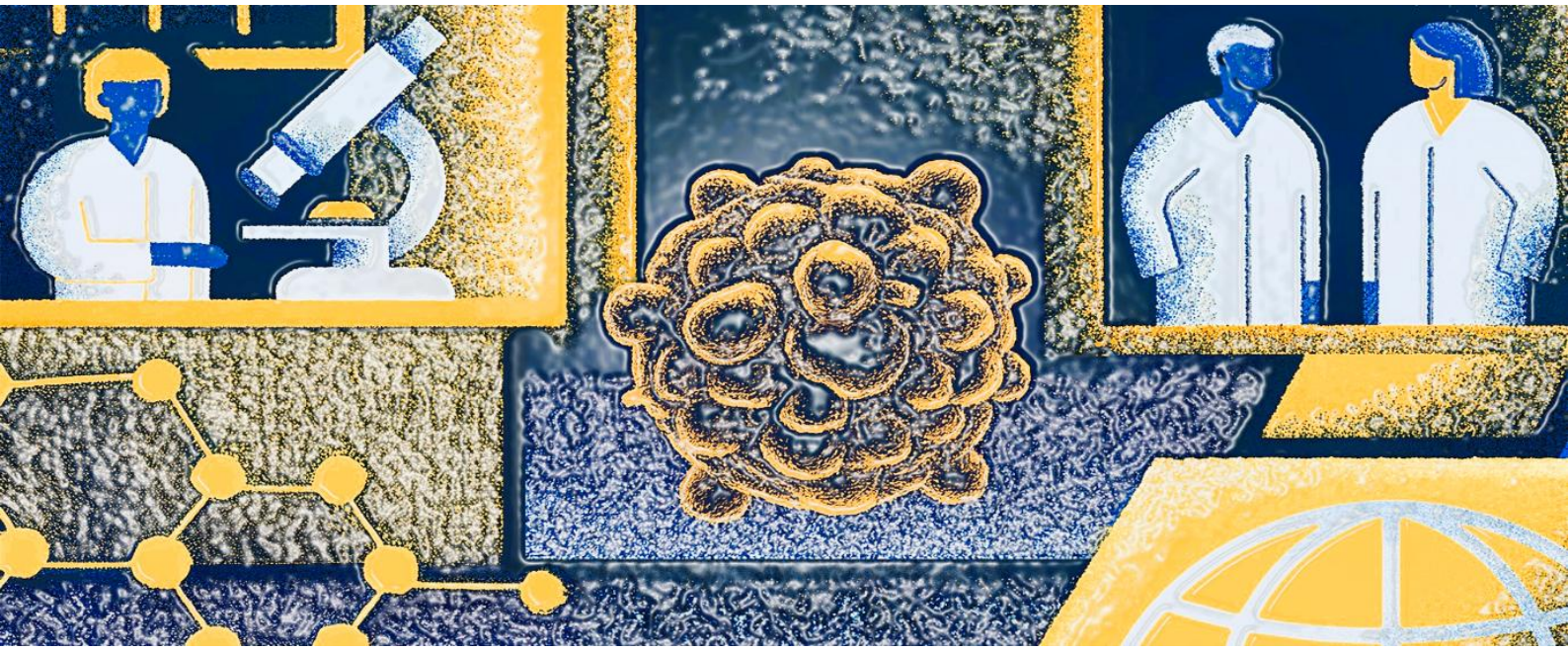
WORKSHOP ON

Cancer Research, Healthcare and Prevention: Structuring translational research to increase innovation and reduce inequalities



22-23 MAY 2025

Casina Pio IV, Vatican City

Leo P.P. XIV

Sensing myself called to continue in this same path, I chose to take the name Leo XIV. There are different reasons for this, but mainly because Pope Leo XIII in his historic Encyclical Rerum Novarum addressed the social question in the context of the first great industrial revolution. In our own day, the Church offers to everyone the treasury of her social teaching in response to another industrial revolution and to developments in the field of artificial intelligence that pose new challenges for the defence of human dignity, justice and labour.

ADDRESS OF HIS HOLINESS POPE LEO XIV
TO THE COLLEGE OF CARDINALS

Saturday, 10 May 2025

BACKGROUND AND CONCEPT OF THE CONFERENCE

Cancer is a mounting human and economic issue globally, and the structuring of translational cancer research has the potential to alter this trajectory. The closer integration of cancer research and healthcare will promote innovation, reduce disparities in access to therapeutics/care, and bolster prevention. The increasing knowledge of cancer biology in the latter part of the 20th century has set the stage for translational research, covering all therapeutics/care and prevention strategies. The increasing complexity of basic/preclinical research also necessitates more advanced infrastructures for clinical research, and the concept of a Comprehensive Cancer Center (CCC) is pivotal in this regard. CCCs play a crucial role in integrating healthcare activities with research and education, thereby advancing cancer research and treatment. We also acknowledge the support to the conference from the Danish Cancer Society, the Embassy of Sweden to the Holy See, and "la Caixa" Foundation.

The Pontifical Academy of Sciences (PAS) and the European Academy of Cancer Sciences (EACS) prioritize addressing critical global issues. Their policy work in cancer research is of significant global relevance, with the potential to bring about positive change and impact lives worldwide. This conference aims to further analyse and discuss how to structure translational cancer research in order to reach all patients in diverse geographic areas, mitigate inequalities, and increase access to the critical mass of patients and the biological information required for translational cancer research. The previous Vatican Conference discussed the need to improve the integration of basic/preclinical and clinical researchers. The ultimate goal is the development of evidence-based and cost-effective prevention and therapeutics/care, offering hope for a better quality of life perspective for cancer patients.

Conference overview

Keynote lecture: Putting Cancer Care, Prevention, and Research on the Global Health Agenda.

Harold Eliot Varmus, Lewis Thomas University Professor of Medicine at Weill Cornell Medicine and a senior associate at the New York Genome Center, USA

Session 1: The increasing cancer problem: initiatives in world regions

The increasing cancer problem, with annually around 20 million new cases and almost 10 million deaths due to cancer globally, is followed by trend analyses, demographics, differences between countries and continents, ethnicity, disparities, and social factors. The increasing incidence and prevalence of patients with chronic cancer diseases and/or side effects of treatment is an additional problem. An important factor behind inequalities is the economic standing of a country. However, rich countries may suffer from disparities within the country due to social inequalities, healthcare structure and the way research is organised. The number of patients with new or progressing cancer is increasing, and with it the demand for diagnostic and treatment methodologies, concomitant with rising costs for cancer therapeutics/care, a problem also rich countries struggle with. In this regard, disseminated disease is the most challenging. This underscores the crucial role of prevention and early detection in combating the global cancer problem. A diverse range of initiatives have been implemented worldwide. These include the US National Cancer Plan with the Cancer Moonshot, the European Research

Council, Europe´s Beating Cancer Plan (EBCP) and the Mission on Cancer (MoC), India's Tertiary Care Cancer Centers (TCCCs) Scheme, China's Healthy China Action–Implementation Plan for Cancer Prevention and Control (2023-2030), the Asia-Pacific Region program for malignant diseases caused by bacteria and viruses and the Cancer Association of South Africa (CANSA).

Questions for the discussion. The increasing cancer problem is an international issue. How should priorities be selected to meet this increasing challenge? What are the roles of prevention, therapeutics, and support of health-related quality of life (HRQoL) in different parts of the world? What is the role of research in innovating prevention and therapeutics/care?

Keynote lecture: The Synergy of Data-Driven Health and Data-Driven Informational Peptide Drug Discovery in Dealing with Data-Driven Health and a Universal N=1 Healthcare: Leroy Hood, Phenome Health and the Institute of Systems Biology, Seattle, USA and Buck Institute for Research on Aging, Novato, Ca., USA.

Turning to sessions dealing with the development of translational cancer research, the P4 Medicine strategy, proposed by Leroy Hood more than 15 years ago, is highly relevant for cancer medicine, which should be Predictive, Preventive, Personalized and Participatory. The P4 Medicine strategy was discussed for diseases overall in a previous conference arranged by the PAS (https://www.pas.va/en/events/2019/medicine.html). While Precision Cancer Medicine has gained traction with its focus on targeted therapy, the broader scope of the P4 Cancer Medicine (P4CM) concept aligns more closely with the ambitious goals of our current conference. The increasing knowledge of cancer biology, new technologies and progress in data science (AI) open new possibilities for diagnostic methods, treatment, and prevention. In addition to transdisciplinary expertise, it requires advanced infrastructure support with access to biological materials and a critical mass of patients. This can be best realised by CCCs that integrate basic/preclinical cancer research with clinical cancer research and cancer care.

Session 2: The Comprehensive Cancer Centre (CCC) for innovative, high-quality multidisciplinary cancer therapeutics/healthcare and healthcare-dependent prevention, the fundamental infrastructure for translational cancer research

The EU has launched projects to quality assure and increase the number of CCCs from 50 to around 100 in the EU, i.e., one CCC per 4,4 million inhabitants. A CCC integrates multidisciplinary cancer therapeutics/care and healthcare-dependent prevention with research and education to enable continuous innovation of high-quality healthcare and decrease inequalities. The clinical part of a CCC should be seen as an infrastructure for translational cancer research that encompasses: a) diagnostics such as molecular pathology, multi-omics, and imaging; (b) treatment modalities based on surgery, radiation therapy, systemic treatment by anticancer agents and immunotherapy; and (c) HRQoL services (supportive care, managing of pain, psycho-oncology, rehabilitation, palliative oncology). For prevention, infrastructures for identification of high-risk individuals, diagnostic technologies for screening programmes and support for vaccination programmes are needed.

The Vatican Conference 2023 initiated discussions on the risks of additional inequalities within and between countries due to the expanding need for sophisticated

infrastructure support, which can only be established in advanced CCCs, while most patients live outside the centres' catchment area. A purpose of this conference is to analyse further and discuss how to structure translational cancer research to reach all patients in defined geographic areas to decrease inequalities while increasing the critical mass of patients and biological information needed for the development of P4CM. An option to address this: each CCC should have the responsibility for a defined geographic outreach area, effectuated through close collaboration with community hospitals and specialised clinics in order to offer all patients and individuals at risk high-quality health care/prevention and participation in clinical/prevention research. This will also facilitate outcomes research on population-based patient cohorts.

The increasing complexity of translational cancer research demands CCCs of Excellence with specific infrastructures and experience in early translational research, clinical trials, and outcomes research, including implementation research of innovations and health economics.

Questions for the discussion. The National Cancer Institute in the USA has been the leader in establishing quality-assured CCCs. How is the situation in other parts of the world? The CCC as the main infrastructure for translational cancer research will be discussed. How to quality ensure multidisciplinary cancer therapeutics/care for patients outside a CCC? How do we responsibly share advanced infrastructures and patient data? What is the role of CCCs of Excellence in fostering innovative translational research? How does education play a crucial role in this process?

Session 3: Translational cancer research, a coherent research continuum, is needed to innovate all clinical and prevention modalities and to achieve cost-effectiveness

Translational cancer research is a coherent research continuum from basic/preclinical to clinical/prevention research, implementation of prevention or health care programmes, and evaluation by outcomes and health economics research. Innovations from basic biological and technological research fuel the translational research continuum, underlining the importance of promoting this field.

Some examples with potential clinical impact: What are the perspectives on the molecular classification of tumours related to biological characteristics? How do we diagnose early primary tumours with metastatic potential and precursor lesions with a high probability of acquiring invasive behaviour? What is the need for the development of molecular pathology and stratification technologies beyond mutational analyses? What are the perspectives for new targets for systemic treatment to deal with the genomic instability of difficult-to-treat tumours? What is the future development of immuno-oncology? What are future aspects of advanced local therapies, individualized surgery and radiation therapy? What is the place for theragnostic? Technologies to predict side-effects of treatments? Technologies for biological analyses of fine needle tumour aspirates and liquid biopsies, will enhance reverse translational research and affect the way clinical trials are conducted. Also, for prevention, preclinical research plays an increasing role. The implementation of data science is another expanding research area.

Moving towards P4CM structuring of clinical trials is necessary. Early clinical trials require

specific infrastructures and competencies. Next-generation clinical trials are based on the stratification of patients, today mainly by genomic technologies and imaging, but in the future also with proteomics and additional technologies. In parallel with the increasing numbers of new anticancer agents, next-generation clinical trials need to expand. Most clinical trials investigate single-drug effects on patients with disseminated cancer. More trials should analyse combinations of targeted drugs and treatment at an earlier stage of disseminated disease. Also, local treatments need to be assessed on clinical trials, within the context of systemic therapies. With the possibilities to follow biological effects of treatment by fine-needle aspiration and liquid biopsies the concept of adaptive treatments should be explored. The need for robust criteria for clinical efficacy data based on multimodal treatment is urgent and crucial to promote potential practice-changing trials.

With the rapid approval of many new targeted anticancer agents and treatments based on immuno-oncology by the FDA and EMA, academic research is tasked with identifying agents of significant potential value. This includes arranging for implementation research to assess the outcomes of specific innovations. However, a crucial missing element is the collection of real-world treatment data from large number of unselected patients. This data is vital in determining the clinical effectiveness of these new treatments. Suboptimal implementation research also hampers potentially promising interventions in prevention programs.

With an increased focus on patients' HRQoL, research on supportive care, including pain management, rehabilitation, psycho-oncology, physiotherapy, palliative oncology, and survivorship, is an urgent translational research item. This requires immediate action and increased research funding. Methods to predict side-effects of anticancer treatments and outcomes research for unique innovations for cancer therapeutics/care and prevention need strong support. With clinical effectiveness and negative treatment effects as primary attention points, cost-effectiveness can be assessed. Health economics research is a missing element, which is strange in view of the notion that the increasing costs for cancer therapeutics/care are considered a main problem worldwide.

Questions for discussion. Translational research is a prerequisite for mitigating the cancer problem, increasing the effectiveness of interventions and developing cost-effective therapeutics/care. European analyses have revealed important gaps in implementing innovations and assessing clinical effectiveness as a basis for health economics analyses. What are the main gaps in the translational research continuum in other continents? It is time to broaden our horizons and take a global perspective in our cancer research?

Session 4: International collaboration, science progress and critical mass problem related to the development of P4 Cancer Medicine research.

P4 Cancer Medicine, a concept that integrates Predictive, Preventive, Personalized, and Participatory aspects, is at the forefront of cancer research and treatment and the consequences of the many subgroups of different histogenetic tumour diagnoses, subgroups with specific biological characteristics that predict prognosis, therapeutics/care, and prevention. The latter requires complex and expensive diagnostic infrastructures. In addition, the critical mass of patients and biological materials is crucial for the research. The previous Vatican Conference presented ways to share advanced infrastructures and patient

information. Quality assurance of cancer therapeutics/care in outreach areas of CCCs will increase innovation and, at the same time, involve more patients in clinical research.

Structuring international translational cancer research must start at the national level. A follow-up of already established international consortia like Cancer Core Europe, a network for next-generation clinical trials, and Cancer Prevention Europe has to be urgently expanded with a discussion on additionally needed research geometries at the EU-level: examples are paediatric and geriatric oncology, surgery, radiation therapy, immuno-oncology, outcomes research, health economics, and data sciences. Digitalisation technologies are also required for infrastructure support at long distances; examples are molecular tumour boards, analyses of innovative imaging, dose planning for radiation therapy or robotic surgery.

A prerequisite for a well-functioning EU platform for cancer research is the governance of CCCs and consortia of CCCs. For sustainability a form of governance at the EU level is needed. Already in 2005-2007, when the EU project EUROCAN+Plus analysed European cancer research and suggested a platform of CCCs and basic/preclinical cancer research centres for translational cancer research, a model like the National Cancer Institute in USA was suggested, a European Cancer Initiative/Institute. This may be discussed again since present funding mechanisms are unsuitable to achieve the expected goals of the EU initiatives.

Questions for the discussion. A reasonable critical mass is necessary for development of P4CM, no single CCC has sufficient critical mass and this is the case also for countries or geographic regions with a limited population. If we want consortia of CCCs we should discuss prioritised research areas and possibilities to develop international collaborations. How to achieve funding mechanisms to establish consortia but also guarantee sustainability.

Session 5: Development of international cancer research and comparative assessments – viewpoints on initiatives from different countries and regions

In the previous Vatican Conferences, representatives from different continents presented their strategies for developing cancer therapeutics/care, prevention and research. With the ongoing implementation of the EU initiatives, it is crucial to understand the outcomes and potential values for cancer activities outside the EU.

Our main aim is to mitigate the increasing cancer problem. We can make a significant impact by decreasing incidence, increasing cure rates, improving survival and HRQoL, and enhancing survivorship of the increasingly prevalent cancer population. This is why priority questions have to be considered.

How can we handle the increasing economic burden due to cancer therapeutics/care? Suppose an important factor behind the rising costs is the new systemic treatment of patients with disseminated disease. How can we best use our resources? Put more emphasis on prevention and early detection at the expense of developing treatments of disseminated disease?

Is there a shared view that CCCs are the most suitable entities to be made responsible for ensuring quality cancer health care in a defined outreach area, including more patients in research and innovation?

How to support collaboration between CCCs, and other cancer research institutions and hospitals, establish educational programmes and adapt funding mechanisms for increased innovation and sustainability?

DAY 1 | Thursday 22 May 2025

09.00-09.15	**Welcome and Introduction to the topic** *Co-Chairs:* ***Joachim von Braun**, President of PAS,* ***Peter Turkson,** Chancellor of PAS, and* ***Michael Baumann**, President of EACS*
09.15-09.45	**Keynote lecture** *Putting Cancer Care, Prevention, and Research on the Global Health Agenda* **Harold Eliot Varmus,** Lewis Thomas University Professor of Medicine at Weill Cornell Medicine and a senior associate at the New York Genome Center, USA
	Session 1: The increasing cancer problem: initiatives in world regions **Co-Chairs:** **Maria Leptin**, President of European Research Council, Brussels, Belgium, and **Edith Heard**, PAS, Director General of EMBL European Molecular Biology Laboratory Professor at Collège de France, Paris
09.45-10.00	*Development of evidence-based and cost-effective P4 Cancer Medicine for innovation of prevention and therapeutics/care and reduction of inequalities* **Ulrik Ringborg**, EACS, Cancer Center Karolinska, Stockholm, Sweden
10.00-10.15	*The overview of the increasing worldwide cancer problem and inequalities in prevention and care* **Elisabete Weiderpass**, EACS, International Agency for Research on Cancer, Lyon, France
10.15-10.30	*Overcoming Cancer Disparities in the USA and Globally* **Douglas R. Lowy, M.D.**, NCI Principal Deputy Director, Laboratory Chief, National Cancer Institute. USA
10.30-10.45	*European Research Council (ERC)* **Maria Leptin**, President of ERC, Brussels, Belgium
10.45-11.00	*Update of the EU initiative Mission on Cancer* **Joanna Drake**, Deputy Director-General of the European Commission's Directorate-General (DG) for Research and Innovation, Brussels, Belgium (**By ZOOM**)
11.00-11.30	**Coffee break**
11.30-11.45	*Cancer Research, Healthcare and Prevention – Update of the EU initiative Europe´s Beating Cancer Plan* **Olivér Várhelyi**, EU Commissioner for Health and Animal Welfare, Brussels, Belgium **(video message)**

11.45-12.00	*China policies for Cancer Research, Healthcare and Prevention: Structuring translational research to increase innovation and reduce inequalities* **Ma Jun** SunYatSen Cancer Center Guangzhou, China (**BY ZOOM)**
12.00-12.15	*Elimination of cancers caused by bacteria and viruses in the Asia-Pacific Region* **Chien-Jen Chen**, PAS, Academia Sinica, Taipei, Taiwan
12.15-12.30	*Private versus public programmes for cancer research, prevention and patient support in South Africa* **M. Iqbal Parker**, University of Cape Town, South Africa
12.30-12.45	*Presentation of the Tertiary Care Cancer Centers (TCCCs) Scheme in India* **Ravi Kannan,** Cachar Cancer Hospital and Research Centre (CCHRC), India
12.45-13.00	**Discussion**
13.00-14.00	**Lunch**
14.00-14.30	**Keynote lecture**: ***The Synergy of Data-Driven Health and Data-Driven Informational Peptide Drug Discovery in Dealing with Data-Driven Health and a Universal N=1 Healthcare*** **Leroy Hood**, Phenome Health and the Institute of Systems Biology, Seattle, USA and Buck Institute for Research on Aging, Novato, CA, USA
14.30-16.00	**Session 2: The Comprehensive Cancer Center (CCC). A fundamental infrastructure for innovative, high-quality, multidisciplinary cancer therapeutics/healthcare, healthcare-dependent prevention and translational cancer research** **Chair**: **Alex Markham**, EACS, University of Leeds, Leeds, United Kingdom
14.30-14.45	*CraNE and EUNetCCC* **Tit Albreht**, National Institute of Public Health of Slovenia, Ljubljana, Slovenia, and **Thomas Dubois**, National Cancer Institute, INCa, Paris, France
14.45-15.00	*How to quality assure multidisciplinary healthcare in a defined geographic area around a CCC (outreach area) and involve patients in clinical and prevention research* **Simon Oberst**, Organisation of European Cancer Institutes, OECI, Brussels, Belgium, and **Christian Brandts**, University Cancer Center, Frankfurt, Germany
15.00-15.15	*Needs, criteria and quality assurance of CCCs of Excellence* **Anton Berns**, EACS, Netherlands Cancer Institute, Amsterdam, Holland
15.15-15.30	*Opinions by a cancer patient advocacy representative* **Johannes Förner**, President of EACS -Spokesperson of the German NCT Patient Research Council and DKFZ Patient Advisory Board, Heidelberg, Germany
15.30-16.00	**Discussion**
16.00-16.30	**Coffee Break**

16.30-18.45	**Session 3**: Translational cancer research, a coherent research continuum, is needed to innovate all clinical and prevention modalities and to achieve cost-effectiveness **Chair**: **Alexander Eggermont**, EACS, Princess Máxima Centrum voor Kinderoncologie, Utrecht, Netherlands
16.30-16.45	*Development of concept-changing clinical trials to improve cancer care* **Stefan Fröhling**, German Cancer Research Center, Heidelberg, Germany
16.45-17.00	*Early detection – the potential roles for prevention and early treatment* **Massimiliano di Pietro**, Early Cancer Institute, University of Cambridge, UK
17.00-17.15	*Skin and cervical cancer treatment in Brazil using photodynamic treatment: an approach within economic reality* **Vanderlei S. Bagnato**, PAS, Professor, Biomedical Engineering Texas A&M, USA and professor of Physics at USP-IFSC; Brazil
17.15-17.30	*Treatment outcomes of the many new anticancer agents accepted by FDA and EMA during the last 25 years* **Richard Sullivan**, EACS, King's College, London, UK
17.30-17.45	*Real-world data is required for implementation and research of clinical effectiveness and innovation of cancer therapeutics/care* **Nils Wilking**, Karolinska Institutet, Stockholm, Sweden
17.45-18.00	*Health-related quality of life research* **Sara Faithfull,** EACS, Trinity College, Dublin, Ireland
18.00-18.15	*Increasing costs for cancer healthcare – growing demands for outcomes and health economics research* **Peter Lindgren**, Institute of Health Economics, Sweden
18.15-19.00	**Discussion**
19:30 21.00	**Dinner at Casina Pio IV**

DAY 2 | Friday 23 May 2025

09.00-12.15	**Session 4:** *International collaboration, science progress and critical mass problem related to the development of P4 Cancer Medicine research* **Co-Chairs:** **Anton Berns,** EACS, Netherlands Cancer Institute, Amsterdam, Holland, and **Elaine Fuchs,** PAS, Howard Hughes Medical Institute and Rebecca C. Lancefield, Rockefeller University, USA
09.00-09.15	*International collaboration between Comprehensive Cancer Centers – Cancer Core Europe for clinical research* **Joseph Tabernero**, EACS, Vall d'Hebron Institute of Oncology, Barcelona, Spain
09.15.09.30	*International collaborations aiming at cancer prevention – Cancer Prevention Europe* **Joachim Schüz**, EACS, International Agency for Research on Cancer, Lyon, France
09.30-09.45	Paediatric oncology **Angelika Eggert**, EACS, Charité Comprehensive Cancer Center, Berlin, Germany
09.45-10.00	Advancing Cancer Research through International Collaboration – The Princess Margaret Global Cancer Program **Danielle Rodin**, Princess Margaret Cancer Center, Toronto, Canada
10.00-10.15	*An initiative to overcome global inequalities in access to curative radiotherapy* **Manjit Dosanjh**, Oxford University, United Kingdom
10.15-10.30	*Innovation in Central-Eastern Europe: The main gap in Pan-European cancer research inequalities* **Péter Nagy**, National Institute of Oncology, Budapest, Hungary
10.30-11.00	**Coffee Break**
11.00-11.15	*Critical and positive considerations on the mission-oriented cancer research perspective* **Manuel Heitor**, EACS, Instituto Superior Técnico, Lisbon
11.15-11.30	*How can cancer research funding be adapted to the goals of translational research in order to pair evidence-based medicine with cost-effectiveness?* **Bengt Jönsson,** EACS, Stockhholm School of Economics, Stockholm, Sweden
11.30-11.45	*The FORCE project – a unique initiative by Charities to foster pragmatic clinical research in oncology in Europe* **Nancy Abou-Zeid**, Fondation ARC, Paris, France
11.45-12.15	**Discussion**
12.15-14.00	**Lunch**

	Session 5: *Development of international cancer research and comparative assessments – viewpoints on initiatives from different countries and regions* **Co-chairs:** **Manuel Heitor,** EACS, Instituto Superior Técnico, Lisbon, Portugal, and **Chien-Jen Chen,** PAS, Distinguished Professor, Academia Sinica, Taipei, Taiwan
14.00-15.30	**A panel discussion (with opening statements of 10 min. each)** **Agenda:** *What are our next steps in the development of translational cancer research aiming at evidence based and cost effective P4CM? Which strategies should we prioritise? What are the opportunities to expand international research collaboration?* • **Edith Heard, Europe** • **Douglas R. Lowy, USA** • **Huanming Yang, China** • **Ravi Kannan, India** • **Iqbal Parker, South Africa**
	Session 6: Overall discussion and conclusions for a conference statement **Co-Chairs: Joachim von Braun, PAS, and Michael Baumann, EACS**
15.30-16.00	**All participants**
16.00	**End of conference**

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General information

Dress code is business attire.

Accompanying persons are invited to the entire event, including meals.

Please remember to bring a valid ID.

Please refer to www.pas.va for further information on the Academy, the Academicians, and current and past events.

Access instructions to the Vatican and the Casina Pio IV

Your name has already been communicated to the Vatican Security, who will check your identity and let you in. If you are bringing a guest, kindly let us know, and we shall add their name to the list.

The easiest way to enter the Vatican is through the Perugino Gate, located at via della Stazione Vaticana, no number.

Instructions to reach the Casina Pio IV, headquarters of the Pontifical Academy of Sciences, can be found in the following link:
http://www.casinapioiv.va/content/accademia/en/about/contacts.html

For all eventualities you can call the Academy on +39 06 69883195 or +39 06 69883451.
A mobile number is also available on travel days: +39 3420026216.

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