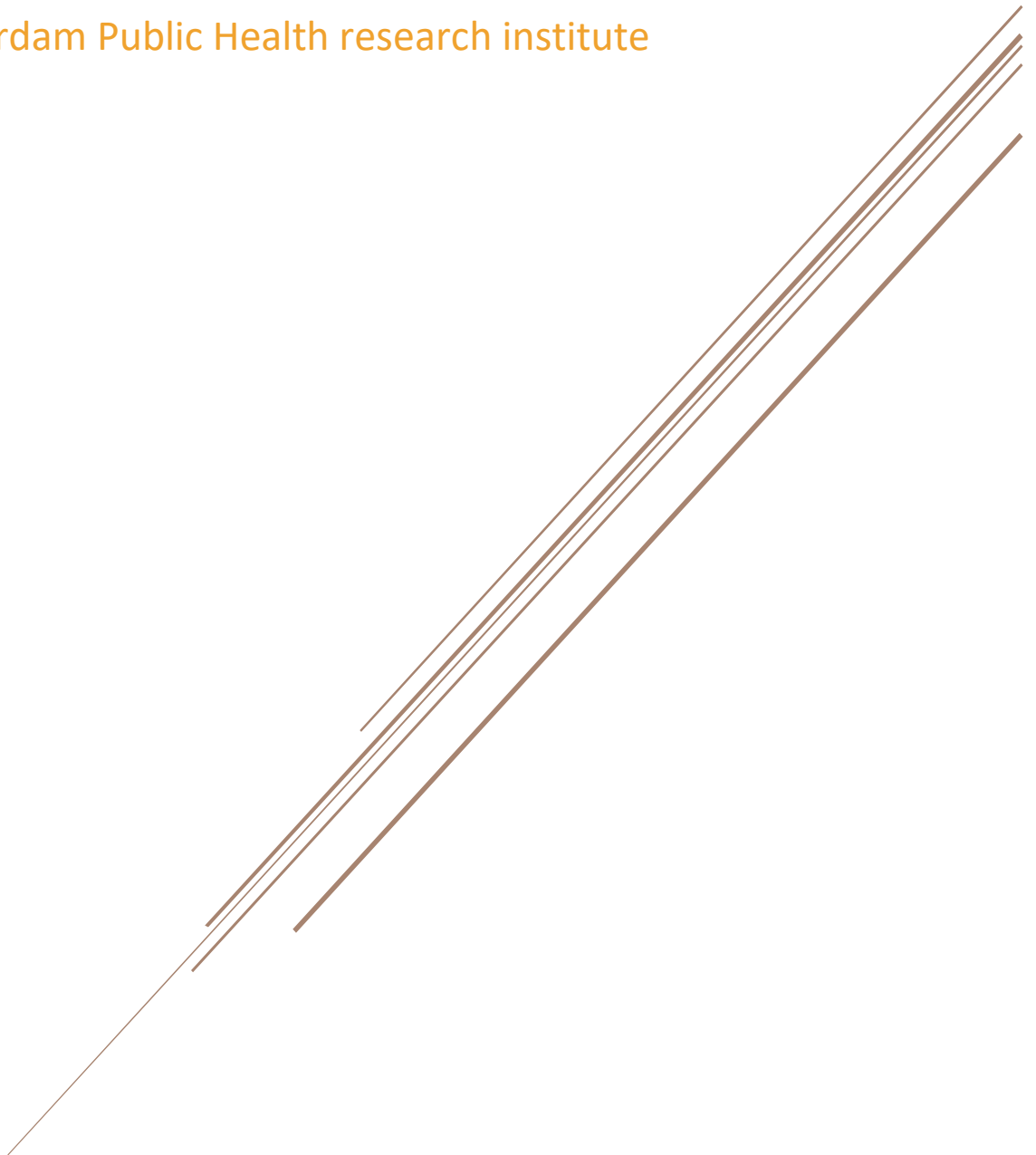


Strategic plan 2020-2023

Amsterdam Public Health research institute



Version April 13, 2022

Version history

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April 6, 2020	Original
June 6, 2020	Added: APH's role in times of COVID-19 pandemic (as Preface)
April 12, 2022	<p>Updated: Preface, Appendix A and C</p> <p>Added: three novel strategic themes in response to current developments and major challenges ahead that will impact public health (chapter 1.3) and its deliverables (chapter 11).</p> <p>Modified: APH's role in times of COVID-19 pandemic in Preface merged with chapter 1.3.</p>

Preface

In 2021 the Amsterdam Public Health research institute (APH) has recalibrated its strategic plan in response to recent developments and major challenges ahead that will likely have an important impact on public health. The updated plan includes three additional strategic themes for APH to contribute to: resilience in times of health crisis, sustainability and digitalization. The new strategic themes complement the previously set strategic priorities around implementation science and seeking partnerships in promoting public health for the citizens of the Amsterdam metropolitan area. The urban context of the research institute continuously provides a large and richly diverse living lab that may not only inspire new research questions and ideas, but that will also foster understanding of effective implementation and dissemination with local public health stakeholders.

The first additional strategic theme has arisen in response to the COVID-19 pandemic and its countermeasures, which primarily revealed the importance of ensuring a resilient health care system. Moreover, it became clear that in health crisis addressing health inequalities in society is essential. The second additional strategic theme is sustainability. With an added focus for the coming years, we will anchor the concept of sustainability more into the core of our research institute. Sustainability should be structurally intertwined with how we think and act as both human beings and researchers, and the impact of our actions on planetary health. Sustainability is of paramount importance to improve the quality of our lives, protect our ecosystem and preserve natural resources for future generations. The third additional strategic theme relates to the accelerating role that digital solutions and technological innovations can play in addressing health challenges, and the methodological, legal and ethical issues that arise at the same time.

These additions to the APH's strategic themes are needed to be more responsive to societal changes and future health needs and behaviors.



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1. Mission, Vision, and Core Values

1.1 Mission

Our mission is Public Health: health for all, powered by science. With our partners in and outside academia, we advance the state of the art in research that contributes to ever growing health potential of individuals and communities across the life course. Our perspective on Public Health means that we specifically focus on freeing the health potential that remains unused due to lack of societal cohesion and inequalities of access to care.

Over the past decade, health and healthcare have undergone major transformations¹ that are still ongoing, paralleled by changing expectations of citizens. These transformations are highly complex and come with enormous challenges. The Amsterdam Public Health research institute (APH) partners with the people who are active in this regard:

1. researchers seeking insight in health and healthcare;
2. citizens and patients who take an active interest in understanding their health and care needs;
3. healthcare providers seeking to improve the quality of their care;
4. policy-makers governing and planning responsive healthcare for changing healthcare needs while safeguarding sustainability.

‘Public Health’ refers to all organized measures (whether public or private) to prevent disease, promote health and participation, and prolong (quality of) life for the population as a whole and specific subgroups. Its activities aim to provide conditions in which people can be healthy. The focus is both on entire populations and individual patients or diseases.

Adapted from *WHO, 2015*

While Public Health (see box) and its sustainability are global issues, implementation is always local. Being based in Amsterdam, we see considerable Public Health challenges in our immediate surroundings. These challenges include: an ageing population of increasing diversity in ethnicity, health literacy, and health needs; rising chronic, non-communicable diseases and multimorbidity; and large health inequalities challenging full societal participation, living in an increasingly individualized and digitalized society, where responsibility for managing healthcare is diffusely assigned to public and private providers as well as citizens themselves. On top of that, the complex interactions with physical and social environmental factors (such as spaces, places and conditions, and related lifestyle behaviors and exposure to air pollution, noise and chemicals) play an increasingly important role in health-related problems.

Building on a strong reputation and research base of world-leading research, this plan announces an increased strategic emphasis on seeking partnerships in promoting Public Health for the citizens of the Amsterdam region, by testing what we learn elsewhere and disseminating what we learn in Amsterdam across the rest of the world. Amsterdam is one of the largest cities in Europe and has an important regional function. Research done in this context is therefore relevant for other metropolitan areas as well. The urban context of our research institute provides a large and richly diverse living lab that may not only inspire new research questions and ideas but that will also

¹ *Nationaal Preventieakkoord*, VWS, 2019; *Hoofdlijnenakkoorden (MSZ, GGZ, huisartsen, wijkverpleging)*, VWS, 2019-2022; Taskforce ‘De juiste zorg op de juiste plek’, 2019; *Onderzoek en innovatie met en voor de gezonde regio*, NFU, 2019; *Zorguitgaven sneller en beter in beeld*. Commissie Transparantie & Tijdigheid, 2017; *Onderzoek waarvan je beter wordt*, Gezondheidsraad, 2016; *Zichtbaar zinnige en zuinige zorg* Vervolgadvies van de NFU aan de minister van VWS, 2014; *Naar nieuwe zorg en zorgberoepen: de contouren* Advies van de Commissie Innovatie Zorgberoepen en Opleidingen, Zorginstituut Nederland aan de minister van VWS; *Innoveren voor gezondheid - technologische en sociale vernieuwing in preventie en zorg* TNO Strategy&Change, 2013

foster understanding of effective implementation and dissemination with local Public Health stakeholders. By stimulating research contributing to and inspired by the young field of implementation science, we increase the societal impact of the internationally well-recognized research embedded within the research institute.

1.2 Vision

APH attributes great importance to the public's interest in its mission as well as in its research culture. It is unique in its sheer mass of excellent researchers who recognize themselves in the research institute's mission and who team up with other researchers as well as patient/citizen communities, care providers, educators, and policy-makers. We believe that Public Health is best served by openness of its network and of the way it conducts science. Given its mass, APH accepts an international leading role where complex health problems call for transdisciplinary, integrated and timely efforts.

We will organize our research in the next years on the areas of health behaviors and chronic diseases, mental health, societal participation and health, global health, ageing and later life, quality of care, personalized medicine, and methodology.

We build on the excellent reputation that Amsterdam UMC, VU and UvA² have in research on these topics and the opportunities for synergy derived from merging thriving communities of Public Health researchers with complementary skills. The research institute is fully integrated in the two Amsterdam universities and has strong ties with partners in research and practice in our environment. It communicates effectively with all stakeholders, its research is highly cited by academic colleagues and used by decision-makers and healthcare providers to improve health, reduce health inequalities, transform healthcare, and empower citizens.

Acknowledging the important role of education in implementing scientific insights, we aspire to evolve over time into an Amsterdam School of Public Health, a single organization combining knowledge generation and dissemination, the training of future healthcare professionals in an academic environment, and the provision of Public Health thus contributing to responsible innovation in health and healthcare. Until that time, however, we will build further on our collaborative networks with vocational and professional educational institutions to accelerate the wide-spread increase in Public Health.

1.3 Recalibrated Strategic Plan in 2021

In 2021 the Amsterdam Public Health research institute (APH) has recalibrated its strategic plan in response to recent developments and major challenges ahead that will likely have an important impact on public health (as depicted in box 1). The updated plan includes three additional strategic themes for APH to contribute to: resilience in times of health crisis, sustainability and digitalization. The new strategic themes complement the previously set strategic priorities around implementation science and seeking partnerships in promoting public health for the citizens of the Amsterdam metropolitan area. The urban context of the research institute continuously provides a large and richly diverse living lab that may not only inspire new research questions and ideas, but that will also foster understanding of effective implementation and dissemination with local public

² In October 2016, the EMGO+ Institute (the forerunner of APH on the VU(mc) campus) was evaluated over the period 2010-2015 by an international panel of esteemed researchers, according to the Standard Evaluation Protocol (SEP) 2015-2021 of the KNAW (i.e. the Royal Netherlands Academy of Arts and Sciences). For the third time in a row, the EMGO+ Institute was rated excellent on all criteria evaluated. The External Evaluation Committee assessed the Institute as world leading on: research quality, relevance of society and viability. The Committee stated that 'the EMGO+ Institute is a leading research institute with a worldwide reputation. The research produced by the institute is top-notch and productivity is impressive and growing'.

health stakeholders. These additions to the APH’s strategic themes are needed to be more responsive to societal changes and future health needs and behaviors.

1.3.1 Resilience in times of health crisis

The COVID-19 pandemic brings the core of public health to a clear and devastating reality. By directly threatening population health and putting health care resources under pressure, acute nationwide measures to protect population health against COVID-19 were taken all over the world. Because of the huge uncertainties around the characteristics of this coronavirus, the impact of the disease and the instigated countermeasures on (inequalities in) population health and wellbeing, health (care) systems, societal cohesion, the economy, food and agriculture, education and other aspects of life, is hard to predict. However, it is certain that the impact of COVID-19 is disruptive, takes place in all societal domains and will most likely last for multiple years. In the acute phase, just after the outbreak of the coronavirus pandemic, clinical trials in search of effective treatment and studies addressing the infectious and immunological issues surrounding the virus predominated. Even when the pace of the outbreak is curbed, research is urgently needed on the long-term consequences of the crisis and on lessons for future outbreaks.

APH aims to contribute to asking and addressing pertinent questions about the pandemic and its countermeasures, to support development and evaluation of innovative solutions and strategies, and to contribute to the resilience of individuals and health (care) systems for future health crises. Our focus is on responsive health care in this pandemic from a societal perspective, using multidisciplinary approaches to increase preparedness for future health crises. The many cohort studies in APH cover populations across the whole lifespan as well as new and vulnerable groups and will be of great value in this effort. Moreover, many longstanding collaborations with societal partners support relevance and implementation of our research findings. At health system level, examples of relevant focus areas are measurement of impact of health crisis on health system performance (access, quality of care); strategies to safeguard continuity of services delivery; the use of timely and accurate data for public health decision-making; the capacity of health care system to respond to surges in demand when faced with unexpected events; counteracting the spread of disinformation or ‘fake news’ which is a serious threat to management of a health crisis.

The COVID-19 pandemic has made it clear to organizations worldwide that the increasing focus on efficiency and cost reduction leads to vulnerable organizations and ethical dilemmas. The theme of crisis resilience is therefore essential, especially in health care. Research covering the consequences of the COVID-19 pandemic or other health crises will be stimulated with this call. This theme is also about research that can make us, as an organization, more crisis-resistant in order to be and remain a robust and responsive organization in any crisis - an agile organization which is able to share available scientific knowledge in a timely manner, which contributes to strengthening social resilience and is a platform for collaboration.

Current health challenges have to do with major transformations that our health and health care have undergone over the past decade and that are still ongoing, paralleled by changing expectations of citizens, such as:

- an ageing population of increasing diversity in ethnicity, health literacy, and health needs;
- rising chronic, non-communicable diseases, mental illnesses and multimorbidity;
- large health inequalities challenging full societal participation;
- an ongoing shift in responsibility for managing health care that is diffusely assigned to public and private providers as well as citizens themselves;
- increased recognition for the complex interaction between environmental factors and health-related problems;
- increased recognition that timely and accurate data are essential for public health decision-making, as well as providing information with sufficient granularity (e.g. by sex, age, ethnicity, residence, socioeconomic status (SES), comorbidities);
- insufficient capacity of health care systems to respond to surges in demand when faced with unexpected events;
- a need to invest in knowledge that can inform strategic preparedness for new challenges, including pandemics, as a means to increase societal resilience; and
- increased spread of disinformation or ‘fake news’ is a serious threat to management of a health crisis.

1.3.2 Sustainability

APH joins many other research institutes around the world in adopting the 2030 agenda for Sustainable Development. APH focuses specifically on contributing towards the Sustainable Development Goal (SDG) of good health and wellbeing (#3). However, insofar the 17 goals are interwoven, APH also seeks to contribute towards the other SDGs, such as poverty (#1), hunger (#2), education (#4), gender equality (#5), clean water and sanitation (#6), and decent work (#8). Furthermore, APH aims to reduce its negative impact on climate (#13) and waste (#12) through its daily operations, in accordance with the Health 2020 policy framework (WHO Regional Office for Europe, 2013a).

Sustainability refers to a balance between humans, environment and economy, in the context to growth. This context challenges the delivery of sustainable public health, as the current unsustainable growth path and the time needed to reverse course will witness increasing global threats to public health such as pandemics and local emergencies such as violent conflicts and refugee crises. The Netherlands as well as many other currently high resources countries will be facing these dangers with a rapidly aging population. In addition to the rise of noncommunicable diseases, such as chronic diseases and mental health problems, societies need to be better prepared for communicable diseases as well. Fortunately, many measures taken to prevent and limit noncommunicable diseases (e.g., lifestyle changes, food and consumption, activity, social participation, education) may also mitigate the impact of communicable diseases and outbreak countermeasures.

Sustainable health care also requires addressing the widening gap between the health care work force in an aging society, the increasing volume that is demanded for care in its different forms (curative care, long term care, mental health care), and the increasing innovation in health care. Sustainable public health will be delivered by fewer people with more extensive training than is currently the case.

APH aims to stimulate research around the design and implementation of sustainable public health interventions in the broadest sense. Example projects could be focusing on reducing pollution to combat increase in respiratory infections, safeguarding the food chain from additives like hormones and antibiotics, or measuring / decreasing the footprint of health care provision.

Using research data in a sustainable matter is also an aspect of sustainability at APH. Sharing of data by making it available for many researchers using platforms or smart infrastructures for example, according to the FAIR principles is essential. Moreover, APH aims to build its network in a sustainable manner, e.g. by fostering participation, building consensus and embedding networks to ensure long term development.

1.3.3 Digitalization

When we think of digitalization and technological innovations, we first think of the rise of big data and artificial intelligence (AI), and how they are radically changing the world and dominating global discussions on how we can make and preserve our world more sustainable across all sectors. In health care, digital solutions, technological innovations and big data offer new opportunities in the areas of diagnostics and treatment, prevention, and the organization and management of care at individual, institutional and system level. They are pivotal in addressing health challenges our society is facing today (see box 1) in order to dampen the rising healthcare costs and to keep health care manageable and responsive. Digital technology and big data can play a decisive or catalytic role in predictive medicine and personalized prevention, in decision support tools for healthcare professionals and policy makers, and in supporting citizens in self-management of their health through wearable technology and health apps. Digital tools can help turn the tide by preventing or treating diseases with personalized support and giving people a high degree of self-control.

Despite the many promising and sometimes decisive applications of digital technology in health care and beyond, there are still many limitations and challenges to overcome from a medical, ethical, legal and social perspective before sustainable implementation can take place. Especially when it comes to the implementation of AI in health care, there are concerns about black boxes, bias that can increase inequality, threats to privacy and security and lack of transparency.

APH aims to stimulate methodologic and applied research focusing on these challenges for implementation. Examples of relevant topics are the assessment of the positive or negative impact of predictive models on inequality, for instance using data of longitudinal cohorts and registrations data and research focusing on prospective assessment of ethical or legal issues related to implementation of digital health tools. To achieve this responsible AI is crucial. Also, improvement of social participation of marginalized groups by digitalization would suit this theme.

1.4 Core Values³

- Personal engagement in advancing the health of *all* citizens, respecting social, ethnic and cultural diversity;
- Excellence, openness, and integrity in everything we do;
- Clinical and societal relevance of scientific efforts;
- Dependable as partner of Public Health practitioners, healthcare providers, decision-makers, and communities in our environment.

1.5 Core Tasks and Facilitating Tasks of the Research Institute

The strategic plan is aligned along the four assets of APH's core business:

- Our eight research programs (chapter 2)
- Our strategic partners (chapter 3)
- Talent development (chapter 4)
- Scientific quality & accountability (chapter 5)

Subsequently we will address the following facilities, services and infrastructure that are of strategic importance to APH:

- Communication (chapter 6)
- Institute specific facilities and infrastructure (chapter 7)
- External funding and acquisition (chapter 8)
- Societal impact and valorization (chapter 9)

³ Reflecting the core values of the founders at the time that APH was established (2016): VU (being responsible, open and personally engaged), UvA (innovation, determination, engagement), and both locations of Amsterdam UMC: VUmc (engagement, carefulness, ambition), AMC (engagement, continuous improvement, competence, integrity).

2. Research Programs

The Amsterdam Public Health research institute will concentrate its research efforts in eight research programs that are well-aligned with the Dutch National Science Agenda.

The Dutch National Science Agenda (NWA)

A coalition of knowledge institutes has crafted a National Science Agenda (NWA) to deploy research resources and efforts in the major academic strengths, societal issues and economic opportunities in the Netherlands. This science agenda will become final in 2016 and will be renewed once every seven years. The NWA aims to further strengthen the top position of Dutch research by providing direction in research, by connecting and consolidating existing strengths and by translating research outcome into policies. Routes have been defined that include several topics which form coherent themes consisting of an underlying collection of related research questions. The Amsterdam Public Health research institute can contribute significantly to at least eight of the 25 prioritized routes: 'Public Health Research, Prevention & Treatment'; 'Towards Resilient Societies: a Future-Proof Netherlands'; 'Sport and Movement'; 'Personalized Medicine'; 'Assessable and Responsible Use of Big Data'; 'Smart, Liveable Cities' & 'Sustainable Production of Safe and Healthy Food'; and 'Youth in Development and Education'.

In the APH research programs, around 1,500 researchers are brought together in total with around 600 PhD students. The research programs and their major themes of research are:

2.1 Health Behaviors & Chronic Diseases

Background

Behavior-related chronic diseases such as obesity, diabetes, cardiovascular diseases, cancer and depression account for most of the burden of disease in high income countries. These diseases are attributable to unhealthy behaviors, such as smoking, physical inactivity, excessive sedentary behavior, and unhealthy dietary behavior. These health behaviors are not only the result of individual free choices. Instead, health behavior is to some extent enforced by the environment (e.g. economic, physical and socio-cultural), through aspects such as material deprivation, living conditions and culture.

The aim of research within the research program Health Behaviors & Chronic Diseases is to examine patterns of health behaviors, genomic and environmental determinants of these behaviors as well as their impact on chronic diseases and functioning; and to develop and evaluate interventions to promote healthy behavior with the aim of reducing chronic disease morbidity and mortality and improve quality of life. The health behaviors covered by these research activities include smoking, alcohol use, physical activity, sedentary behavior, sleep and dietary behavior.

Starting point of all research is recognition of the fact that health behaviors are embedded in the conditions in which people are born, grow up, live, work and age, but also bear an individual component. Specific attention is given to high risk groups, including ethnic minority populations. This research is conducted in a variety of populations (e.g. children, older adults, and diabetes and cancer patients) and a variety of settings including primary care, communities, nursing homes, schools and workplaces. The multifactorial etiology, covering biological, psychological and social factors, requires the employment of a broad range of disciplines, including medical and social sciences.

Themes

Our multidisciplinary research is clustered around two themes:

1. Understanding health-related behaviours, their impact on health and functioning, and their distribution across the population.
2. Development, implementation and evaluation of interventions aimed at promoting healthy behaviours in the complexity of real life settings.

Specific attention is given to groups with a high risk of developing chronic diseases, including lower socio-economic groups, older adults, and ethnic minority populations. This research is conducted

- in relation to a broad range of health-related behaviours - i.e. dietary behaviour, physical activity, sedentary behaviour, sleep, smoking, substance abuse;
- in relation to a broad range of chronic diseases such as obesity and diabetes, as well as related outcomes such as quality of life;
- in a variety of populations across the life course; and
- in a variety of settings including cities (in particular the urban region of Amsterdam), communities, families, healthcare, schools and workplaces.

Partners

The researchers within this research program are based in a broad range of departments of the VU(MC), UvA and AMC, including Public Health, general practice, (biological) psychology, epidemiology, biostatistics, health and nutrition, obstetrics and gynecology, psychiatry and communication science. Each of these departments have strong collaborations with other academic research groups and universities of applied sciences within the Netherlands and abroad, promoting the quality of their research within both etiological and intervention studies. We also have strong collaborations with organizations that implement health promoting measures, including the Municipal Health Service Amsterdam (Academic Collaborative Center Child Public Health and Sarphati Amsterdam), General Practice and other primary care practices such as dietetics and physiotherapists, and healthcare insurers. We expect APH to facilitate further collaboration with both academic and societal partners.

Relation to other research programs within APH

This research program is closely related to many other research programs within APH. To increase the potential for synergy and innovation of research, we will actively promote collaboration with other research programs within APH. For example, quantitative methods to efficiently analyze data from cohort studies or big data are of common interest. Moreover, the development of interventions to promote healthy behavior will complement interventions developed in healthcare for those who suffer from chronic diseases or in the work setting. These examples illustrate the opportunities for collaboration with the research programs Methodology, Quality of Care, Personalized Medicine and Societal Participation & Health.

2.2 Mental Health

Background

It is undisputed that there is no health without mental health, encompassing the wide spectrum from mental well-being to severe mental illness. Mental disorders, such as depressive disorders, anxiety, and alcohol use disorders are common in the general population; they rank among the conditions with the largest disease burden worldwide. Other, less common disorders, such as psychotic disorders, bipolar disorder and OCD have enormous impact on the life of those afflicted. Overall, life-time prevalence rates of mental disorders are very high at 40-50% in most places in the world. Given the fact that most mental disorders have peak incidences at a young age and that their

course often amounts to a waxing and waning of symptoms, their cumulative impact over the life course is huge. Mental health conditions impact not only on individuals' wellbeing and quality of life, but also on their somatic health, healthcare utilization and daily (work) functioning. Therefore, these conditions have a profound impact on the society as a whole.

Mental health conditions are considered complex diseases, with multiple risk factors involved in their etiology: genetics, psychosocial and environmental stressors, brain abnormalities, personality and coping strategies and somatic conditions. Consequently, to more completely understand the causes and consequences of mental health problems, a multidisciplinary approach is needed. This multidisciplinary approach provides excellent opportunities to learn more about the etiology, course and consequences of mental disorders such as depression and anxiety disorders, addictive or disruptive disorders and psychotic disorders. It also allows for cross-disorder research by exploring underlying shared and unique vulnerabilities.

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

Urban environments, such as the city of Amsterdam and its surrounding municipalities, are becoming progressively less tolerant for, or more sensitive to the variation, whether normal or abnormal, in mental health or fitness of their inhabitants. Although the prevalence rates of mental disorder appear to be rather stable over time, the consequences of mental dysfunctioning seem to be increasing. This is evidenced in areas such as school drop-outs, the number of young people seeking professional care, the access to the labor market of people with mental problems, police encounters with patients with mental disorders, involuntary admissions etc. Increasing complexity and diversity of urban environments calls for novel ways to understand the pathways to mental fitness and mental disorder in order to better equip all parties involved to create thriving communities (for example [Thrive New York](#) and [Thrive London](#)). Specific subgroups, such as migrant workers, students and refugees will receive special attention. [The Centre for Urban Mental Health \(UMH\)](#) was established in 2019 to which APH researchers are affiliated. This Centre aims to unravel new pathways to improve urban mental health that takes into account the complexities and dynamics of mental health problems and mental health disorders in an urban environment. UMH is an initiative of the Faculty of Medicine, Faculty of Science, the Faculty of Social and Behavioural Sciences and the Institute for Advanced Study (IAS) of the University of Amsterdam.

The Mental Health research program brings together the wide range of scientific communities that is necessary to do this work. It also serves as a platform, bringing together the relevant theaters of intervention to improve public mental health.

Themes

Etiology, development and consequences of mental health

This theme includes epidemiological, observational research either in the community setting, the general practice setting and/or the psychiatric care setting. Within the mental health research program, we have a rich source of large-scale community and/or patient cohorts covering the entire lifespan. Using these rich research infrastructures, this research line will increase our evidence-base for the occurrence, determinants and consequences of mental disorders. The objectives are to

investigate: (1) genetic, clinical, psychosocial and environmental factors that contribute to mental well-being and the development of mental disorders; (2) the chronicity, staging and profiling of disorders; and (3) the impact of mental disorders on the individual patient, the patient's social environment as well as the society at large.

Prevention and treatment of mental health problems

This theme encompasses research that contributes to evidence-based information on innovative prevention and treatment interventions to improve mental health and reduce associated disability. This research line also uses insights from observational studies, but will mainly provide new insights through the conduct of various intervention studies (randomized clinical trials). These intervention studies are applied in the general population, primary care, mental healthcare and somatic healthcare settings. Studies are aimed at evaluating psychotherapeutic or psychotropic interventions as well as other emerging interventions, e.g. e-mental health interventions over the internet or mobile phone, stepped care interventions, running therapy, light-therapy and nutritional interventions.

Soma & Psyche

The research theme Soma & Psyche aims to facilitate research on the interface between mental health and somatic disease. It includes mental disorders as well as common mental reactions to somatic diseases, such as anxiety, hope, and growth. Mental disorders are highly prevalent in patients with somatic diseases and, vice versa, psychiatric patients frequently have or develop coexisting somatic diseases. The studies investigate (1) mental health, mental disorders and quality of life in persons with various somatic diseases; (2) (underlying reasons for) increased somatic health problems in persons with psychiatric disorders; (3) specific conditions at the interface of soma & psyche such as chronic pain and somatoform symptoms and disorders; and (4) effects of specific intervention programs targeting combined somatic and mental health problems. This theme connects strongly to intramural research.

Partners

Researchers within the Mental Health research program come from different backgrounds: psychology, orthopedagogy, psychiatry, genetics, general practice, elderly care medicine, nursing a range of other medical specialties, health sciences, epidemiology and biostatistics. We have strong collaborations with the mental healthcare organizations of the Municipal Health Services (GGD) Amsterdam, GGZ inGeest, Arkin and De Bascule, where various Academic Collaborative Centers have been formulated (e.g. Academic Collaborative Center for depression, anxiety, bipolar disorder, psychiatry for elderly, child psychiatry). The city of Amsterdam has adopted Thrive as a strategically important program to improve and sustain mental health. We fully support and collaborate with the Universities of Applied Sciences in their effort to contribute to mental health. In the area of Soma & Psyche we collaborate with the relevant medical specialties, GP's and the emerging structures for psychosocial care in somatic diseases, such as in oncology.

Relation to other research programs within APH

The Mental Health research program will closely collaborate with other research programs within APH. For instance, we have direct links with the theme Aging & Later Life, specifically with respect to the topics resilience, vulnerability and quality of life. We will work closely with the research program Personalized Medicine to develop risk profiling and predict mental health outcomes. This is necessary both for the prevention as for the treatment of disorders. We will also develop and evaluate stratified or personalized interventions, based on personal background, including genetic characteristics. In collaboration with the Quality of Care research program we will develop reliable and valid person-specific outcome measures for mental health. With the Health Behaviors & Chronic Diseases research program we will collaborate around lifestyle interventions and mental health impact. We will additionally collaborate with the research program Methodology, to fine-tune

existing and develop new outcome measures, to link data from different sources and to model and interpret data across multiple levels of measurement.

2.3 Societal Participation & Health

Background

Participation in society is important to everyone. It provides purpose in life, structure and social contacts, it is linked to a better health and quality of life, and often delivers an income.

Societal participation is defined as the opportunity for individuals to optimally participate in as many social roles as desired. Such social roles involve paid and unpaid work, including voluntary work, informal care giving, digital participation, and other forms of societal participation. The increasing number of people with (chronic) health problems in the Netherlands originates in epidemiological and demographic changes: a growing number of (young) people suffering from (chronic) diseases, of which a substantial part is lifestyle related, and an aging population. Consequently, societal participation is becoming increasingly problematic for many people, warranting pragmatic, evidence-based solutions. At the same time, a significant group of people perceive difficulties to participate in society as, for instance, they perceive a distance to society in general (e.g., when they lack digital skills), or the labour market more specifically. Government policies increasingly stimulate informal care within families and other social groups, digital skills and access for participation, and more self-management of people with (chronic) health problems. These demands have a major impact on individuals, resulting in more responsibilities on top of those in their own working and private life. Prevention of disabilities or disorders, and related sickness absence, work disability and (temporary) unemployment, is required, because of the large impact on the individual and on the society.

The aim of our research program is to perform research focused on maintaining and further improving societal participation, and to prevent early exit from the societal participation, such as unemployment and work disability, or losing connection to society in general. Special focus in our research is on vulnerable groups including groups with disabilities, with chronic disease or chronic health complaints, workers with occupational disease or other complex work-related health issues, older workers, and groups with a low socio-economic position.

Our aim aligns with Sustainable development goal number 8 of the UN: ‘Decent Work and Economic Growth. This goal encompasses to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

The alliance of VUmc and AMC research groups into Amsterdam UMC provides synergy and increases the chance of becoming the number 1 in the Netherlands and Europe regarding research on ‘lifelong participation, for everyone, everywhere’.

Mission

The mission of the program ‘Societal participation and health’ is to maintain and improve sustainable participation in society for all, including groups with and without health problems.

Themes

Sustainable societal participation

The main focus of this program is on enhancing societal participation by inclusion of vulnerable groups in society, preventing unemployment and promoting work participation until retirement. The development and evaluation of evidence-based interventions to support employment, (re-)integration and functioning in both paid and unpaid work is an important focus within this theme of research. As such, we develop and evaluate interventions to prevent exit from work, and to promote societal participation, including return or stay at work, voluntary work, informal care

giving and digital participation. The focus of this theme is on people with a wish to participate or to return to their normal activities, such as work despite their (chronic) health condition. Research addresses the value and meaning of societal participation of these groups of people and their needs from healthcare professionals, including occupational and insurance physicians. Implementation of interventions aimed at improving lifelong participation of people with chronic disease is ongoing.

With the increase of the statutory retirement age, older workers are forced to postpone their retirement date. Insight into determinants of (early) exit from work, and prolonged participation in paid and unpaid work is required to develop interventions to better support older workers towards their retirement. Another recent development concerns delayed retirement, in which older workers continue to work after they have retired, i.e. bridge employment. As both in the Netherlands and in Europe many large datasets are available, this theme offers ample opportunities for international collaboration.

To enhance societal participation of people with complex work-related disorders, the expertise and collaboration of medical specialists, general practitioners, occupational and social insurance physicians should be combined. The development and evaluation of the effectiveness of these work-integrating (clinical) care programs, aimed at improving functional recovery and return to normal daily activities, are the focus. This research is of great added value to traditional hospital care in providing better patient-reported outcome measures which include work-related outcomes, facilitating communication between different stakeholders and integrating clinical & occupational healthcare.

Prevention of decreased societal participation is an important focus. A healthy lifestyle is crucial for societal participation and healthy aging. Determinants of health behaviour will be translated into instruments and (prevention) intervention programs, which will be evaluated in large trials in real world settings. A particular focus is put on the emerging topic of sedentary behaviour, both at work and at home. Another focus on prevention is the enhancement of the quality of workers' periodic medical examinations (pre-employment and on-employment) and (preventive) medical guidance with respect to their sustainable work ability in general and specifically in high-demands jobs.

To prevent or decrease work-related disorders, research related to the aetiology and prevention of work-related disorders and occupational diseases is addressed. It focuses on work-related factors, such as infectious/allergic/toxic agents, manual materials handling, computer work, work stress, or shift work. The effectiveness of measures to prevent or decrease work-related disorders, and thereby preventing decreased societal participation, is investigated.

Societal participation and digitalization

Over the past years, digital skills and digital access have become crucial to connect with society, with the corona-check as a most recent example. A relevant part of society does not have sufficient digital skills to connect, and because of this, they miss out on essential support. Given that this is already a more vulnerable group, that is also often under-represented in research, the program societal participation and health focuses on inclusion of this underrepresented group in research and by developing interventions to increase digital skills and by increasing inclusiveness of society.

Flexibility

The flexible labour market has major consequences for sustainable societal participation in the Netherlands. Sequences of temporary contracts instead of permanent employment contracts for life have impact on many aspects of life, such as family planning, housing etc. Moreover, the flexible labour market can induce more frequent episodes of unemployment, which can lead to uncertainty and stress.

Partners

Research, education, evidence synthesis and guideline development is being conducted in close collaboration with the curative and occupational healthcare sector, but also with the Dutch Social Security Agency, private insurers, citizens and the community, civil society organisations, and municipalities.

We will continue and encourage further collaboration with other alliance research institutes, such as Cancer Center Amsterdam (CCA), Cardiovascular disease, and MoveMed. We will operate within our existing network of Academic Collaborative Centers, and other stakeholders and partners, such as companies (Tata Steel), Occupational Health and Safety Providers (ArboNed, Arbo Unie, Zorg van de Zaak, VU/VUmc/AMC Arbodienst,), the Employee Insurance Agency (UWV), municipality (Amsterdam) and also (semi-)governmental applied research institutes (e.g. TNO, RIVM, and NIVEL). We liaise with family practitioners, clinicians within Amsterdam UMC (departments of Rehabilitation, Rheumatology, ENT & Audiology, Cardiology, Gynecology, Surgery, Psychiatry, Orthopedics, Nephrology, Gastroenterology, and Dermatology) and other healthcare professionals. The research is further conducted within and in co-operation with various labour sectors (construction, transport, household waste, defence, government, police, firefighting, healthcare, rehabilitation services).

We collaborate with the National Alliance Digital Society (Nationale Alliantie Digitale Samenleving) as partner in projects focusing on increasing digital access, including digital skills for groups perceiving barriers with societal participation. Together with Dutch professional organisations including the Netherlands Society of Occupational Medicine (NVAB), Netherlands Society for Insurance Medicine (NVVG) and the Federation of Medical Specialists (FMS), we develop evidence-based guidelines. We collaborate with the Netherlands School of Public and Occupational health (NPOH) in the medical specialist education of occupational and insurance medicine physicians.

Relation to other research programs within APH

To increase the potential for synergy and innovation of research, an active network of researchers and an innovation platform is established to facilitate and encourage collaboration with the other research programs within APH such as Quality of Care, Mental health, and Aging & Later Life. With the research program Methodology we work closely together in two projects on outcomes, i.e. the PROMIS and MEES projects to develop a common core outcome set for the measurement of societal participation and a COMET project to develop a core outcome set for work participation. In addition, collaboration with Methodology and several Cochrane is ongoing, which includes evidence synthesis, guideline and methods development.

We will strive to collaborate with the new APH program Digital Health, as societal participation is largely dependent of digital access, especially in vulnerable groups.

2.4 Global Health

Background

Global health is the health of populations in a global context; it involves "the area of study, research and practice that places a priority on improving health and achieving equity in health for all people worldwide". Global health is about worldwide health improvement, reduction of disparities, and protection against global threats that disregard national borders. Historically infectious diseases like HIV, tuberculosis and malaria have been a major focus. Increasingly non-communicable diseases (NCDs), maternal health, environmental determinants such as climate change and conflicts and migration are asking for attention, as well as the intersection between infectious diseases and NCDs, in particular in the context of aging. The quality of the health

systems, functioning of disease-specific control programs, evidence-based interventions, the use of new technologies and adaptation of those to the local context are important cross-cutting topics.

Global health research often involves an inter- and transdisciplinary approach. The Global Health research program within APH uniquely combines researchers and global health practitioners from different backgrounds like clinical and laboratory medicine, Public Health, epidemiology, health informatics, social sciences, innovation studies, anthropology, biomedical sciences and mathematical modeling. These researchers and practitioners have a strong tradition in global health research, thereby supporting health systems development by supporting policy advice and developing international recommendations.

The Global Health research program aims to contribute to health for all in a global context through research collaboration that foster interaction between theory, policy and practice. Main research themes are given below.

Themes

Urbanization, Migration & Environmental health

For the first time in human history more than 50% of the world's population lives in urban centers. The number is projected to increase to 70% by 2050. This comes with many health challenges, including environment degradation, violence and injury, non-communicable diseases driven mainly by unhealthy diets and physical inactivity, harmful use of alcohol, as well as the risks associated with disease outbreaks. Increasingly health problems that are attributed to urbanization affect rural areas as well. Urbanization is intrinsically linked to human migration. It is estimated that there are 1 billion migrants in the world today of whom 214 million international migrants and 740 million internal migrants. The collective health needs and implications of this sizeable population are huge. Migration flows comprise a wide range of populations e.g. migrant workers, refugees, and undocumented migrants, each with different health determinants, needs and levels of vulnerability. This research theme focuses on the role of urbanization on health in low-resource settings, and the vulnerable migrant populations globally, including high-income countries.

Sexual, Reproductive & Child Health

In spite of the progress achieved over the past 15 years, indicators for maternal and child health, specifically for adolescent mothers and newborns, still remain behind in many low and middle-income countries, particularly in sub-Saharan Africa. Morbidity and mortality of mothers as the result of complications during pregnancy, childbirth or soon afterwards are still common in poor communities. Children are at greater risk of dying before the age of five if they are born in poor households, rural areas or to a mother without basic education. More than half of under-five child deaths are due to diseases that are preventable and treatable through simple, affordable interventions. This research theme focusses on key issues that affect maternal health and the health of the early life including poverty, malnutrition, low education and poor access to healthcare services. Sexual and reproductive health and rights (SRHR) is the concept of human rights applied to sexuality and reproduction and is the #1 priority within the Dutch Foreign Aid research agenda and also high on many international agendas.

Communicable Diseases & Non-Communicable Diseases

In the past few decades the global pattern of chronic disease burden is shifting. While infectious diseases still remain a major problem in most low-and middle-income countries, chronic diseases, including non-communicable conditions such as cardiovascular diseases, cancer and diabetes are now major causes of death and disability in LMIC as well as high-income countries. In addition, there is a paradigm shift for many infectious diseases from control to elimination/eradication

strategies. The nature and control of communicable diseases, including challenges of antimicrobial resistance, make that specific attention is warranted despite obvious relation with other topics in the global health theme. This research theme focuses on surveillance, disease program evaluations, transmission models, antimicrobial resistance, and preventive strategies of major as well as neglected communicable diseases. Research on non-communicable diseases and mental health within this theme will focus on burden and determinants of disease.

Health Systems Strengthening & Governance

Health systems strengthening is, according to WHO, the process of identifying and implementing the changes in policy and practice in a country's health system in such a way that the countries can respond better to its health and health system challenges; and any array of initiatives and strategies that improves one or more of the functions of the health system resulting to better health through improvements in access, coverage, quality, or efficiency. The health systems encompass many subsystems including human resources, information systems, health finance and health governance, all of which can be weakened by different types of constraints. This research theme focusses on health systems strengthening particularly in low-resource settings to improve universal health coverage. Research will focus on health information systems, evaluation of innovative prevention, care and treatment models, including use of technologies such as m-health, access to affordable drugs, various financing models, human resource management and laboratory/research capacities. Research questions will also include assessing the efficacy and functioning of different governance and accountability structures, including consumer/community involvement.

Partners

The research program aims to increase collaborations between academia, other research institutes, and implementing organizations in the Amsterdam region and in developing nations. This provides opportunity to increase involvement of methodological expertise in e.g. epidemiology and biostatistics in global health research. In addition, to researchers from more than 10 different departments within AMC/UvA and VUmc/VU, researchers of the following institutes have already indicated their interest in participating in APH: Amsterdam Institute Global Health & Disease (AIGHD), KIT Health, GGD Amsterdam, PharmAccess, Amsterdam Health & Technology Institute (AHTI) and Equator Foundation. Further collaboration with implementing organizations will be sought in the future.

Relation to other research programs within APH

Among the researchers participating in the Global Health research program are participants in other APH research programs including Quality of Care and Methodology, and participants in various Amsterdam UMC research institutes, especially the Amsterdam Infection & Immunity research institute.

2.5 Aging & Later Life

Background

An aging population affects everyone: young people and older generations take care of each other, while medical and healthcare services have to respond to new societal and scientific developments. The Aging & Later Life research program aims to help people in the Netherlands grow old and be old in the best possible way, e.g. using a dynamic health approach in which older people and their relatives are supported in their ability to adapt and self-manage.

There is no such thing as the typical older person. 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 idea of resilience – "the ability to bounce back in the face of adversity" – focusses on older people's capacity for responding to specific age-related tasks and transitions. As such, resilience recognizes older people's innate strength, without establishing an absence of problems as the norm for a good old age. For many older people, full physical health is often unachievable. But this doesn't necessarily mean that they can't experience a good quality of life. A "good" life is determined by more than just physical health. It also depends on the extent to which people can continue to get value and meaning out of life after suffering a health setback. There is a growing awareness of group differences in health effects or treatment results, and of the influential factors at play. We therefore need to know more about personalized care in healthcare.

Amsterdam, a model of our increasingly diverse society where over 180 nationalities are represented, needs this more than anywhere else in the Netherlands. We want our research to help provide deeper insights into what kind of care works for whom, and when.

Our job is to improve our understanding of the complex process of aging, being old, and experiencing the last years of life. Our goal is to promote the visibility of and the discussion around the increase in physical, mental and social vulnerability that occurs as people get older. We will use the knowledge we gain to design and evaluate (preventative) treatment and care strategies.

Themes

We focus specifically on the concepts of resilience, quality of life, and personalized care during three stages: aging (growing old), the older person (being old), and the last years of life.

Aging

Researchers from Aging & Later Life study the process of growing old and consider the clinical, genetic and social factors that can explain the variances that occur. Research into the contribution of factors to the development of chronic diseases, multi-morbidity and loss of function goes hand in hand with knowledge about personalized care. Research also focuses on the question of what the main medical, functional, cognitive, communicative and social pillars of Quality of Care are, and what roles they play in the aging process. Why is it that some people still experience a good quality of life in spite of their limitations?

Within aging, we consider the effects of aging on society, and on healthcare in particular. This includes research into the impact of aging on national laws and regulations, such as the long-term care act (WLZ) and the social support act (WMO), or changes to social systems, such as caregiving, informal care networks and family support. Finally, we examine the labor market, for example the consequences of changing the retirement age. An aging population means we must think differently about housing, public transport and shopping centers.

The Older Person

People are living longer than ever, but in their old age they experience more conditions and limitations. Nowadays, older people prefer to live independently and participate in society for as long as possible. But this becomes more difficult the older people get, as their social network thins out, their physical and mental abilities deteriorate, and their need for care rises. We also want to understand why some older people are so much more vulnerable than others who live in similar circumstances. If an individual's health problems stack up, or if their health is progressively deteriorating, for example in the case of dementia, this puts pressure on the relatives and/or

friends who are taking care of them. We therefore also study the health, well-being and quality of life of informal caregivers.

The main research topics are prevention, diagnosis and treatment of the somatic and psychosocial problems that commonly occur in old age. These include cognitive dysfunction and falls, functional and sensory impairment, polypharmacy, atypical presentation, and other interacting components. Most clinical guidelines currently only address single conditions, but managing people with multi-morbidity is much more complicated than managing people with a single condition. We are therefore conducting research into the development of adequate and appropriate diagnostic tools. One of the biggest challenges is the shrinking workforce in the healthcare sector. In order to be able to offer high-quality care, we need to look for innovative solutions, such as technological advances, participation of older people and social networks that contribute to caregiving.

The Last Years of Life

Research within this phase addresses ways of making the last years of life as enjoyable as possible, and dying with dignity. Although most people in this phase are old, 'the last years of life' and 'the final stage of life' are not by definition synonymous with old age. During the last years of life, quality of life and well-being become vitally important. Adequate, timely, personalized care that suits the needs and situation of each patient are essential for providing good care. The focus shifts from curative treatment to preventative and palliative treatment, and to the possibilities for optimizing daily well-being. This includes research into pain and pain relief, preventing and treating delirium, treating infections, and appropriate medication, or research into the needs of patients and the people around them towards the end of life, as well as different perspectives on appropriate care.

We consider the medical-ethical dilemmas that can come into play when caring for people in the final phase of their life. Researchers from Aging & Later Life study the standards around continuing treatment, self-reliance and vulnerability, and to translate this into treatment options in clinical practice. Finally, we investigate ways to organize care effectively and efficiently. For example, by continuing to develop and evaluate geriatric rehabilitation programs, and by thinking of strategies to minimize care transitions, or improve palliative care pathways. We hereby make critical use of the theoretical and conceptual foundations of care interventions, such as research on advance care planning, shared/collaborative decision making, and goal-setting.

Partners

Aging & Later Life actively works with partners in research, care, local government, and secondary and vocational education. Older people themselves are also important here: their perspective is essential to doing individually-relevant work.

We aim to establish partnerships within both national research groups and European working groups. Relevant local partners already established include: University Primary Care Practice (UHP VUmc), University Elderly Care Medicine Practice (UPO VUmc), Academic Network General Practice (ANH-VUmc), Consortium for Palliative Care, University Network of Organization for Elderly Care (UNO-VUmc), the Expertise Centre on Palliative Care (EPZ), the Ben Sajet Centre, Institute for Societal Resilience, Inholland Amsterdam, Amsterdam University of Applied Sciences (AUAS), and several centers of excellence and working groups on specific conditions and issues such as falls, osteoporosis and sensory deficits. Large-scale (continuous) cohorts under the supervision of members of the program group include Longitudinal Aging Study Amsterdam (LASA), the RAI database, LTCF Ysis database, the Dutch hunger winter cohort, Prevention of Functional Reduction in Elderly Persons in Primary Healthcare (FIT), and NL-SH.

Relation to other research programs within APH

The Aging & Later Life research program has a lot in common with the Personalized Medicine research program, for example in the case of individualized diagnostic testing and treatment modalities. We work closely with the Methodology research program to improve data analysis, and to develop diagnostic and treatment modalities. We work with the Mental Health, Health Behaviors & Chronic Diseases, and Quality of Care research programs to optimize prevention, treatment and care strategies for older people. We also work with the Social Participation research program to evaluate preventative care and social programs.

2.6 Quality of Care

Background

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 these societal changes and to make healthcare more patient-centered, sustainable and available for everyone, both the organization and the content of healthcare systems have to change considerably, while maintaining or improving quality.

To improve quality of care, decisions about healthcare system changes, reimbursement and financing, regulation and recommendations about specific interventions should be based on the outcomes of solid research, while taking ethical issues and legal aspects into account. Patient-important outcomes, client preferences, healthcare equity and the use of scarce resources are central issues.

With existing data resources, such as electronic patient records, determinants of quality and safety of care can be analyzed and valid and useable indicators can be developed with relevant stakeholders, such as healthcare providers, patients, informal caregivers, and decision-makers. The consequences of changes in healthcare can thus be analyzed, monitored, and adjusted, in order to maintain and improve quality and to reduce disparities in health.

In the context of major changes in the healthcare system, research of the Quality of Care research program aims to optimize the quality of care for individuals and groups of patients.

Themes

Optimizing professional, institutional and healthcare system performance

We will analyze the effects of various forms of knowledge management and performance management, regulatory measures, dissemination and implementation of guidelines and best practices, audit and feedback and other tools to reduce divergences between desired and observed outcomes and processes in healthcare. We will analyze the role of various technical, professional, organizational, regulatory and patient-related factors in causing undesired outcomes, and design and implement solutions to create a safer healthcare environment.

Achieving patient-centered care

Together with patients, clients, care professionals and other societal stakeholders we will investigate, and evaluate integrated healthcare services that are organized around the patient rather than the healthcare professional. The focus will be on strengthening patient-centered healthcare systems. For that purpose, reliable and valid patient-specific outcome measures will be developed. We will evaluate the (cost)effectiveness of healthcare interventions including shared decision making, e-health and m-health interventions, that take into account ethics, personal

characteristics and preferences, and focus on patient-specific outcomes covering the complete lifecycle.

Striving for equity

We will systematically develop, improve and evaluate measures to reduce or eliminate undesirable variability across patient groups and population subgroups, in access to healthcare, healthcare processes and outcomes, thereby promoting equity. We will systematically analyze and evaluate the role and effects of regulatory equity promoting measures in healthcare - at different levels: patients, care professionals, institutions and health system - as well as the ethical and legal underpinnings of healthcare equity policy.

Evaluating and Improving implementation strategies

We will develop and evaluate strategies to disseminate and implement the findings from sound performance assessment. Effective implementation strategies will be promoted to improve professional, institutional and healthcare system performance. The network of organizations active in care and welfare in Amsterdam (SIGRA, www.sigra.nl) is considered a relevant partner in this respect.

Partners

In this research program researchers from different disciplines and several medical specialties closely work together. We aim to connect science and practice by collaborations between academia, universities of applied science (MBO = Secondary vocational education and HBO = Higher professional education, thereby focusing on the Amsterdam region in particular), postgraduate education and healthcare practices in both public and private settings. On all four above-mentioned themes we will collaborate with healthcare providers and researchers organized in Academic Collaborative Centers such as the General Practitioners Network AMC, Network of Academic General Practices (AHN-VUmc), Child and Youth Healthcare Network, Insurance Medicine Network, and UNO (University Network of Organizations for Elderly Care). We also closely collaborate with the Netherlands Institute For Health Services Research (NIVEL) and we participate in (inter)national quality registries such as NICE (www.nice.org.uk), ERA-EDT (www.era-edta.org), Perinatal Registration Netherlands (www.perinatreg.nl), Heart Interventions Committee Netherlands (www.bhn-registratie.nl). We collaborate in research, development or implementation teams from other national scientific and (semi-)governmental organizations such as IQ Healthcare, Centre of Expertise for Standardization and E-health (NICTIZ), National Institute for Public Health and the Environment (RIVM) and the National College Health Insurance (Zorginstituut Nederland). We will explore the possibility to collaborate with business partners dedicated to measuring and improving quality of care.

Relation to other research programs within APH

The Quality of Care research program has the opportunity to collaborate with any APH research program as quality of care always needs to be taken into account and can be of added value.

Quality of Care will work closely together with the research program Methodology to optimize the use of existing data resources, such as electronic patient records, with adequate record linkage and semantic interoperability. Additionally, qualitative and quantitative methods to develop instruments to measure person's preferences are areas of shared interest.

The Quality of Care research program is intimately related to the Personalized Medicine research program. Personalized medicine can be defined as an adequate and desirable response to diversity, responding to individual features, needs, and goals, which is also covered by our theme: *Achieving*

person-centeredness. Individualized diagnostics and treatment based on genetic characteristics are addressed in the Personalized Medicine research program.

Maintaining and improving quality and patient-centered healthcare for chronic, elderly or mentally ill patients, and patients in resource-limited settings, offers opportunities for collaboration of the Quality of Care research program with the research programs Aging & Later Life, Mental Health and Global Health in the APH. This also applies to the research program Societal Participation & Health when preventive care or societal programs need to be evaluated.

2.7 Personalized Medicine

Background

The past decades have brought great progress in health, with various interventions that increase longevity, reduce suffering, and promote healthcare effectiveness and efficiency. With the combination of ongoing (bio)technological 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 guide stratification and personalization in healthcare.

As our understanding of the human genome and disease pathogenesis has improved, theories have been developed about variability in disease susceptibility and response to prevention and treatment. Based on unique molecular and metabolic characteristics we will be able to diagnose disease more accurately, select the most effective prevention and treatments, and reduce disadvantageous side-effects.

Importantly, personalized medicine is not limited to individualized medicine, let alone to people's genomes. In response to societal changes, there is increased recognition that healthcare should also become more responsive to the cultural, ethnic, socio-economic, gender, and psychological diversity in the population and to people's social identities across their intersections, hence, across people's 'biosocial' locations (intersectional approach) and their privileges and disadvantages. Responsiveness to individual healthcare and information needs is a necessary condition for a healthcare system that intends to provide optimal care for all. In this way we can fine-tune the healthcare system, offering stratified approaches wherever possible, and personalizing where needed, while normative (ethical and legal) aspects will be addressed.

Themes

Within this research program we plan to bring the prospect of personalized medicine closer by pursuing the following research themes:

Mapping Diversity in Healthcare Needs

We will study diversity in (future) healthcare clients, at different levels (personal, interpersonal, institutional, and societal) and in different settings, and analyze the relevance for health, prevention, and healthcare. We will rely on extensive genotyping and deep phenotyping to document biomedical and metabolic processes. We will analyze psychological, sex/gender, ethnic, religious, cultural, and socioeconomic variability in information needs, disease presentations and effectiveness of treatment and prevention, and determinants of this variability.

Risk Profiling

We will rely on existing approaches (e.g. prediction modelling) and develop new techniques for risk profiling, classifying and stratifying patients and other clients, to predict benefit or harm from diagnostics and interventions (including pharmacogenomics and population screening programs). If relevant, the normative (i.e. ethical and legal) context will also be addressed.

Stratified Interventions

With researchers and healthcare providers in other research institutes within the Amsterdam academic alliance, we will systematically develop, implement, and evaluate guidelines and interventions that build on and effectively respond to biological and social axes of diversity, including genetic factors and intersectionality.

Training for Diversity

Based on our research, we will contribute to how future healthcare professionals can be better trained to be receptive and effective to differences in patient diversity, presentation, needs, and goals, for example by improving care providers' skills in Shared Decision Making.

Innovative research methods

Realizing personalized medicine's full benefits will require active patient involvement. We will use innovative methods such as participatory research (including patients and communities from underserved populations), N=1 studies, and applying mixed methods (Mixed Methods: Integrating quantitative and qualitative data collection and analyses) to optimized and inform personalized medicine with and beyond the Amsterdam University Medical Centers.

Partners

VU(mc) and AMC researchers within this theme come from different backgrounds and will bring in external partners that reflect this broad palette. Existing successful partnerships with medical partners (clinical, general practice, Public Health), Academic Collaborative Centers, local (e.g. Gemeente Amsterdam) and national (semi) governmental organizations (e.g. RIVM, NIVEL), implementation organizations (e.g. Pharos, Stichting Eigenwijks), educational institutes (e.g. Netherlands School of Public and Occupational Health) will be continued and new alliances will be forged. Research is conducted in collaboration and co-creation with patient or client organizations and other stakeholder groups.

Relation to other research programs within APH

The Personalized Medicine research program will work closely together with the research program Methodology to optimize the use of existing data resources, such as electronic patient records, with adequate record linkage and semantic interoperability. Additionally, qualitative and quantitative methods to develop instruments to measure person's preferences are areas of shared interest. The Personalized Medicine research program is most closely related to the Quality of Care research program when it comes to health services research and the development of tailored healthcare delivery. Personalized medicine can be defined as an adequate and desirable response to diversity, responding to individual features, needs, and goals, which is also covered by *Achieving person-centered care*, the 2nd theme of Quality of Care. However, individualized diagnostics and treatment based on individual genetic or other characteristics is part of the research program Personalized Medicine.

2.8 Methodology

Background

Scientific instruments and methods require continuous refinement and improvement to address evolving and new scientific questions. The Methodology research program aims to develop and evaluate methods for Public Health, healthcare and biomedical research. Methods should be considered broadly and include amongst others statistical techniques, theories, instruments, and frameworks. Our projects cover methods in epidemiology, biostatistics, mathematical modelling,

(bio)informatics, machine learning, clinimetrics, and psychometrics. Our research is of a generic nature and dedicated to our understanding of methods, which means that it overarches research fields, patient groups and geographical regions.

The Methodology research program promotes and supports methodological research by bringing together methodologists from Amsterdam UMC, VU and UvA and is strongly connected with other research programs within APH. External partners include domain experts (e.g. clinicians, biologists) from APH, other Amsterdam UMC research institutes and from outside Amsterdam UMC.

Themes

Our research program focuses on the development of new methods, the evaluation of existing methods, and research into research integrity. An important aspect of the research conducted within the research program is the development of guidance for future researchers to use the methods developed within and outside the Methodology research program. This means that guidelines and tutorials for using the developed methods are provided and that scripts are made openly available to other researchers to enable them to apply the developed methods in their own studies.

Development of new methodology

This theme is dedicated to the development of new (or better) research methods, and to support researchers in applying these methods. Development may be interpreted broadly, and includes improvement of existing methods, application of existing methods to a new research problem, and the development of new methods.

Examples of existing methods development projects within the Methodology research program are:

- Development of methods for research synthesis: systematic reviews, meta-analyses and guidelines. This includes automation methods, methods to link evidence from different scientific sources, and methods to assess the risk of bias in primary studies.
- Development of methods to allow for causal inference using different types of data (randomized clinical trial data, observational data, etcetera).
- Development of decision support and audit & feedback mechanisms, to improve implementation of scientific knowledge use in practice.
- Development of architectures that use Natural Language Processing in prediction models in medicine.
- Development of novel biostatistical methods to meet challenges in the analysis of big data and high-dimensional data within healthcare.
- Development of methods for optimal trial design in personalized medicine
- Improvement of instruments to measure quality-of-life, treatment adherence, patient preferences, and patient-reported outcomes.
- Development of new methods to combine different datasets, based on automated record linkage, while taking into account privacy regulations.
- Improvement of information systems, in such a way that they communicate together, and enable automation of obtaining data at distance (telemedicine and e-health) and pre-specified (quality) indicators.
- Development of methods for Systems medicine, addressing the systems of the human body as part of an integrated whole, incorporating biochemical, physiological, and environment interactions

Evaluation of existing and new methods

When analyzing data, a large number of choices can be made. Amongst others, different analytical approaches can be applied, different statistical models can be used, and different choices can be

made regarding the data included in the analyses. One of the aims of the Methodology research program is to evaluate the impact of these different methods and choices on the outcomes of the study, as well as the performance of the methods.

Examples of existing methods evaluation projects within the research program are:

- Evaluation of methods for causal inference for data collected under different research designs (other than randomized controlled trials).
- Evaluation of existing measurement instruments with regard to reliability, responsiveness and assessment of minimal important changes in health measurement instruments.
- Comparison of alternative methods to study and communicate the impact of uncertainty on model-based health policy recommendations.
- Evaluating the potential value of meta-modelling to increase the feasibility of uncertainty analysis and calibration of complex models.

Research on research

The third theme of the Methodology research program concerns research on research, which varies from research into the reporting of scientific results and research into research integrity.

Examples of existing projects on research at a meta-level are:

- Assessment of the attitude of researchers towards research integrity and sloppy science.
- Investigation of the quality of reporting of research projects, including ‘spinning’ of results and conclusions, publication bias, etcetera.
- Conduct of methodological systematic reviews and Delphi studies focused on obtaining consensus on well practices regarding research integrity and the conduct and analysis of studies within different fields.

Partners

Partners affiliated with the Methodology research program comprise methodologists in the broadest sense of the word including epidemiologists, (bio)statisticians, bio/medical-informaticians, computer scientists, psychologists, etcetera. External public partners include: Ministry of Health, Wellbeing and Sports (VWS), RIVM, regional Screening organizations (Midden-West, Zuid-West en Oost), the Dutch Healthcare Institute (ZorgInstituut Nederland), Central Bureau of Statistics (CBS), Netherlands Organization for Applied Scientific Research (TNO), Netherlands Comprehensive Cancer Organization (IKNL), Nationwide Network and Registry of Histo- and cytopathology (PALGA), Netherlands Institute For Health Services Research (NIVEL), GGD Amsterdam. External collaboration network partners include: TraIT, DTL, STAR: Stochastics, Amsterdam Data Science, PROMIS Health Organization, OMERACT, COMET, HOME, REWARD Alliance, EQUATOR network, WHO, EFSA, ExpertDoc, Elsevier, Pharmeon, and Cochrane.

Relation to other research programs within APH

The Methodology research program is not bound by specific clinical or Public Health domains; it cuts through and empowers all other APH’s research programs and research institutes. Close collaboration between methodologists and content experts results in the use of cutting-edge methods to deal with the unique analytical challenges in non-standard scientific studies. Furthermore, most methodologists connected to our research program apply state-of-the-art as well as innovative methodology to epidemiological and clinical research questions, in close collaboration with researchers from the other Amsterdam UMC research institutes.

3. Strategic Partners

Collaborations with strategic partners are essential elements in the research institute for reaching its goals. These partners can be found at different levels.

In research, APH will team up with researcher in other research institutes embedded in Amsterdam UMC, VU and UvA, both those interested in Public Health per se as well as those whose research topics, methods, cohorts or biomaterials can foster research within the institute’s respective research programs.

A successful strategy for bringing together researchers and field partners are the Academic Collaborative Centers (‘Academische Werkplaatsen’). These are close collaborations in research, training and practice, based on long-term contractual agreements, between researchers, practitioners and managers. At a national level, collaboration has been established within these Academic Collaborative Centers with semi-governmental partners such as Employee Insurance Agency (UWV), Trimbos Institute Utrecht and on a regional level with the municipality of Amsterdam and Health Service Amsterdam within the Sarphati Initiative. In the pan Amsterdam area, Academic Collaborative Centers are mainly established with a focus on care, for example AMC HagNet (with partners Stichting Gezondheidscentra Amsterdam Zuid-Oost, Gezondheidscentrum Diemen-Noord, Praktijk Buitenhof Amsterdam), Ben Sajat Center (with partners HVA, Inholland, Cordaan, Ons Tweede Thuis, Amsta, Siga), University Network of Organizations for Elderly Care (UNO), Network of Academic General Practices, Amsterdam Institute for Global Health and Development (AIGHD), and Prezens by GGZ inGeest. Academic Collaborative Centers with national coverage in the field of care are those with Bartimeus for people with visual and visual-intellective impairment and ‘s Heeren Loo care for people with intellectual disability. Furthermore long-term formalized collaboration has been established with industry partners as Tata Steel and KLM.



Figure 1 - Overview of examples of APH’s collaborations with strategic partners.

The coming years we will strengthen existing strategic alliances and support new ones, with a focus on urban health in the Amsterdam region. We can exploit both our research and the position of Amsterdam internationally, by participating in international initiatives of which we can apply the knowledge during the project and afterwards into local practice.

The research institute will redefine and strengthen its collaborations with other knowledge institutes in the fields of primary care and Public Health, such as other universities in the

Netherlands, RIVM, TNO, KIT Royal Tropical Institute and the Dutch Healthcare Institute. Also the existing collaboration between APH, CAPHRI, NIVEL and RIHS within the Netherlands School of Public Health and Care Research (CaRe) will be further strengthened.

The research institute wants to further strengthen the relationship with universities or applied sciences in the region, such as InHolland University of Applied Sciences and the Amsterdam University of Applied Sciences (HvA). With their applied knowledge and expertise in, for example, design thinking, they form a natural partner for APH when it comes to the effective methods for implementation of research into the integral healthcare practice.

APH is an important interface between inpatient healthcare at Amsterdam UMC and extramural care in the Amsterdam surrounding area. We will facilitate intramural and extramural professionals to implement national policies of NFU⁴ and other organizations, connecting research from lab to life. The coming years we will keep investing in sustainable partnerships with (scientific) professional organizations, Public Health authorities and stakeholder organizations, in order to ensure that knowledge is produced in line with challenges society is facing and to have an impact on daily healthcare practice.⁵ We will increasingly involve stakeholders such as patient associations, scientific professional organizations, regional and national providers of care and prevention, health insurers and municipalities in the prioritization, implementation and assessment of research.

4. Talent Development

In the coming years, the Amsterdam Public Health research institute will consolidate its policy on talent development that aims to stimulate talented researchers and to support them in developing both their academic competencies and more generic professional (transferable) competencies.

APH offers resources to the eight research programs to stimulate talent by initiating grant rounds to perform multidisciplinary research within consortia and by offering travel grants for PhD candidates. The travel grants give young researchers the opportunity to strengthen existing, or to set up new collaborations with international institutes and to spend part of their PhD trajectory abroad. At the APH annual meetings junior researchers are encouraged to compete for awards by presenting their research to big audiences in order to improve their visibility in the scientific field, and to advance their communication and dissemination skills. The CaRe Days offer a good opportunity for PhD candidates to increase their network with PhD candidates from other research institutes of the Netherlands School of Public Health and Care Research (CaRe). The APH research programs have installed Junior Councils in which young researchers can provide Program Leaders with solicited and unsolicited advice on the strategic direction of the research program and help them with the organization of research program-specific activities or events.

In order to offer peer support and to increase the chance of successfully completing PhD trajectories, APH offers intervision meetings to all PhD candidates and junior researchers. The focus of the meetings is to develop insight and problem-solving skills. Moreover taking part of intervision meetings provides young researchers with a network to discuss practical or methodological issues with others from within the research institute. Initially, the intervision meetings were primarily organized for PhD candidates and junior researchers on location VU(mc), however given the positive results first steps have been taken to roll out the initiative to location AMC. In the upcoming period

⁴ E.g. NFU (2019). Onderzoek en innovatie met en voor de gezonde regio. Think globally, act locally. Utrecht: NFU

⁵ Cf. Gezondheidsraad. (2016). Onderzoek waarvan je beter wordt. Een heroriëntatie op umc-onderzoek. Den Haag: Gezondheidsraad; publicatienr. 2016/14. Ministerie van Volksgezondheid (2018). Nationaal Preventieakkoord. Naar een gezonder Nederland. Den Haag: Ministerie van Volksgezondheid.

APH wants to further expand these meetings to both locations, in collaboration with the Graduate School. In the near future it is intended that intervision will become available to all PhD candidates, regardless of the research institute to which they belong. Close collaboration with internal PhD research organizations (ProVUmc and APROVE) is therefore crucial. We will investigate whether expansion of the intervision meetings to midcareer and senior researchers is valuable.

All PhD trajectories within APH have to conform with the doctorate regulations as set by the overarching universities (University of Amsterdam and Vrije Universiteit Amsterdam). As part of the merger of AMC and VUmc, the development of one Amsterdam UMC Doctorate School is ongoing. In the meantime, matters concerning education, supervision and assessment of AMC PhD candidates are regulated in a central Graduate School, whereas these matters for VUmc candidates are regulated decentral at the different research institutes. APH has installed a PhD Education Committee APH-VU/VUmc, comprised of two senior researchers (chair and vice-chair), one Postdoc researcher, one PhD candidate and a policy officer of APH, who is responsible for reviewing the Training Plan of PhD candidates according to the VU/VUmc-specific and the APH-specific requirements. The committee writes and updates the 'PhD manuals' with details about the various general and research institute-specific steps PhD candidates need to be concerned with in the various phases of their trajectory. Moreover, the committee coordinates the intervision meetings for young researchers, and may offer assistance when PhD students find themselves in a dispute with their supervisors.

The Amsterdam UMC has a range of resources in the form of scholarships and prizes to stimulate talent, but also offers guidance through the grant desk aimed at talented researchers which enable them to obtain prestigious personal or other highly competitive grants. These facilities are also available to APH researchers. Together with principal investigators, Program Leaders and associated departments, APH will develop a talent monitoring system that enables to identify research talent within the research institute. This will increase the opportunities for being nominated for internal or external prizes to further stimulate talent and support academic careers. In addition to the grant desk support, APH will facilitate midcareer researchers by improving clarity around funding possibilities, and will encourage midcareer researchers to follow courses aimed at increasing researchers' abilities for independent acquisition. APH will also stimulate the development and growth of talented (multidisciplinary) teams to undertake research through financial support of Grant Writing.

To stimulate collaboration with both academic and societal partners, APH will offer fellowships around Academic Collaborative Centers to its midcareer researchers. By means of close collaboration, APH researchers will improve their evidence-based working and will boost the societal impact of their research. In addition, APH is an active partner in local initiatives, such as Hacking Health Amsterdam. APH midcareer and senior researchers will be stimulated to participate in such events to increase collaborations with society and to improve the innovativeness of their research.

Success and accomplishments in research are key elements throughout academic careers. The directors of the research institute deliver recommendations to the Amsterdam UMC research board and Dean about promotions of midcareer and senior researchers to the level of associate and full professor in the participating organizations.

More generic professional competencies have become increasingly relevant to acquire for academics, in addition to academic competencies. In part this is the case, because Public Health researchers are increasingly expected to interact with health policy makers, educators, science communications, consultants, managers, supervisors or entrepreneurs, to increase the relevance of their scientific work and to translate their findings to practice. This requires a new set of skills and competencies, that are also relevant for those academics that may leave academia at some point in

time to move into one of these professions. By taking the PhD trajectory as a period in which there is room for discovering, growing and nurturing personal talents in addition to research, APH aims to lower the perceived pressures created by the highly competitive environment and to also increase vitality (or well-being) of the researchers by offering courses and by adopting a caring organizational attitude. Moreover, expectation management of career opportunities for young and midcareer researchers in this highly competitive and insecure environment is also an important aspect. APH also emphasizes the importance of leadership development for academics. As part of the Netherlands School of Public Health and Care Research, it is intended that APH will offer a CaRe Leadership fellowship to midcareer and senior APH researchers, in order to increase leadership skills. APH also acknowledges the relevance and importance of providing high quality supervision of researchers. APH will closely collaborate with the Graduate School to gain insight in the best research supervisory and learning climate practices in order to enhance supervision skills of midcareer and senior researchers within the research institute.

5. Research Quality & External Accountability

Research Quality

Promoting ongoing improvement in research quality is one of the primary goals of APH. The scope of these efforts includes all phases of research, that is study conceptualization, design, participant recruitment, data collection, data analysis, reporting, archiving, sharing, and dissemination. Across the research life cycle, we stimulate and support researchers in pursuing the highest degrees of soundness, trustworthiness, honesty, accuracy, and fairness. Increasingly, government bodies and funders have joined efforts of individual researchers to enhance the quality and impact of research according to the approach of Open Science, defined as “the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods” (www.fosteropenscience.eu). Open Science may increase the societal impact of research not only by enhancing its soundness and credibility, but also by promoting reuse of methods and data and reducing research waste. Thus, Open Science principles are very much aligned with elements of APH’s mission and vision, including working in the public interest, seeking collaboration with fellow researchers and stakeholders, and building an open network. Therefore APH has chosen to approach Open Science not as a challenge imposed by developments in our context but as an opportunity to refresh our efforts to foster a research culture conducive to research quality. Doing so will also ensure that Open Science can be practiced under terms that are compatible with the specific conditions under which Public Health research may be conducted (such as maximum protection of participant privacy). Swift action is needed for APH in particular, because changes in research practices are harder to implement in long-term trials and cohorts with human subjects than in sciences using mainly experimental and lab-based methods. APH will structure activities towards an open research quality culture along a Research Quality Roadmap, drawing inspiration from Nosek (2019) and Rogers theory on Diffusion of Innovation. Figure 2 provides an overview of actors and activities with the roadmap to improve Open Science and Research quality, structured along 5 salient building blocks.

How to achieve a cultural change towards open science & better research quality



Figure 2 - Actors and activities of APH to foster an open research quality culture (source: @BrianNosek, based on a tweet storm).

Key to the success of the roadmap will be the close coordination between actors at the institutional policy level (APH Board, Program Leaders) and actors at the research practice level, organized within a Scientific Quality Committee (SQC) and working groups. The following activities along these steps should therefore not be seen as consecutive, but as interrelated and interdependent. Furthermore, the roadmap will be dynamic and maximally responsive to the fast-paced developments in open research infrastructures and practices.

Step 1 Implementation

Infrastructural supports for moving beyond the state of the art in research quality and transparency need to be developed or made accessible to APH researchers. This includes platforms or frameworks to collaborate on and share research methods and data. As an example, APH is planning to offer APH researchers an institutional account to Open Science Framework (OSF) for documenting projects, including hypothesis registrations, methods, code, data, and preprints. APH will also implement an Open Review system for APH researchers who want to embed their work in APH and benefit from peer review in the early stages of their project, for example when they have drafted a protocol or preregistration for their study.

The SQC will be the key steering body for the development, implementation and evaluation of activities and projects to improve Open Science and Research Quality. The committee ideally broadly represents research from the different APH research programs, but more important is that they bring in ideas, skills, and ideals to promote the open research quality culture within APH. The key actor for implementation is the dedicated Research Quality Officer of APH, who is also secretary of the SQC. To promote coordination, APH Board will regularly join the committee to discuss progress, conditions for implementation, resources, and refinements of plans and priorities.

The remit of the SQC is to advise the APH Board on any issue related to research quality, being sought or not sought for. The committee bases these advices not only on their own experience and expertise but also on their collection of questions and needs of researchers seeking to improve openness and quality of their research. Furthermore, the SQC takes responsibility for peer review offered to APH researchers, by outlining the submission and review workflow, determining the quality criteria, and recruiting peer reviewers. SQC members participate in SQ-working groups for specific projects deriving from the Open Research Quality roadmap, with the full SQC functioning as

the steering group. It is to be expected that 2-3 projects will be running alongside each other in any given year. One project, for example, is the development and implementation of a system for auditing and monitoring research projects within the departments.

Step 2 Interfaces

Infrastructures can only successfully support Open Science and Research Quality when these tools are used in daily practice. This is more likely to happen if tools are acceptable to researchers, easy to use, and preferably well-integrated within researchers' already existing workflows. In light of this aim, the Research Quality Officer will draft plans for promotion of and instruction in the use of the OSF framework and the planned infrastructure for peer review. Moreover, use of interfaces for Open Science and Research Quality will be supported by integrating practical information on and the logic underlying these tools in the protocols, standard-operating procedures, and handbooks offered by APH and Amsterdam UMC Research Support and Research Support VU.

Step 3 Normal Practice

An acceptable easy to use infrastructure provides a basis for Open Science and Research Quality. However, the (real or perceived) additional time investments of researchers using these infrastructures need to be acknowledged and reinforced by norms, incentives, and policies for the desired cultural change to occur. Norms are explicit rules to guide (new) behavior. Clearly, many researchers are already informed and highly committed to the values and principles of Open Science and Research Quality. Others may follow when desired behaviors are made more explicit and visible. We develop an action plan to define and communicate norms on the issue of good scientific practice, developed in co-creation between APH Support Staff and the SQC. An important tool in the communication of shared norms will be the APH Quality Handbook, which shall be updated according to current values, principles and norms. Shared norms for good scientific practice will have a role in research audits too. Auditing may not only contribute to the internalization of norms, but also offers an opportunity to highlight practices aligned with Open Science and Research Quality, to share these in the research community as best-practices, and to create opportunities for researchers learning from each other.

Step 4 Incentives

Culture change also comes with changes in incentives for research practices, behaviors, and products. These changes reflect broader policy shifts (e.g., the VSNU-committee on recognition and rewards for academics), which require anticipatory action from APH to put our researchers in the most favorable position. Specifically, APH may help individual researchers and research teams with building a recognized track record of Open Science and Research Quality achievements, complementing the track records of publications, citations, grants, et alia. Second, APH will submit itself once every six years to a self-assessment based on the national Standard Evaluation Protocol (SEP) developed by the Association of Universities in the Netherlands (VSNU), the Netherlands organization for Scientific Research (NWO), and the Royal Netherlands Academy of Arts and Sciences (KNAW). The SEP is, more than previously, taking developments with regard to Open Science and Research Quality into account. Aggregating Open Science and Research Quality track records of individual researchers will allow external evaluators to gauge the progress of the research institute in this area. Swift action is needed for APH in particular, because changes in research practices are harder to implement in long-term trials and cohorts with human subjects than in sciences using mainly experimental and lab-based methods.

Step 5 Policy

While an open research culture follows from intrinsic motivation to do the best possible research with the greatest possible benefit, policies are sometimes needed to resolve inevitable dilemmas and conflicts between principles and external pressures impinging upon the research enterprise. The APH Board seeks to consolidate its norms for research as much as possible in the line of the research organizations of Amsterdam UMC, VU, and UvA, and their respective faculties and

departments. Similarly, APH will strive towards the inclusion of the Open Science and Research Quality track record in criteria for hiring, tenure, and promotion. Furthermore, APH will monitor how its desired open research quality culture is promoted by adhering to the research quality policy of Amsterdam UMC, VU, and UvA (e.g. JCI, AMC-VUmc research code (2019); VU research data policy; Netherlands Code of Conduct for Research Integrity (2018), JCI Guidelines and central Standard Operating Procedures) and if needed seek to further better alignment. Furthermore, the APH Board will work with line management to support the enforcement and execution of policies where needed.

External Accountability

All research institutes of Amsterdam UMC and the parent universities (VU and UvA) are evaluated once every six years according to SEP. In their self-assessment, research institutes are expected to describe a clear mission (goal) and strategy for the coming six years and a reflection on the past six years. The quality of the research, social relevance and viability are assessed. The self-assessment must be interwoven with how the research units address the topics Open Science, PhD Education, Academic Culture and Human Resources Policy in its strategy.

The SEP expects a good, concise description by means of a self-assessment of the results achieved and their quality on these subjects, including examples and, where applicable, substantiated with robust figures. At the aggregate level, the Amsterdam UMC will also be externally evaluated once every six years in the form of an external quality control of the governance, policy and support (research support, graduate school, core facilities) of the research that takes place within the institution.

An External Advisory Board consisting of external members (e.g. from major partners like GGD Amsterdam, National Institute for Public Health and the Environment (RIVM), Trimbos Institute, Dutch Federation of Patients, Employee Insurance Agency (UWV), Dutch National Science Agenda and the Netherlands School of Public and Occupational Health) started in the winter of 2017 (see Appendix A). The External Advisory Board provides guidance on the overall strategy of the research institute including the viability of existing research programs or the need for new research programs. Members were selected on their administrative, academic and/or policy experience deemed relevant to the adopted broad definition of Public Health research, APH and for their interest in transmurals and extramural healthcare and research. Members have no direct interest in the research institute. We achieved a balanced composition of members representing the various areas within APH.

6. Communication

The Amsterdam Public Health research institute will develop a communication strategy in 2020, which will result in a plan for both internal and external communication tailored to specific stakeholders. Our plans and ambitions will be actively communicated to our researchers and relevant stakeholders. The research institute wants to improve the visibility of her services to the researchers and wants to increase the awareness of the tremendous assets and potential of the APH network to both researchers and external stakeholders. After APH's start-up phase in which the focus was mainly on creating internal cohesion within the research programs, our focus will shift to external profiling in the coming years (obviously without losing sight of our internal community). We will strengthen our efforts on designing a digital landscape embedded in our website on which the expertise of our researchers is made accessible to our internal community and external audience. Not only will the digital landscape encourage our researchers to find each other and work together, also our expertise and multidisciplinary nature becomes more visible to external partners and grant providers.

External Communication

An important goal for the coming years is to position APH and the research programs in a strong and convincing way to the outside world. In line with our mission and vision, Amsterdam will have an even more prominent role in our communication strategy. Our priority is to invest in getting to know Amsterdam better and vice versa, and improving the embedding of APH opinion leaders in Amsterdam networks. Opportunities for making communication more focused on certain 'bubbles' are within reach - specific groups of people with a certain profile and experience that communicate mainly within their own group. New technology makes it possible to reach these groups with tailored messages.

APH will continue to engage effectively with all stakeholders regionally, nationally and internationally, to meet core organizational objectives, to demonstrate the success of its research efforts, and to ensure that sponsors and the general public understand our activities. The research institute will develop a matching press plan to raise its profile through the media - print, broadcast and online - and a web strategy, to strengthen its online presence in a way that matches the overall Amsterdam UMC communication strategy.

Within APH various scientifically renowned opinion leaders have embedded their line of research. We want to encourage them to position themselves as figureheads of APH in the public debate and towards politicians.

APH will optimally use the little room for maneuver in corporate branding that was left for research institutes after the administrative merger of both hospitals (AMC and VUmc) in 2018 to create a strong identity for Amsterdam UMC. The research institute will further develop active branding and public relations strategy using the website, but also providing conference banners, templates for roadshows and presentations and assistance in connecting to the media. At the research community portals of the website a description of the ongoing projects in each of the research programs and the research staff will become available as well as the illustrated versions of (annual) reports.

APH is prioritizing the following external communication strategies:

- For *the public* at large we aim to disseminate scientific findings/knowledge in lay man's terms, amongst others by a short lay man's description easily translated to daily life of the most cited papers and an overview of recent media appearances. We also attach great importance to showing the public what the application of knowledge can add to designing evidence-based improvements.
- The website portal for *(medical) professionals* at large aims to disseminate scientific findings/knowledge in usable and practical terms, amongst others by a short description of the most interesting papers for professional's daily work and an overview of recent media appearances.
- Communication with the *international research community* is achieved through high quality scientific peer-reviewed publications, which we strive to be open-access.
- Scientific meetings, lectures and masterclasses for the *research community and external stakeholders* will be organized to discuss important Public Health topics and disseminate results.
- In addition, we aim to achieve findability of researchers, research projects, cohort studies and Academic Collaborative Centers demonstrating our expertise to external stakeholders in a digital landscape where researchers can be found on the individual, project, theme and research program level.

Membership of the research institute helps researchers to radiate a professional corporate identity. APH provides continuity and stability to external partners, public and private alike, who prefer not

to depend on isolated individuals but on teams of individuals backed by a larger research organization. This is particularly salient when engaging in contracts and long-term collaborative agreements.

Internal Communication

APH's internal communication strategy aims primarily on stimulating researchers to join the APH network: a strong community of researchers with like interest, but stemming from different disciplines and research traditions. Moreover, the research institute aims to emphasize the different services APH has to offer to their researchers and the increase the visibility of the APH network itself.

The research institute is developing a strategy to promote the institute more effectively inside the different departments and to stimulate researchers to join APH.

- We want to activate heads of departments to inform and stimulate their research groups about how to take advantages of joining the APH network.
- We want to give target group oriented presentations on occasions like the Methodology tutorials to highlight the advantages of being part of the community.
- Junior Councils will be appointed as ambassadors for each research program to create more involvement with the group of young researchers.
- Taking part in one of the APH committees or working groups facilitates development of scientific expertise, as well as development of collaboration and leaderships skills.

Organizational embedding within APH must be organized in such a way that the system makes it attractive for researchers to join APH and actively stimulates them to meet each other and to be more visible in the network. APH is a large research institute of almost 1,500 researchers and its great diversity and multidisciplinary nature is one of its unique strengths. APH is well-equipped for this, but we could use this power even better to prevent the size of APH from becoming our Achilles heel. The digital landscape we mentioned above can increase the visibility of researchers internally and encourage researchers to find each other.

The website together with both institution-wide, and research program-specific e-newsletters are used for the central dissemination of information on lectures, seminars, colloquia and other events as well as information on calls, highlighted papers, inspiring grant successes etc. The websites' section about the different APH services will be updated to the latest standards.

Each of the research programs organizes regular master classes and the research institute yearly organizes a Spring Meeting for all of its researchers specifically focused on the own research programs and an Annual meeting with a trending or overarching theme for both its researchers and external stakeholders.

7. Institute Specific Facilities and Infrastructure

The Amsterdam Public Health research institute will use core facilities of the participating organizations, such as biobanking, data management, data warehousing, cluster computing, survey tools, IT support, dedicated officer grants desk, as well as central support groups for large grants. APH will play an active role in the development and maintenance of these core facilities on behalf of its researchers to promote the development of research infrastructure in a way which fosters collaboration, is cutting edge, cost-effective, and suits the needs of the research programs. In addition, will assist talented researchers to improve the chances of acquiring personal grants.

Research groups in APH coordinate and maintain more than 25 large scale cohort studies such as the Netherlands Twin Register (NTR), Netherlands Study of Depression and Anxiety (NESDA), Netherlands Study of Depression in Older Persons (NESDO), Netherlands OCD Association (NOCDA), HCHA, GROUP, European Network of National Schizophrenia Networks Studying Gene-Environment Interaction (EU-GEI), Netherlands Longitudinal Study on Hearing (NL-SH), Longitudinal Aging Study Amsterdam (LASA), Amsterdam Born Children and their Development (ABCD), Healthy Life in an Urban Setting (HELIUS), Dutch Famine Birth Cohort Study, Netherlands Autism Register, and Generations². They also maintain (inter)national databases like Resident Assessment Instrument (RAI) and the Long-term Care Facility (LTCF) Ysis database, and disease specific registries such as National Intensive Care Evaluation (NICE) registry and TREATment of ATopic eczema (TREAT) registry.

At the level of the research institute, we will try to organize a core facility for these large scale epidemiological resources, as well as for methodological innovation. The coming years we will prioritize our efforts to strengthen and sustain the tremendous assets formed by our cohort studies. We will assess the scientific and societal value of our cohorts and present the results to major actors involved in building research infrastructure, which is to date lacking for cohort studies. In addition we will support responsible data sharing of cohort data within and outside APH.

8. External Funding and Acquisition

Increased power of acquisition is a major driver motivating the formation of the Amsterdam Public Health research institute. Research funding is expected to be based for 40% on research grants from competitive national (NWO/ZonMw) and international grant agencies (ERC), 50% on contract research in cooperation with (semi)governmental and societal parties such as VWS, EU (non ERC), and charitable funds (e.g. Dutch Diabetes Foundation, Dutch Cancer Society and the Dutch Heart Foundation). Only 5-10% of the obtained funding is acquired through public-private collaboration with industry parties.

An active network with relevant funding agencies will be maintained by the APH Board, the Program Leaders and the Principal Investigators (PI), amongst others by memberships of committees and advisory boards and national organizations. Being part of the major academic player in Public Health in the Amsterdam metropolitan area should make this task quite feasible. To support the institute's researchers in competing for these public national and international research funds, in particular excellent science (NWO-VI, ERC, Marie Skłodowska Curie) and program grants within ZonMw and the Societal Challenges calls of Horizon 2020, the research institute will signal grant opportunities, facilitate cross-disciplinary contact, and mediate connections to NGO's and private partners that can help implement research outcomes and generate societal and economic impact. Participation of such partners to grant proposals is increasingly demanded by major grant organizations. The Amsterdam UMC grant desk will provide administrative and legal support for grant applications.

The research institute will further actively seek to lead consortia applying for large scale funding within the NWO gravity program or the EU Joint Programming Initiatives, IMI and EIP-AHA. Multi-year collaborative agreements will be sought with public partners like Public Health Services (GGD) Amsterdam, Cordaan, Ben Sajat Center, the Primary Care Network Amsterdam and the universities of applied sciences (HvA an InHolland), and with private partners like ArboUnie, KLM, Tata Steel and, using the Amsterdam Economic Board as a main hub, with the many SME's in the region with a Public Health scope. The research institute will also actively seek to keep or put Public Health themes on the regional, national and international research agenda.

9. Societal Impact and Valorization

The research topics within the research programs are identified in close collaboration with stakeholders including citizens, and the topics as defined by the Dutch National Science Agenda (NWA). A regular consultation process with patients and stakeholders will guide priority setting within each of the research programs. The research institute will provide an important source of input for the training of bachelor and master students and healthcare professionals taking place in the departments listed in Appendix B.

Through direct interactions and active dissemination policies we will communicate our research findings with decision-makers, Public Health professionals, clinicians, patient and citizen groups. We contribute to the development and dissemination/implementation of guidelines and we actively engage in the public debate on responsible innovation in healthcare. The coming years we will focus on the urban region of Amsterdam, among others by maintaining relationships with societal partners (i.e. municipality, AEB, GGD, Sigra, Pakhuis de Zwijger, de Balie) and by taking part in Hacking Health Amsterdam.

Our research reaches from universal, selective and indicated prevention to care-related prevention. To achieve prevention in practice, our findings have to be utilized. Valorization is “the process of creating value from knowledge by making knowledge suitable and/or available for societal use and translating that knowledge, whenever possible, into competitive products, services, processes and entrepreneurial activity”⁶.

As the joint knowledge transfer office of the Amsterdam universities, the Innovation Exchange Amsterdam (IXA) assists researchers in creating value from their knowledge and expertise. IXA helps them to cooperate with third parties, assist them in intellectual property management, offer support in starting new ventures and activities, and provide legal support.

A strategy will be developed in conjunction with IXA on how to combine academic (incl. universities of applied sciences), societal and industrial activities in grant applications and how to implement sustainable solutions in healthcare, while maintaining sufficient academic independence. Suiting the strategy APH will invest in support for valorization, for instance by an expert consultancy center for or an external relation manager.

10. Organization, Management and Budget

Organization and Management

The **APH Board of Directors** ('APH Board') consist of a Director with two Vice-Directors, representing both locations of Amsterdam UMC and the Faculties of Behavioural and Movement Sciences and Bèta Sciences of the Vrije Universiteit Amsterdam. Director Martine de Bruijne (Amsterdam UMC - location VUmc), Vice-Director Dionne Kringos-Pereira Martins (Amsterdam UMC - location AMC), and Vice-Director Carlo Schuengel (Vrije Universiteit Amsterdam - Faculty of Behavioural and Movement Sciences) will lead the research institute in the coming period. All members of the APH Board are appointed formally until the end of 2023, after which the APH Board will be re-appointed for all alliance research institutes. The organizational structure of the Amsterdam Public Health research institute is depicted in Figure 3.

⁶ Bron; Nederland Ondernemend Innovatieland, 2009

Together with the directors of the other research institutes, the APH Board takes part in the **Amsterdam UMC Research Board (ARB)**. The ARB meets every 4 weeks in the first two years and later bi-monthly to align the policy of all Amsterdam UMC research institutes and to shape the Amsterdam UMC research policy on issues that transcend a single research institute. This may include ethics review, career perspectives for talented researchers, scientific quality, PI score methodology, criteria for full professorships, research output registration, large scale research infrastructure, and financial project control (quarterly). The Amsterdam UMC deans meet and chair the ARB quarterly. Annually, a strategy day is held between the ARB, the Board of Directors of Amsterdam UMC, head of departments and Division Boards. Annually a half-day strategy meeting is held with ARB and Division Boards. Bi-annually, the ARB meets with young talent.

The **APH Board of Deans** of the participating university faculties and the Amsterdam UMC acts as the main supervisory organ of APH. Bi-annually, a meeting with APH Board is used to discuss and approve the annual work plan and deliverables and the use of budget. The APH Board of Deans, chaired by the dean of Amsterdam UMC - location VUmc, appoints the APH Board.

There are eight thematic research programs with two **Program Leaders** per research program. They coordinate the APH activities in their own research program. The APH Board meets every six weeks with the 16 Program Leaders to update the internal strategy and to discuss anticipatory or reactive response to external events. Actions flowing forth from this and the daily operation of the research institute are delegated to the APH Board and **APH Support Staff**. The APH Support staff is appointed by the APH Board. The Program Leaders chair their **Program Council**, which consist of a selection of PI's in the research program, appointed by the Program Leaders and meet at least bi-annually to implement or update the research program-specific strategy and to discuss anticipatory or reactive response to external events; daily business of the research program is delegated to the APH Support Staff and research program-specific administrative support. Most research programs have installed a **Junior Council** that provides Program Leaders with solicited and unsolicited advice and helps them with the organization of research program-specific activities or events. It also allows the Program Leaders to keep in close contact with their juniors, surely the future of APH.

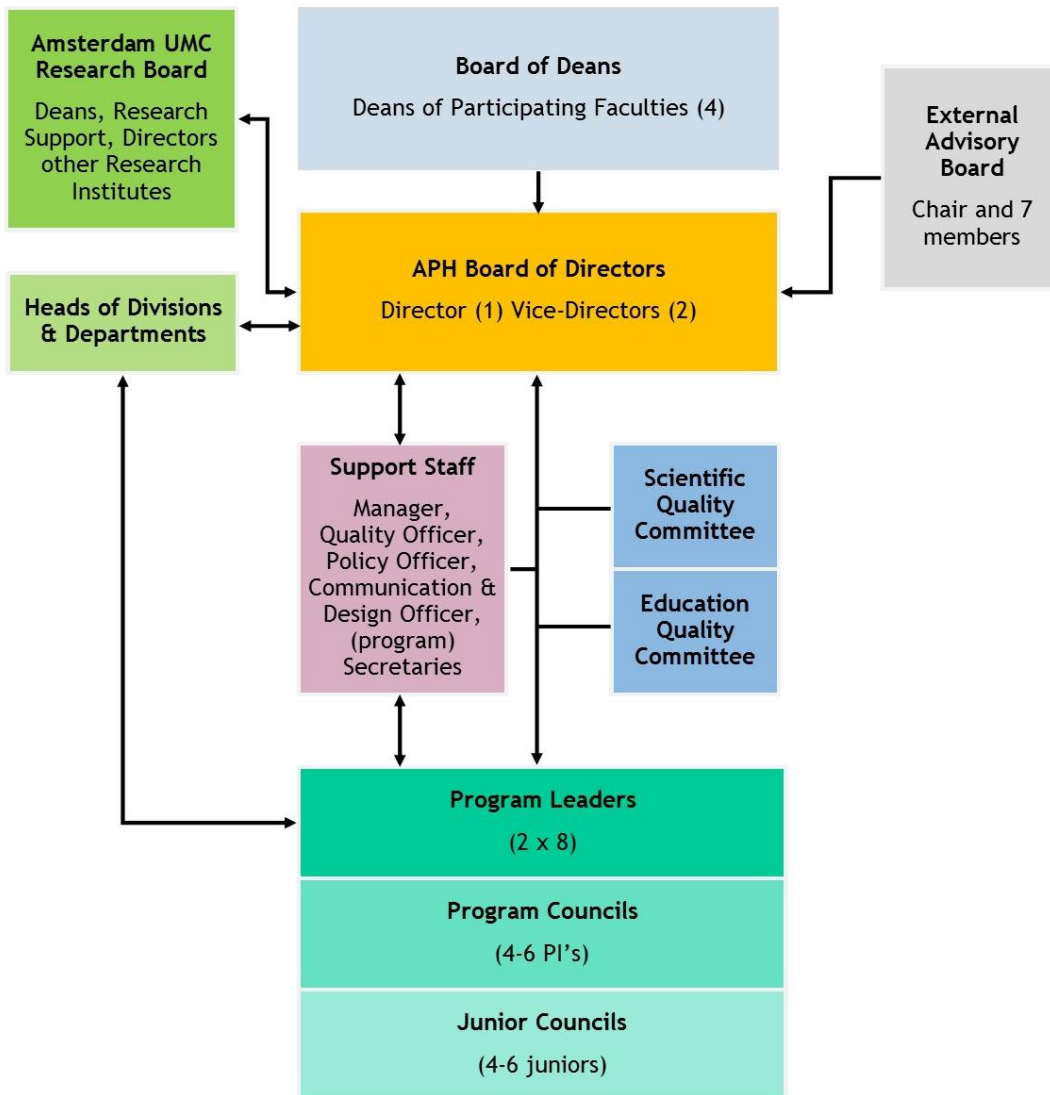


Figure 3 - Organizational structure of the Amsterdam Public Health research institute.

The APH Board may meet periodically with the **Heads of the Divisions**⁷ that collaborate with more than four departments in APH. This ensures a good alignment of the mission of the research institute with the hierarchical organization of the Amsterdam UMC and the universities (VU, UvA), in terms of research resource allocation. The meetings will address the mission, vision and policy of the research institute and will address criteria for admittance and total the researchers that participate in the research institute on behalf of the departments.

The selection of researchers will typically be based on research teams around a PI. Criteria for admittance are a good fit to one or more themes in at least one research program.

The APH Board meets quarterly with the **Scientific Quality Committee (SQC)** and the **Educational Quality Committee (EQC)**. The SQC co-develops and implements APH-specific research quality policies and guards Amsterdam UMC policies regarding the quality of research. Parallel to the establishment of the Amsterdam UMC-wide Graduate School, the EQC will ensure that the APH specific interests of our PhD students are represented within the alliance. These interests concern

⁷ Or the directors of research of participating faculties at VU and UvA.

educational activities, PhD and talent guidance and support the network of PhD and postdoc researchers.

The **External Advisory Board** consists of external members with a senior position in the 'Public Health' field and its institutions. They meet with the APH Board annually and can provide unsolicited advice at any time.

The staffing of APH Board and Program Leaders from 2019 is listed in Appendix C. In the fall of 2019, it will become clear if staffing of the APH Board and Program Leaders for 2020-2024 will remain the same.

Budget

In 2020-2023 the budget is formed by four sources: Amsterdam UMC innovation budget (42%), VU support for interfaculty research institutes (25%), contribution of the four participating faculties (33%). The merger of AMC and VUmc divisions will in 2020 lead to the formation of Amsterdam UMC Division Primary Care, Public Health & Methodology (EPM), housing about 60% of APH researchers. Between 2016-2019 this division freed up part of their budget to support the ongoing development of APH. After the merger the contribution of EPM is expected to decrease gradually. APH will look for additional budget from UvA and other partners. In 2020-2023 the APH funding will provide sufficient support for the operational costs and strategic investments to realize the goals set out in this plan.

Seven components in the budget of the research institute can be discerned: (1) Cohorts & research infrastructure, (2) Societal impact, implementation and valorization, (3) Open science, quality & accountability, (4) Talent development, (5) Innovation research programs, (6) Internal & external communication and (7) Management.

(1) Cohorts & research infrastructure

The cohorts are key resources for a Public Health research institute. Longitudinal cohorts with rich biobanks are and will be a crucial factor in the international visibility of the Amsterdam UMC and parent universities, and development of the next-generation of (bio)statistical and clinimetrics methodology has always been a strong point of Public Health research institutes - the AMC and VU/VUmc not being exceptions. These resources are paramount for attracting external funding but they are usually hard to co-fund in grant proposals; they are often considered to be an existing asset that makes the grant proposal competitive rather than something that needs to be created by the grant money itself.

Because external structural funding is a major challenge the research institute needs to actively invest in these resources. APH has therefore allocated structural budget to support the cohorts in fulfilling their important role in the APH research infrastructure:

- Data management & linkage
- (FAIR) accessibility to APH and external researchers
- Digital fenotyping
- Omics, biobanking

(2) Societal impact, implementation and valorization

As a research institute of Amsterdam UMC, VU, and UvA, APH is an important interface between inpatient clinical care, scientific research and the extramural care practice in the Amsterdam metropolitan area. Compared with clinical research, the practice of public health research is often outside the hospital, and much of the research that is carried out within the institute potentially has a direct impact on practice and society.

Like other knowledge institutions, APH is expected to produce knowledge in line with societal challenges and to ensure that this knowledge can actually be used in health care and beyond. This means that strong links between research, practice and training are, more than in clinical research, crucial conditions for the effective translation of public health research into practice.

In order to have an impact on daily healthcare practice, APH supports partnerships with (scientific) professional organizations, public health authorities and stakeholder organizations. Regional partners are brought together in the Academic Collaborative Centers, in which collaboration between research, education and practice is formalized on the long-term.

To encourage research within the context of public-private partnerships (PPP), APH will launch an 'embedded' PhD program. These embedded PhDs work (part-time) in a company setting on a research question relevant to that company, but with complete and independent scientific supervision from an APH researcher. Costs are shared by APH and the company, and the company takes care of the transferable / commercial skills training of the PhD student and will increase the job prospects of the PhD student within the company (or similar ones in its sector) after the PhD project has finished.

Creating an academic context in which this interaction with healthcare practice and society can flourish requires time, support and financial commitment and cooperation with various stakeholders. Therefore APH has allocated budget to facilitate implementation research and education and the further upscaling of knowledge to the real-world for a better public health. APH will contribute to the success of the fellowships and embedded PhDs by having the proposals go through peer review and by organizing intervision between fellows, embedded PhDs, and their supervisors (see also 4. Talent development)

- Fellowships in implementation research (3 postdoc fellowships of 2 years between 2020 and 2023, 3x 2x 40 k€ per postdoc per year, 50/50 funded by a implementation partner or research department)
- Implementation & valorization support (install APH center of expertise for implementation and support by IXA)
- Embedded PhD's digital health, innovation & healthcare organization, 50/50 funded by societal partners/industry (2 * 120k€ per 4 year)
- Boost Academic Collaborative Centers (see fellowships under budget component 4)

(3) Open science, quality & accountability

APH strives to perform high-quality and robust scientific research and therefore works with a quality system that supports researchers in achieving the highest possible quality according to the usual criteria. The starting point of this system is a learning community in which researchers learn (from each other) through manuals, tools, peer reviews and internal audits. The principles of Open Science are closely aligned with elements of the mission and vision of APH, whereby APH embraces Open Science as an opportunity to refresh our previous efforts and to foster a culture that promotes research quality. In contrast to other institutes, a relatively large amount of non-WMO research takes place within APH that falls outside the scope of existing reviewing and monitoring facilities (METc and CRB) within Amsterdam UMC.

- Project Open Science - For APH, the emergence of Open Science is a new incentive for our research culture. In the project a quality officer will structure and roll-out activities towards an Open Science quality culture, based on a roadmap. This roadmap includes open peer review, whether or not in combination with pre-registration, and the incorporation of Open Science practices in the quality handbook for researchers.

- Project Midterm evaluation 2020 (addressing the years 2017-2019) and full term in 2023 (addressing the years 2017-2022) - The quality of scientific research within APH will be externally evaluated in 2023 according to the Standard Evaluation Protocol (SEP). To prepare for this, an internal mid-term evaluation will take place in 2020. The project-based quality officer supervises the evaluation and ensures that all relevant instruments are updated (including quality manual, audit forms).
- Scientific integrity, academic culture

(4) Talent development

To stimulate talented researchers and to support them in developing both their academic competencies and more generic professional (transferable) competencies, APH has allocated budget to the following matters.

- Research School CaRe - First, all APH PhD students take part of the nationwide graduate school CaRe (www.researchschoolcare.nl) accredited by the Royal Dutch Academy of Arts and Sciences as a valid training program for PhDs in the areas of public health and primary care research. CaRe is a network organization of four major research institutes NIVEL, CAPHRI, RIHS and APH. CaRe institutes are a source of useful PhD courses and also organizes specific PhD events during its annual meeting.
- Fellowships Academic Collaborative Centers (3 postdoc fellowships of 2 years between 2020 and 2023, 3 x 2x 40 k€ per postdoc per year, 50/50 funded by an Academic Collaborative Center or research department). An Academic Collaborative Center is defined as a collaboration based on a formal agreement with a non-academic partner that is concerned with care provision or policy making or governance of Public Health care. To stimulate collaboration with both academic and societal partners, APH will offer fellowships around Academic Collaborative Centers to its midcareer researchers. By means of close collaboration, APH researchers will improve their evidence-based working and will boost the societal impact of their research.
- Travel grants (4 * €1.250 per research program per year) - APH offers resources to the eight research programs to stimulate talent by initiating grant rounds to perform multidisciplinary research within consortia and by offering travel grants for PhD candidates. The travel grants give young researchers the opportunity to strengthen existing, or to set up new collaborations with international institutes and to spend part of their PhD trajectory abroad.
- Stimulate the development and growth of talented (multidisciplinary) teams to undertake research through financial support of Grant Writing (see Innovation Research Program section).
- Epidemiological and methodological education for PhD students - APH has a long standing expertise in epidemiology, of which the EpidM master program, accredited by the Accreditation Organization of the Netherlands and Flanders (NVAO) is a prime example (www.epidm.nl). Apart from the standard arsenal of epidemiological techniques, APH researchers are made well versed in multilevel analysis, meta-analysis, genetic association analysis and mixed methods techniques. The latter are needed when addressing research questions that require a mix of quantitative and qualitative methods. For instance, quantitative methods can give insight in the frequency of a phenomenon, while qualitative methods can shed light on the way this phenomenon is experienced and impacts the life of people who encounter this phenomenon. Annual payments from the APH budget allow PhD students within the institute to receive a substantial reduction on the costs of EpidM courses.
- Support PhD guidance and supervision - All PhD trajectories within APH have to conform with the doctorate regulations as set by the overarching universities (UvA or VU). As part of the merger of AMC and VUmc, the development of one Amsterdam UMC Doctorate School is

ongoing. In the meantime, matters concerning education, supervision and assessment of AMC PhD candidates are regulated in a central Graduate School, whereas these matters for VUmc candidates are regulated decentral at the different research institutes. APH has installed a PhD Education Committee APH-VU/VUmc, which is responsible for reviewing the Training Plan of PhD candidates according to the VU/VUmc-specific and the APH-specific requirements. The committee writes and updates the 'PhD manuals' with details about the various general and research institute-specific steps PhD candidates need to be concerned with in the various phases of their trajectory. Moreover, the committee coordinates the intervision meetings for young researchers, and may offer assistance when PhD students find themselves in a dispute with their supervisors.

(5) Innovation research programs

Innovation funds are reserved each year to increase the scientific and societal impact of the research institute. Goals are to generate highly cited papers and to increase translation and successful implementation of scientific findings in healthcare. Innovation funds are used to (1) increase the success rate of collaborative program grants at ZonMw (TOP) and the EU (Horizon 2020) by freeing up senior staff (assisted by an up-and-coming) for grant writing; (2) execute high risk first proof-of-concept studies; (3) facilitate 'out-of-the-box' ideas that do not conform to current themes but could grow into future themes, (4) stimulate the development of talented (multidisciplinary) teams to develop and perform joint research; and (5) strengthen the relationship with our scientific and societal partners. All program leaders are supported by a program secretary (0.2 FTE)

(6) Internal & external communication

- Communications & design officer (1 * 0.66 FTE).
- External communication aimed at specific target groups using appropriate means (e.g. Hacking Health Amsterdam, WeMakeTheCity/Pakhuis De Zwijger).
- Exhibiting scientific expertise and social impact via research community.
- Running costs (annual meeting and research program meetings, website design and maintenance, annual report costs, advisory board & standing committee meetings, general office expenses, traveling costs directors, sponsoring).

(7) Management

- APH Board (1 * director 0.5 FTE; 2 * vice directors of 0.1 and 0.2 FTE).
- Management and research policy (1 * manager 1 FTE; 1 * policy officer 1 FTE).
- Secretary (1 * 0.91 FTE)

11. Deliverables

Activities - Talent Development (chapter 4)					
Ambitions	Activities	Year			
		2020	2021	2022	2023
Offer peer support to PhD candidates and junior researchers and to increase the chance of successfully completing PhD trajectories	Providing intervision meetings for PhD candidates of both Amsterdam UMC locations and VU faculties				
	Exploration, and depending on the results, the implementation of peer support to midcareer (postdocs) and senior researchers in the form of a mentorship program or by expanding intervision meetings				
Systematically and easily identify talented researchers within the research institute, in order nominate them for internal and external prizes	Developing a talent monitoring system to identify research talents that excel in science innovation or valorization				
Increase support on funding possibilities and encourage participation in independent acquisition courses for midcareer researchers	Facilitate information about Public Health funding/grant support				
	Stimulate participation in courses aimed at increasing researchers' abilities for independent acquisition				
	Offer Career Grants to postdocs researchers for individual grant writing for a specific time period				
Stimulate collaboration with academic and societal partners	Implementation of 1-2 part time fellowships (e.g. around Academic Collaborative Centers, Implementation Research)				
	Encourage participation of midcareer and senior researchers in local initiatives (Hacking Health Amsterdam, We Make The City festival etc.)				
Emphasize the relevance to acquire more generic professional competencies	Contribute to the development of a Public Health Leadership program for midcareer researchers (together with CaRe)				

for academics, in addition to academic competencies					
Lower the perceived pressures created by the highly competitive environment and adopting a caring organizational attitude	Collaborate with the Graduate School in order to enhance supervision skills of midcareer and senior researchers within the research institute				
	Create a supportive environment (increase vitality and well-being) of researchers by offering/bring under the attention targeted courses				
Provide possibilities for junior researchers to improve their visibility in the scientific field, to advance communication and dissemination skills, and to strengthen or set up new collaborations with international institutes	Travel awards for junior researchers from each research program				
	Award competitions for junior researchers at plenary sessions of APH events				
	An annual event for the PhD students in the research institute (CaRe days)				
Stimulate academic careers of researchers within the research institute	Provide recommendations to the Amsterdam UMC Research Board (ARB) and deans about promotions of midcareer and senior researchers and on attracting external talents (e.g. for Amsterdam UMC fellowship)				

Activities - Open Science, Research Quality & External Accountability (chapter 5)					
Ambitions	Activities	Year			
		2020	2021	2022	2023
Infrastructural supports in research quality and transparency need to be developed or made accessible to APH researchers	Researchers will have user accounts for Open Science Framework (OSF), preferably through their institution				
	APH will have a project submission site for peer review and embedding, based on the Open Journal Systems Editorial Manager				
	Scientific Quality Committee (SQC) with clear mandate and all vacancies filled				
Create easy to use, acceptable and preferably well-integrated tools within researchers' already existing workflows	Update the Quality Handbook, including open science practices (OA, data-sharing, open notebooks, transparency in research evaluation, ensuring the reproducibility of research (where possible), transparency in research methods, open source code, software and infrastructure, citizen science) and responsible data management (including DMPs)				

	Inventory of research quality procedures and practices at departments and research groups				
	Monitor of research quality procedures at departments and research groups				
	Awareness of the Quality Handbook among APH researchers at 90%				
	A set of workflows is available for researchers and research groups/departments seeking peer review for: a) registration or pre-registration of hypotheses and research protocols; b) ethics and responsible practice of non-WMO and WMO research; and c) other				
	To administer APH embedded projects through existing administrative databases				
	A portfolio of several audit types is available (peer-, theme-, compliance audit)				
Develop an action plan to define and communicate norms on the issue of good scientific practice	Registrations/pre-registrations are peer-reviewed; non-WMO and WMO studies are peer reviewed				
	5 pilot audits to develop an audit protocol				
	Based on pilot audits are scaled up: 1) to assess compliance with research protocols and DMPs; 2) to share best practices; and 3) to support learning new ways of improving quality of research				
Provide incentives for research practices, behaviors, and products in order to stimulate a culture change	Criteria being used for the evaluation of research and for hiring and promotion of personnel are based on established and shared values and principles of Open Science and Research Quality; criteria are recognized in the research community, acted upon by researchers, and furthermore utilized by the management				
	Selection and/or development of Research Quality and Open Science track record metrics				
	Routine collection of Research Quality and Open Science metrics data				
Develop policy to force achievement of good and open scientific practice	Inclusion of Research Quality and Open Science track record and metrics in hiring and promotion criteria				
External accountability of the research institute	Periodic assessment of the research conducted within APH according to the national Standard Evaluation Protocol (SEP). This includes a midterm (2020) and a full term (2023) self-assessment that will be evaluated internally and				

	externally, respectively. As part of this accountability cycle, APH will publish annual reports every year.				
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Activities - Internal & External Communication (chapter 6)					
Ambitions	Activities	Year			
		2020	2021	2022	2023
Plan for both internal and external communication tailored to specific stakeholders and to communicate our strategy	Integrate existing communication strategies with an overall Communication Plan (yearly updated) with specific attention for targeted messaging and use of social media (including a press plan and website strategy)				
Improve the visibility of APH resources and support to the researchers	Departmental conversation rounds with researchers				
	Welcome leaflet for APH new employees and integrating in existing structures (AMC, VUmc, VU centrally; via departments)				
	Internal video pitch on APH resources and support				
To increase the awareness of the tremendous assets and potential of the APH network to both researchers and external stakeholders	Design a digital landscape embedded in the new research website in order to display ongoing projects, researchers, research programs and scientific findings, and to guide new APH researchers				
	Storytelling in lay language on research findings on website (content news)				
	External APH video pitch				
	APH Flyer for external stakeholders				
	Public media attention for researchers by passing relevant news on to the Amsterdam UMC and VU Communication offices, and potential other suitable media				

	Develop and communicate list of APH research(ers) possibly interesting for the media to the Amsterdam UMC and VU Communication offices and stimulate participation in media training				
	Regularly publish APH E-newsletters and research program-specific E-newsletters				
	Junior Councils will be appointed as ambassadors for each research program to create more involvement with the group of young researchers				
	Set up list of Alumni at external stakeholders to actively collaborate with them (e.g. organize career events for APH researchers)				
Stimulate branding of the research institute	Raise awareness of existing templates branding APH (PhD theses; scientific articles; posters; presentations; E-mail signatures) via Newsletter, information package and by performing random application checks				
	EU grant proposal description of APH				
Invest in getting to know Amsterdam better and vice versa, and improving the embedding of APH opinion leaders in Amsterdam networks	Stimulate APH opinion leaders' participation in local and national public debates and initiatives (e.g., Hacking Health Amsterdam, We Make The City festival)				
Cohesion/internal networking within the research institute	Organize APH Annual Meetings				
	Organize APH Spring Meetings				
	Organize research program-specific events (e.g., masterclasses, tutorials)				
	Build online communities as a functionality of the new website/intranet				
Activate heads of departments to inform their research groups about the advantages of joining the APH network	Consultation round for relation building with (selected) heads of departments				

Activities - Cohorts & Research Infrastructure (chapter 7)					
Ambitions	Activities	Year			
		2020	2021	2022	2023
To strengthen and sustain APH cohorts	Enumeration and calculation of scientific and societal value of our cohorts				
	Presentation of scientific and societal value of our cohorts to major actors (i.e. university boards; funding bodies) responsible for or contributing to research infrastructure				
	Stimulate innovation on cohort research methodology to make them more sustainable				
	Linking healthcare data and population information to our cohort data				
Responsible data sharing	Each cohort has access to data stewardship capacity				
	Fairness of APH cohort data is known				
	Fairness of APH cohort data has improved				
	Portal for access to running APH cohorts				
	Each cohort has access to data management capacity for handling data requests of running APH cohorts				

Activities - Valorization & Implementation (chapter 9)					
Ambitions	Activities	Year			
		2020	2021	2022	2023
Improving the match between APH resources/expertise and what researchers need to effectively bring knowledge into practice	Report a market exploration on valorization with a focus on implementation, to identify ways in which APH can facilitate researchers in bringing knowledge and products to practice				
	Organizing workshops for researchers that provide them with entrepreneurial skills and create awareness for the valorization of public health research				
Creating more awareness among researchers when it comes to implementation	Workgroup on implementation research				
	Visiting professor with expertise in the field of implementation				
	Implementation fellowships (0.2-0.4 FTE), e.g. linked to the Academic Collaborative Centers or cohorts				

Promoting structural collaboration with universities of applied sciences (InHolland, HvA)	Exploration along which lines universities of applied sciences in the Amsterdam metropolitan area operate, what they have to offer in the field of implementation, where they can be of added value for us, and where are the gaps that can be filled				
	Identify APH researchers with a double appointment at HvA and InHolland (e.g. lecturers, endowed professorships). Organize a structural consultation between these linking pins and the APH board				
Stimulating collaborations with implementing organizations	Relationship management in order to keep in touch and monitor opportunities. APH board actively maintains relationships with these organizations, for example AIGHD, GGD, PharmAccess, AHTI, KIT Health				
Promoting external financing for regional cooperation	Evaluation, and depending on the results, the implementation of the embedded PhD program of the EMGO+ Institute (2015-2018), partly funded by social partners/business				
	Bucket list of our assets and resources with regard to cohorts, networks, Academic Collaborative Centers				
Strengthening partnerships (existing and new)	Establishing an annual program on the theme of urban health, in collaboration with Pakhuis De Zwijger (e.g. events Hacking Health Amsterdam, We Make The City festival)				
	Inviting the Municipality of Amsterdam, GGD, SIGRA, AEB, Sarphati and other important stakeholders for public APH events				
	APH board actively maintains relationships with stakeholder organizations to monitor and anticipate their priorities				
	Strengthen relationships with UvA FMG in order to stimulate collaboration in a more coordinated and aligned way, for example with regards to the urban Mental Health program				
Strengthening and boosting the Academic Collaborative Centers	Set up a task force to identify the needs of the Academic Collaborative Centers active within APH, translate the results into an action plan and implement this within APH				
	Facilitating organizational advice (in the context of social impact and strategic partners)				
	Fellowships (research or coordination)				

	Promoting structural financing of Academic Collaborative Centers, by pointing out opportunities and providing governance support				
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Activities - Resilience, & Sustainability & Digitalization (chapter 1.3)					
Ambitions	Activities	Year			
		2020	2021	2022	2023
Stimulate research on resilience in times of health crisis	APH Strategic Research call 2021 focused on resilience				
Stimulate research on sustainable health and care	Perform an inventory of expertise and interest in sharing research on sustainable health and care				
	Broaden APH's (active) membership to Groene Zorg Community				
	APH Strategic Research call 2021 focused on sustainability				
	Submit an interfaculty proposal to UVA Call for Seed Grants				
	Organize with/for researchers and support staff regular workshops on sustainable health and care				
Stimulate research on digitalization in public health	Develop a new research program on Digital Health				
	Visiting professor 2022-23				
	APH Strategic Research call 2021 focused on digitalization				

Appendix A - External Advisory Board

Name	Affiliation and function
Drs. H.J. (Bert) van der Hoek	Chair of the Board of Trimbos Institute
Prof. R.C.M.E. (Rutger) Engels	Rector Magnificus at Erasmus University; member in a personal capacity
Prof. L.J. (Louise) Gunning-Schepers	Chair of the Dutch National Science Agenda (NWA); member in a personal capacity
Prof. J.A. (André) Knottnerus	Former chair of the Scientific Council for Government Policy (WRR); Professor of General Practice at Maastricht University; member in a personal capacity
Dr. H. (Herman) Kroneman	Medical Advisor at Employee Insurance Agency (UWV)
Dr. H. (Henriette) Treurniet	Director of the Netherlands School of Public and Occupational Health (NSPOH)
Drs. D.A. (Dianda) Veldman	Director of Netherlands Patients Federation
Drs. P. (Paul) van der Velpen (chair)	Advisor Bureau Public Health; Former Director of the Public Health Service of Amsterdam (GGD Amsterdam); member in a personal capacity
Drs. M. (Marith) Volp	Director Public Health and Health Services at the National Institute for Public Health

Appendix B - Participating departments and PI's

All eight research programs combine expertise from a broad range of disciplines spanning from basic sciences to community research in keeping with the life course perspective inherent in Public Health and the twofold translational nature of our research, from bench to bedside and from in-hospital to extramural setting. The table below illustrates the multidisciplinary nature of the research institute by listing the participating departments of the universities and both medical centers of the Amsterdam UMC (27 in the AMC, 23 in the VUmc, 1 in the UvA and 8 in the VU). The table also specifies the total number of 1.616 researchers including the principal investigators (PI) who participate in the Amsterdam Public Health research institute.

Table 1. Participating departments in the Amsterdam Public Health research institute.

Departments AMC	Head of department	PI's	no of researchers
Anesthesiology	Prof. W.S. (Wolfgang) Schlack	2	4
Cardiology	Prof. A.A.M. (Arthur) Wilde	0	10
Center for Experimental and Molecular Medicine	Prof. J.P. (Jan Paul) Medema	0	2
Clinical Epidemiology, Biostatistics & Bioinformatics	Prof. A.H. (Koos) Zwinderman	10	54
Coronel Institute of Occupational Health	Prof. C.T.J. (Carel) Hulshof	7	42
Public Health	Prof. A.E. (Anton) Kunst	9	71
Dermatology	Prof. M.A. (Menno) de Rie	2	12
Ear, Nose and Throat	Prof. F.G. (Freek) Dikkers	1	4
Experimental Immunology	Prof. T.B.H. (Theo) Geijtenbeek	2	8
Gastroenterology and Hepatology	Prof. P. (Paul) Fockens	0	2
General Practice	Prof. H.C.P.M. (Henk) van Weert	5	53
Geriatrics	Dr. H.C. (Hanna) Willems	1	27
Global Health	Prof. F.G.J. (Frank) Cobelens	3	27
Gynaecology	Prof. J.A.M. (Joris) van der Post	4	37
Internal Medicine	Prof. J.M. (Jan) Prins	9	61
Medical Informatics	Prof. N. (Nicolette) de Kezier	3	32
Medical Psychology	Prof. F.J. (Frank) Snoek	4	33
Neurology	Prof. Y.B.W.E.M. (Yvo) Roos	0	3
Pathology	Prof. M.J. (Marc) van de Vijver	1	4

Paediatrics	Prof. J.B. (Hans) van Goudoever	3	42
Psychiatry	Prof. D.A.J.P. (Damiaan) Denys	4	50
Pulmonology	Prof. A. (Anton) Vonk Noordegraaf	1	8
Radiology	Prof. J. (Jaap) Stoker	1	9
Rehabilitation	Prof. F. (Frans) Nollet	0	1
Surgery	Prof. D.A. Legemate	2	12
Urology	Prof. H.P. (Harrie) Beerlage	1	23
Subtotal AMC		75	631

Departments VUmc	Head of department	PI's	no of researchers
Anesthesiology	Prof. S.A. (Stephan) Loer	0	1
Cardiology	Prof. A.C. (Bert) van Rossum	0	1
Clinical Genetics (including Community Genetics)	Prof. J.J. (Hans) Meij	2	11
Clinical Pharmacology & Pharmacy	Prof. E.L. (Noortje) Swart	1	8
Epidemiology & Biostatistics	Prof. J. (Hans) Berkhof	11	83
General Practice & Elderly Care Medicine	Dr. J.C. (Hans) van der Wouden	9	73
Internal Medicine (including Endocrinology; Nutrition & Dietetics)	Prof. M. (Martin) den Heijer	3	29
Medical Humanities	Prof. G.A.M. (Guy) Widdershoven	6	45
Medical Psychology	Prof. F.J. (Frank) Snoek	4	7
Midwifery Science	Dr. J. (Ank) de Jonge	2	21
Nephrology	Prof. F.J. van Ittersum	0	1
Neurology	Prof. B.M.J. (Bernard) Uitdehaag	0	1
Obstetrics & Gynaecology	Prof. C.J.M. (Christianne) de Groot	0	3
Ophthalmology	Prof. H. (Stevie) Tan	2	14
Otolaryngology, Head & Neck Surgery	Prof. C.R. (René) Leemans	3	27
Pediatrics (including Child & Adolescent Psychiatry)	Prof. J.B. (Hans) van Goudoever	2	34
Plastic, Reconstructive and Hand Surgery	Prof. M.J.P.F. (Marco) Ritt	1	15
Psychiatry - GGZ InGeest	Prof. A.T.H. (Aartjan) Beekman	15	167
Public and Occupational Health	Prof. A.J. (Allard) van der Beek	19	109

Pulmonary Medicine	Prof. A. (Anton) Vonk Noordegraaf	0	2
Rehabilitation Medicine	Prof. V. (Vincent) de Groot	4	17
Surgery	Prof. H.J. (Jaap) Bonjer	0	6
Urology	Prof. R.J.A. (Jeroen) van Moorselaar	0	1
Subtotal VUmc		84	676

Departments VU	Head of department	PI's	no of researchers
Health Sciences	Prof. I.A. (Ingeborg) Brouwer	8	91
Athena Institute	Prof. J.E.W. (Jacqueline) Broerse	7	36
Biological Psychology	Prof. J.C.N. (Eco) de Geus	5	42
Clinical, Neuro- & Developmental Psychology	Prof. W.J.M.J. (Pim) Cuijpers	10	74
Clinical Child and Family studies	Prof. C. (Carlo) Schuengel	5	34
Human Movement Sciences	Prof. J.H. (Jaap) van Dieën	0	6
Sociology	Prof. M.I. (Marjolein) Broese van Groenou	0	5
Complex Trait Genetics	Prof. D. (Danielle) Posthuma	0	2
Subtotal VU		35	290

Departments UvA	Head of department	PI's	no of researchers
Communication Sciences	Prof. M. (Martine) van Selm	0	19
Subtotal UvA		0	19

In keeping with the pan Amsterdam and multidisciplinary character of the research, the research institute cuts across universities, medical center divisions and several departments. A part of the departments that participate in APH will also have researchers that participate in other research institutes of the Amsterdam UMC and some researchers will have a dual membership. This reflects the fading boundaries between intra- and extramural care and the importance of patient research that connects prevention, cure, and care.

Appendix C - APH Board and Program Leaders

APH Board of Directors	Name	Email
Director	Martine de Bruijne	mc.debruyne@amsterdamumc.nl
Vice-Director	Dionne Kringos - Pereira Martins	d.s.kringos@amsterdamumc.nl
Vice-Director	Frank van Leth	f.m.c.vanleth@vu.nl

Research programs	Program Leaders	Email
Health Behaviors & Chronic Diseases	Marcel Adriaanse	marcel.adriaanse@vu.nl
	Hidde van der Ploeg	hp.vanderploeg@amsterdamumc.nl
Mental Health	Femke Lamers	f.lamers@amsterdamumc.nl
	Arne Popma	a.popma@amsterdamumc.nl
Societal Participation & Health	Angela de Boer	a.g.deboer@amsterdamumc.nl
	Cécile Boot	crl.boot@amsterdamumc.nl
Global Health	Frank Cobelens	f.cobelens@aighd.org
	Marianne van Elteren	m.vanelteren@amsterdamumc.nl
Aging & Later Life	Martijn Huisman	ma.huisman@amsterdamumc.nl
	Janet MacNeil-Vroomen	j.l.macneil-vroomen@amsterdamumc.nl
Quality of Care	Ellen Smets	e.m.smets@amsterdamumc.nl
	Ruth van Nispen	r.vannispen@amsterdamumc.nl
Personalized Medicine	Kristel van Asselt	k.m.vanasselt@amsterdamumc.nl
	Tessel Rigter	t.rigter@amsterdamumc.nl
Methodology	Judith Bosmans	j.e.bosmans@vu.nl
	Miranda Langendam	m.w.langendam@amsterdamumc.nl