cas Smits	Clinical and experimental audiology	Full professor	AMC
Jeannette Pols	Anthropology of everyday ethics in healthcare	Full professor	AMC

APPENDIX H
APH RESEARCH OUTPUT

Table H1 – Research output of research institute APH, 2017–2022*

	2017	VU	VUmc	AMC	2018	VU	VUmc	AMC	2019	VU	VUmc	AMC	2020	VU	VUmc	AMC	2021	VU	VUmc	AMC	2022	VU	VUmc	AMC
Refereed articles	2,971	334	1,200	1,437	3,142	362	1,274	1,506	3,341	401	1,273	1,667	3,249	392	1,253	1,604	3,487	426	1,323	1,738	3,027	428	1,223	1,376
Non-refereed articles	131	10	29	92	170	22	59	89	130	15	38	77	165	18	51	96	178	16	52	110	139	15	37	87
Books and book chapters	62	19	26	17	66	7	31	28	60	10	37	13	38	6	14	18	34	14	9	11	40	9	18	13
PhD theses**	135	36	44	59	152	43	48	65	148	30	47	77	147	37	55	60	210	44	68	106	188	39	54	96
Professional publications	326	28	178	120	299	24	123	152	326	24	151	151	304	34	103	167	234	33	87	114	154	12	63	79
Publications aimed at general public	13	6	5	2	20	15	3	2	19	14	5	-	16	7	7	2	15	2	9	4	9	1	5	3
Other research output	142	33	99	10	124	22	84	18	161	54	77	30	111	15	79	17	133	38	73	22	81	12	46	23
Total***	3,780	466	1,581	1,737	3,973	495	1,622	1,860	4,185	548	1,628	2,015	4,030	509	1,562	1,964	4,291	573	1,621	2105	3,638	516	1,446	1,677

* Part of the research output (books, publication aimed at general public, other research output (meeting abstracts, letters to the editor, and editorials)) is (only) available after researchers' manual entry in the PURE system, therefore the numbers might be underestimated.

** PhD theses produced from graduations at the VU or the UvA are included provided that the author and/or one or more supervisors were affiliated with APH.

*** The sum of the yearly research outputs of the affiliated institutions (VU, VUmc, AMC) is greater than the total, because a publication may be affiliated with more than one institution.

Table H2 – Research output of research institute APH in 2017 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Refereed articles	2,971	620	825	314	440	799	1,011	670	990
Non-refereed articles	131	11	17	10	15	38	55	49	44
Books and book chapters	62	6	21	5	17	18	25	8	8
PhD theses	135	34	40	17	24	37	34	43	25
Professional publications	326	46	103	56	16	83	150	45	50
Publications aimed at general public	13	2	5	1	1	3	6	3	3
Other research output	142	42	53	15	4	43	41	14	48
Total	3,692	738	1,035	406	501	993	1,297	797	1,153

* The sum of the research output of the programs is greater than the total APH output, because a publication may be associated with more than one research program.

Table H3 – Research output of research institute APH in 2018 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Refereed articles	3,142	554	878	292	461	867	1,014	715	970
Non-refereed articles	170	31	32	24	34	30	76	36	40
Books and book chapters	66	15	22	9	6	9	19	13	11
PhD theses	152	21	53	15	32	32	44	55	28
Professional publications	299	41	84	55	27	83	124	69	42
Publications aimed at general public	20	14	5	0	0	2	0	0	2
Other research output	124	37	48	18	6	39	46	21	38
Total	3,901	711	1,080	404	550	1,046	1,307	868	1,118

* The sum of the research output of the programs is greater than the total APH output, because a publication may be associated with more than one research program.

Table H4 – Research output of research institute APH in 2019 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Refereed articles	3,341	652	925	279	556	923	1,067	792	1,099
Non-refereed articles	130	12	30	8	30	28	44	38	39
Books and book chapters	60	7	22	4	3	12	16	11	18
PhD theses	148	27	38	16	34	42	66	42	22
Professional publications	326	45	99	34	32	119	120	76	31
Publications aimed at general public	19	11	2	0	0	3	4	3	0
Other research output	161	23	76	17	8	45	68	33	41
Total	4,119	766	1,167	347	644	1,151	1,351	970	1,243

* The sum of the research output of the programs is greater than the total APH output, because a publication may be associated with more than one research program.

Table H5 – Research output of research institute APH in 2020 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Refereed articles	3,249	580	901	315	441	810	1,043	760	1,082
Non-refereed articles	165	17	26	10	32	34	82	56	35
Books and book chapters	38	2	15	3	1	6	9	7	8
PhD theses	147	23	64	15	32	38	58	37	25
Professional publications	304	36	82	46	23	81	138	78	44
Publications aimed at general public	16	5	0	1	0	0	7	8	2
Other research output	111	38	37	14	4	40	36	21	42
Total	3,961	690	1,072	394	520	986	1,346	946	1,232

* The sum of the research output of the programs is greater than the total APH output, because a publication may be associated with more than one research program.

Table H6 – Research output of research institute APH in 2021 by per research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Refereed articles	3,487	611	1,023	286	577	871	1,059	856	1,142
Non-refereed articles	178	26	46	16	39	32	59	37	47
Books and book chapters	34	4	15	5	4	5	12	12	9
PhD theses	210	28	75	16	45	57	85	65	32
Professional publications	234	46	78	43	24	63	75	43	27
Publications aimed at general public	15	2	2	2	1	2	8	3	1
Other research output	133	43	69	23	4	44	47	21	44
Total	4,177	742	1,250	382	666	1,036	1,297	1,000	1,284

* The sum of the research output of the programs is greater than the total APH output, because a publication may be associated with more than one research program.

Table H7 – Research output of research institute APH in 2022 by research program

	Total*	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Refereed articles	3,027	574	843	255	544	727	968	704	995
Non-refereed articles	139	18	28	9	31	30	51	37	38
Books and book chapters	40	8	26	1	2	6	8	13	16
PhD theses	188	19	77	13	48	54	73	53	47
Professional publications	154	27	49	18	10	24	65	29	37
Publications aimed at general public	9	4	2	3	0	3	4	2	5
Other research output	81	24	16	10	8	17	34	15	34
Total	3,542	663	991	303	605	822	1,155	820	1,142

* The sum of the research output of the programs is greater than the total APH output, because a publication may be associated with more than one research program.
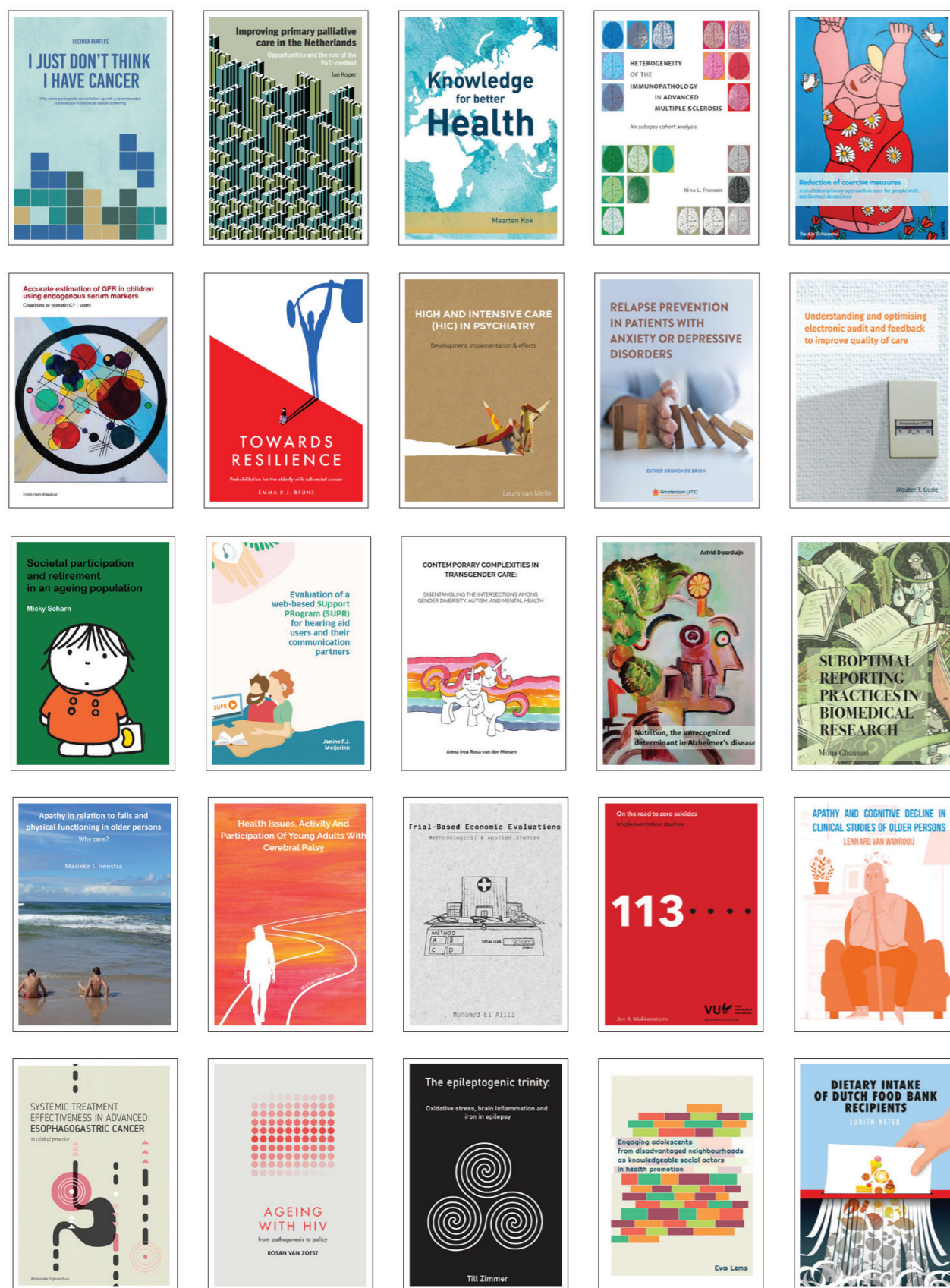
APPENDIX I
COVERS OF APH PHD THESES

Figure I1 – Selection of APH thesis covers, 2017–2022

APPENDIX J
GRANTS AWARDED

Table J1 – Strategic research institute grants awarded to APH researchers

APH strategic funding		
Name	Title	Type
2020		
Femke van Nassau	Research learning from practice: Using implementation science in "Living Labs" to optimize implementation evaluation of public health interventions at scale	Postdoc fellowship (on Implementation)
Manou Anselma, Mai Chin A Paw	I Act: Co-designing actions to support racial justice inclusive implementation science	Postdoc fellowship (on Implementation)
Malon van den Hof	The impact of early life conditions on health throughout life: a population based study using big data	Postdoc fellowship (on Academic Collaboration)
Inge de Wolf (supervisor: Hidde van der Ploeg)	Integrating sensor assisted measurement of physical activity in national surveillance systems	Embedded PhD (partner: Netherlands Statistics)
2021		
Leonie Visser	Digitalization in Alzheimer's disease: towards inclusive and sustainable digital tools	Postdoc fellowship (on Digitalization/Sustainability)
Mireille Dekker	Implementation of a link nurse program in acute care hospitals	Postdoc fellowship (on Implementation/Sustainability)
Mirthe Muilwijk	Diabetes complications in non-western migrant people in comparison to people of Dutch ethnicity, and the impact of the social and physical environment	Postdoc fellowship (on Digitalization/Sustainability)
Max Tijhuis (supervisors: Frederieke Schaafsma, Astrid de Wind)	Responsible application of AI in occupational healthcare – an ethical and legal exploration and the consequences for communication	Embedded PhD (partner: Human Total Care)

Table J2 – National and European grants awarded to APH researchers in 2017–2022

NATIONAL GRANTS

NWO Veni, Vidi, Vici grants*

Name	Project title	Year	Location
Veni			
Marije Verhage	Like parent, like child?	2017	VU
Emiel Hoogendijk	Frailty in older people: A modifiable condition?	2017	VUmc
Joreintje Mackenbach	Making the health choice easier: Role of the local food environment	2017	VUmc
Ellen Driessen	Depression treatment: The best match	2018	VU
Wouter Peyrot	What causes depression?	2018	VUmc
Birit Broekman	I have a dream: Sex-sensitive care in sleep and depression	2018	VUmc
Marij Hillen	Dealing with the unknown: Supporting physicians to better tolerate uncertainty in clinical practice	2018	AMC
Anouk Schrantee	The brain's response to medication: Zooming in with pharmacological MRI	2018	AMC
Janet MacNeil Vroomen	The influence of stay-at-home policies on institutionalization, costs, and crises in persons with dementia	2018	AMC
Vanessa Harris	Better protection against rotavirus with intestinal bacteria	2019	AMC
Nanon Labrie	Small children, big worries: Argumentation at the neonatal care unit	2019	VU
Michel Nivard	Genomic structural equation modeling elucidates psychiatric disease etiology	2019	VU
Christin Scholz	Health behavior in the context of healthy and unhealthy information	2019	UvA
Els van der Ven	Investigating the excess psychosis risk among ethnic minorities through a biopsychosocial framework	2020	VU
Emma Birnie	Antibodies for prevention and treatment of melioidosis	2022	AMC
Laura Han	Understanding biological aging: the key towards healthier and happier lives	2022	VUmc
Vincent van Vugt	Keep primary care sustainable with blended care: tailor-made eHealth for chronic disease	2022	VUmc
Vidi			
Joline Beulens	Heart of stone	2017	VUmc
Judith Bosmans	Time to get real! Using real-world data to assess cost-effectiveness	2017	VU
Christiaan Vinkers	Understanding the impact of childhood trauma in depression	2019	VUmc
Lotte Haverman	Mitigating health inequity by creating inclusive patient-reported outcome measures	2021	AMC
Janet MacNeil Vroomen	Aging in place: Are the healthcare reforms working?	2021	AMC
Annelou de Vries	Strengthening transgender care for youth	2021	VUmc
Elsje van Bergen	Growing up among bright books and generous genes	2022	VU
Joreintje Mackenbach	Prevention of obesity: From failure to success	2022	VUmc

Name	Project title	Year	Location
Marij Hillen	Discussing the unknown: An interdisciplinary perspective on communicating uncertainty in healthcare	2022	AMC
Vici			
Erik Rietveld	Change-ability for a world in flux: The next step for an embodied cognitive science of brain–body–environment systems	2020	AMC
Meike Bartels	The power of wellbeing. A multi-omics approach to build an integrative wellbeing framework	2021	VU

NWO Rubicon grant**

Name	Project title	Year	Location
Rubicon			
Arend van Deutekom	A healthy pregnancy for a healthy child's heart. Department of Cardiovascular Clinical Research, University of Oxford, United Kingdom	2018	AMC
Eirini Karyotaki	Who responds to psychotherapy and who does not? An artificial intelligence approach. Harvard Medical School, United States	2018	VU
Janneke van 't Hooft	Improve research into premature birth. Meta-Research Innovation Center, Stanford University, United States	2018	AMC
Bart Baselmans	Which role does the cortex play in cognitive disorders in psychiatric patients? Institute for Molecular Bioscience, University of Queensland, Australia	2019	VU
Laura Han	Adolescent brain age in youth mental health. Melbourne University, Australia	2020	VUmc
Sanne Bruijniks	No improvement without learning: Optimizing therapy skill acquisition in depression. Department of Clinical Psychology and Psychotherapy, University of Freiburg, Germany	2020	VU
Josephine Tan	Energy-burning fat cells originating from smooth muscle cells. Perelman School of Medicine, University of Pennsylvania, United States	2021	VUmc

NWO Gravitation funding***

Name	Project title	Year	Location
Gravitation			
Danielle Posthuma	BRAINSCAPES: A roadmap from neurogenetics to neurobiology	2018–19	VU
Joline Beulens	Exposome-NL	2018–19	VUmc
Brenda Penninx, Eco de Geus	Stress-in-action: Advancing the science of stress by moving the lab to daily life	2022	VUmc, VU
Lucres Nauta-Jansen	GUTS: Growing up together in society	2022	VUmc

EUROPEAN GRANTS

Name	Project title	Year	Location	Type of grant
ERC (European Research Council)				
Charles Agyemang	Hypertension susceptibility in African migrants: Solving the puzzle through transcontinental prospective cohort study design	2017	AMC	Consolidator

Meike Bartels	The dynamics underlying well-being: Understanding the exposome–genome interplay	2017	VU	Consolidator
Danielle Posthuma	From GWAS to functional studies: Tackling the complex nature of brain disorders	2018	VU	Advanced
Martijn van den Heuvel	Connecting cross-condition patterns of brain connectivity toward a common mechanism of mental conditions and prediction connectomics	2020	VU	Consolidator
Stéphanie van der Pas	Finding causal relationships in large datasets	2022	VUmc	Starting
Elsje van Bergen	The interplay of genes and environment in educational achievement	2022	VU	Starting
Horizon 2020				
Marit Sijbrandij	Strengths: Scaling up psychological interventions with Syrian refugees	2017	VU	
Brenda Penninx, Laura Nawijn	Lifebrain: Healthy minds 0–100 years: Optimizing the use of European brain imaging cohorts	2018	VUmc	
Brenda Penninx	PRISM: Psychiatric ratings using intermediate stratified markers	2019	VUmc	
Marit Sijbrandij	RESPOND: Studying mental health effects of the COVID-19 pandemic	2020	VU	
Jos Bosch, Brenda Penninx, Femke Lamers, Yuri Milaneschi	TO_AITION: A high-dimensional approach for unwinding immune-metabolic causes of cardiovascular disease–depression multimorbidities	2020	UvA, VUmc	
Femke Lamers	Remote Assessment of Disease and Relapse – Central Nervous System	2021	VUmc	
Meike Bartels, Anne Landvreugd	ENLIGHTENme: Innovative policies for improving citizens' health and wellbeing addressing artificial lighting	2021	VU	
Marie Skłodowska-Curie Actions				
Rose-Marie Dröes, Teake Ettema, David Neal	FindMyApps: Helping elderly people to use a tablet	2018	VUmc	
Mai Chin A Paw, Teatske Altenburg	LABDA: Learning network for advanced behavioural data analysis	2022	VUmc	
Martine de Bruijne	Tools4Teams: Research and training network on innovative tools and training for teams in acute and chronic care	2021	VUmc	
EU4Health 2022				
Els van der Ven, Marit Sijbrandij, Anke Witteveen	U-RISE: Improving well-being of Ukraine's displaced people	2022	VU	

* NWO Veni grants are awarded to researchers who have recently obtained a PhD; Vidi grants are for researchers with several years of postdoctoral research experience; Vici grants go to researchers with demonstrated ability to develop their own line of research.

** NWO Rubicon grants are awarded to recent PhD recipients for gaining experience at foreign knowledge institutes.

*** NWO Gravitation funding is awarded to academic consortia with a potentially high ranking in their field worldwide.

APPENDIX K
EXTERNAL FUNDING

Table K1 – External funding obtained by APH researchers, by funding source* and by research program, 2017–2022

	Total	HB&CD	MH	SP&H	GH	A&LL	QoC	PM	Me
2nd flow	€ 150,333,845	€ 18,128,439	€ 40,122,866	€ 10,382,730	€ 8,391,564	€ 16,671,685	€ 29,266,861	€ 8,481,748	€ 18,887,952
3rd flow	€ 96,669,266	€ 6,294,070	€ 22,256,219	€ 8,444,062	€ 8,821,033	€ 7,652,594	€ 39,677,310	€ 2,265,052	€ 1,258,926
4th flow	€ 7,441,379	€ 999,077	€ 1,897,968	€ 103,075	-	€ 376,802	€ 3,575,230	€ 256,520	€ 232,707
Total	€ 254,444,490	€ 25,421,586	€ 64,277,053	€ 18,929,867	€ 17,212,597	€ 24,701,081	€ 72,519,401	€ 11,003,320	€ 20,379,585

* Funding sources: "2nd flow" involves conditional funding by intermediary public bodies and agencies (NWO, ZonMw, KNAW, EU); "3rd flow" concerns private funding by non-profit organizations; "4th flow" refers to private funding from commercial sources (such as for contract research or for clinical research funded by the biopharma industry).

Table K2 – External funding obtained by APH researchers, by year and by research program, 2017–2022

	Total	HB&CD	MH	SP&H	GH	A&LL	QoC	PM	Me
2017	€ 46,475,527	€ 6,041,201	€ 10,114,149	€ 1,917,605	€ 3,688,900	€ 5,751,751	€ 12,770,129	€ 1,923,817	€ 4,267,975
2018	€ 44,239,897	€ 4,992,655	€ 12,605,748	€ 3,161,933	€ 2,525,709	€ 3,155,864	€ 9,093,963	€ 5,818,496	€ 2,885,529
2019	€ 40,298,012	€ 5,328,883	€ 10,899,851	€ 1,673,571	€ 1,101,198	€ 1,883,401	€ 13,238,567	€ 493,071	€ 5,679,470
2020	€ 43,736,032	€ 3,129,608	€ 15,011,183	€ 5,450,286	€ 2,251,370	€ 4,965,402	€ 9,288,720	€ 391,906	€ 3,247,557
2021	€ 37,083,187	€ 3,440,333	€ 8,179,651	€ 2,541,261	€ 2,010,295	€ 5,083,050	€ 14,405,558	€ 1,020,990	€ 402,049
2022	€ 42,611,835	€ 2,488,906	€ 7,466,471	€ 4,185,211	€ 5,635,125	€ 3,861,613	€ 13,722,464	€ 1,355,040	€ 3,897,005
Total	€ 254,402,490	€ 25,421,586	€ 64,277,053	€ 18,929,867	€ 17,212,597	€ 24,701,081	€ 72,519,401	€ 11,003,320	€ 20,379,585

APPENDIX L
BIBLIOMETRIC ANALYSES

Bibliometric analyses have been performed by the Centre for Science and Technology Studies (CWTS) on APH-associated publications over the period 2017 to 2022. To analyze APH's scientific impact in terms of publication performance, the CWTS reported on a number of different indicators, including numbers of publications, performance in open-access publishing, performance in national and international collaborations, and citation impact (Tables L1–L3).

CWTS also carried out area-based connectedness (ABC) analysis to assess the societal impact of APH publications in terms of various indicators, the most pertinent of which are depicted below: clinical guidelines, hospitals, media, and policy (Figures L1–L4).

Table L1 – APH publication performance by research program, 2017–2022

	HBCD	MH	SPH	GH	ALL	QoC	PM	Me
Total number of publications	3,455	5,006	1,660	2,878	4,699	5,702	4,413	6,109
Number of publications (in citation analyses)*	2,733	4,040	1,333	2,242	3,795	4,457	3,473	4,859
Number of open-access publications	2,706	3,986	1,303	2,413	3,622	4,170	3,379	4,920
Proportion of publications involving collaborations	91%	94%	89%	93%	91%	88%	90%	91%
Proportion of publications involving international collaborations	54%	57%	42%	71%	51%	48%	57%	54%
Proportion of publications in top-10% journals*	18%	19%	14%	18%	18%	17%	20%	19%
Mean normalized citation score*	1.86	1.66	1.61	1.87	1.68	1.51	2.02	2.00

* Citation information of publications in 2022 is not yet know, and therefore not included in these analyses.
** The proportion of publications in the top 10% of most frequently cited journals, compared with others in the same field and publication year.
*** Normalized for field and publication year, with a score above 1 indicating an above-average citation impact.

Table L2 – Top 20 national collaborations based on co-authorship

		P [copub full]	P [copub fract]*
1	Utrecht University	2,486	463
2	Leiden University	1,920	374
3	University of Groningen	1,901	352
4	Erasmus University Rotterdam	1,974	347
5	Radboud University Nijmegen	1,839	339
6	Maastricht University	1,284	190
7	Santeon	1,032	183
8	Public Health Service of Amsterdam (GGD Amsterdam)	471	121
9	Netherlands Cancer Institute (Antoni van Leeuwenhoek)	476	121
10	National Institute for Public Health and the Environment (RIVM)	416	99
11	Netherlands Institute for Health Services Research (Nivel)	289	74
12	Amsterdam University of Applied Sciences (Hogeschool van Amsterdam)	301	67
13	Royal Netherlands Academy of Arts and Sciences (KNAW)	346	48
14	Trimbos Institute	214	43
15	Tilburg University	283	41
16	Wageningen University and Research	230	40
17	Sanquin	166	38
18	Reade	132	33
19	Netherlands Comprehensive Cancer Organisation (IKNL)	222	31
20	University of Twente	180	28

* Number of co-authorships weighted by the number of co-authoring institutions

Table L3 – Top 15 international collaborations based on co-authorship

			P [copub full]	P [copub fract]*
1	Harvard University	United States	731	76
2	Katholieke Universiteit Leuven	Belgium	545	67
3	University College London	United Kingdom	791	62
4	Karolinska Institute	Sweden	681	60
5	University of Oxford	United Kingdom	684	57
6	Ghent University	Belgium	403	55
7	University of Copenhagen	Denmark	551	53
8	King's College London	United Kingdom	596	48
9	University of Toronto	Canada	438	44
10	University of Melbourne	Australia	476	40
11	University of Oslo	Norway	394	37
12	University of Cape Town	South Africa	287	36
13	Monash University	Australia	360	36
14	Heinrich Heine University Düsseldorf	Germany	115	36
15	Johns Hopkins University	United States	350	31

* Number of co-authorships weighted by the number of co-authoring institutions

Figure L1 – Potential relevance of APH publications to clinical guidelines

The colors show the relative uptake of the terms in clinical guidelines (yellow indicating higher frequency and blue lower frequency) as compared with the average in a reference database (=1). A value above 1 means that a keyword was cited more than average in clinical guidelines.

Figure L2 – Potential relevance of APH publications to hospitals

The colors indicate the relative numbers of researchers from non-academic hospitals as co-authors, suggesting their interest in collaboration (yellow, higher numbers; blue, lower numbers) as compared with the average in a reference database (=1). A value above 1 means that the keywords appear more than average in publications with hospitals.

Figure L3 – Potential relevance of APH publications in the media

The colors show the relative uptake of the terms in the media (yellow indicating higher frequency and blue lower frequency) as compared with the average in a reference database (=1). A value above 1 means that a keyword was cited more than average in media.

Figure L4 – Potential relevance of APH publications in policy

The colors show the relative uptake of the terms in policy documents (yellow indicating higher frequency and blue lower frequency) as compared with the average in a reference database (=1). A value above 1 means that a keyword was cited more than average in policy documents.

APPENDIX M
INDICATORS OF APH SOCIETAL IMPACT

Academic and public prizes

Multiple APH researchers or research projects and products have received scientific, academic, or public prizes. A few examples: In 2019, Arne Popma received the Amsterdam UMC Societal Impact Award for his efforts in implementing the @EASE initiative in Amsterdam, which provides an approachable walk-in venue where young people can come to talk about their psychological problems. The @EASE initiative also won the Research and Innovation Trophy from the Netherlands Federation of University Medical Centres (NFU) in 2021. The Amsterdam UMC Societal Impact Award for 2020 was conferred on Cees Hertogh and Bianca Buurman for their initiatives and policy recommendations on transmission prevention in nursing homes, which they provided to outbreak management teams during the COVID-19 pandemic. The IkHerstel application (Han Anema and Judith Huirne), which provides patients with relevant information before and after their surgery as well as a personal recovery plan, received the Nationale Zorginnovatieprijs in 2020 and the VGZ Zinnige Zorg Award in 2021. In 2022, the Amsterdam UMC Societal Impact Award was again won by an APH researcher, Marlies Schijven, for her efforts in implementing digital technologies in health care.

Memberships of societal organizations and academic bodies

APH researchers participated in a diversity of societal organizations and scientific and academic panels in the period from 2017 to 2022. Such positions included membership of the Committee on Nutrition (Joline Beulens) and the Committee on the Dutch Physical Activity Guidelines (Eco de Geus) in the Health Council of the Netherlands; editor-in-chief (Hidde van der Ploeg) and journal manager (Léonie Uijtdewilligen) of the International Journal of Behavioral Nutrition and Physical Activity; associate editor of the International Journal of Audiology (Sophia Kramer); editor of the journal Health & Place (Joreintje Mackenbach); editor-in-chief of the European Journal of Psycho-traumatology (Miranda Olff); associate editor of the Scandinavian Journal of Work, Environment and Health (Cécile Boot); member of the advisory board in the charitable organization Join for Joy (Meike Bartels); member of the advisory board of the journal Artificial Intelligence in Medicine (Ameen Abu-Hanna); member of European Commission's Expert Panel on Effective Ways of Investing in Health (Dionne Kringos); chair of the European Cancer and Work Network CANWON (Angela de Boer); deputy coordinating editor of the Cochrane Work Review Group (Jan Hoving); member of the WHO's Technical Working Group on Maternal and Perinatal Death Surveillance and Response (Ank de Jonge); and member of the Racial Equality Advisory Board of The Lancet (Charles Agyemang). Multiple APH researchers have also held visiting professorship appointments externally and abroad, including Willem van Mechelen, Visiting Professor at University College Dublin and Honorary Professor at the University of Queensland, Brisbane; and Cécile Boot, Visiting Professor at Radboud University Nijmegen.

Contributions to clinical and health guidelines and policy documents

Many contributions to national and international guidelines and policy documents have been made by APH researchers. Examples include tobacco control policies to prevent smoking commencement in young people (Anton Kunst); occupational health guidelines to enhance work participation (Paul Kuijer); guidelines for psychological care for young people with diabetes (Mariska de Wit); guidelines on physical activity advice to children aged 0 to 4 (Eco de Geus); guidelines on physical activity and sedentary behavior (Hidde van der Ploeg); guidelines for rehabilitation referral of persons with permanent visual impairments (Ger Rens); European guidelines on cancer and work (Angela de Boer); guidelines for scientific evaluation of new diagnostics to predict progression to tuberculosis (Frank Cobelens); government policies to give every child the best possible start in life (Tessa Roseboom); and standards of care for anxiety symptoms and disorders (Ton van Balkom).

Outreach activities to academic, professional, and general audiences

APH researchers performed and organized multiple activities for academic and professional audiences, including experts, scientists, policymakers, and government ministers. Other outreach activities were organized for general audiences. Examples of the latter were a public lecture for the Netherlands Academy of Nutritional Sciences (Ingeborg Brouwer); organization of conferences on resilient aging (Hein van Hout); invited lectures entitled "Mental Health and Psychosocial Support in Crisis Situations" (Marit Sijbrandij) and "Why Do the Kilos Increase Just As Easily after Dieting?" (Ingrid Steenhuis); a European outreach conference on childhood aggression entitled Childhood Aggression and Its Comorbidities: Dissemination Meeting (Dorret Boomsma); an ethnographic film production We Thought It Would Be Fun and an art exhibition on the impact of the COVID-19 pandemic on secondary school students (Kees Boersma and colleagues); initiation of a Kenniscyclus (knowledge cycle) in the field of psychiatry, where researchers, practitioners, and patients and their loved-ones can convene in semi-annual meetings (Annemiek Dols); and a web-based training program for adult hearing aid users (Sophia Kramer).

Societal impact during the COVID-19 pandemic

During the COVID-19 pandemic many APH researchers started diverse initiatives within their research projects with the aim to collect new valuable data or combine data in cohort studies in order to respond to this global crisis. Based on this rapid response, many interventions were developed and recommendations were provided for policy guidelines, for instance to the Outbreak Management Team. Examples of these initiatives include the collaboration of the Netherlands Twin Register (Meike Bartels et al.) with other national cohort studies. The harmonized data collection provided insight into the role of both the genetic and environmental risk factors that determine severity upon COVID-19 infection; another APH project (Bert Moelwijk et al.) made an inventory of central ethical questions and moral stress, ethical guidelines/policy and the use or impact thereof on professionals and healthcare and rapidly shared this on both national and international level (fast open access sharing); a representative sample of children and adolescents of the general Dutch population completed six PROMIS computerized adaptive tests on the following domains: anxiety, depressive symptoms, anger, sleep-related impairment, peer relationships, and global health. These data were compared to normative data collected in 2018 and variables associated with worse mental and social health during COVID-19 were identified; the population based cohort study HELIUS (Karien Stronks et al.) investigated how ethnicity affected the epidemiology of COVID-19 in the Netherlands, in terms of infection rates and disease outcomes.

APPENDIX N
SUSTAINABLE DEVELOPMENT GOALS ANALYSES

The figure illustrates the pertinence of APH publications to the UN Sustainable Development Goals (SDGs) as developed by the United Nations. Titles and abstracts of APH publications from 2017 to 2022 were searched for pre-defined keywords for each SDG.

Figure N1 – Pertinence of APH publications to the UN Sustainable Development Goals (SDGs)

Publication details