



Topic: PHC-11-2015:

Development of new diagnostic tools and technologies: in vivo medical imaging technologies

## HYPMED

### Digital Hybrid Breast PET/MRI for Enhanced Diagnosis of Breast Cancer

**Grant Agreement Number: 667211**

### D5.3: End User Workshop

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<b>Work Package No:</b>	5		
<b>Estimated delivery date:</b>	M75 (31 March 2022)	<b>Actual delivery date:</b>	M76 (1 April 2022)
<b>Nature:</b>	Other		
<b>Dissemination level:</b>	Public		



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## 1. Introduction

The HYPMED project aims to develop a novel positron emission tomography–radio frequency (PET–RF) insert integrating an innovative, fully digital magnetic resonance imaging (MRI)-transparent PET detector directly into a novel, fully PET-transparent breast MRI surface coil. With the resulting PET–RF insert, for the first time precision imaging of breast cancer will be combined with unprecedented high-resolution and ultra-low-dose-dedicated breast PET with highest level structural and multi-parametric functional MR imaging.

Resultingly, the HYPMED project and device will lead to improvements in the following aspects of cancer detection and diagnosis.

- Early diagnosis of biologically relevant breast cancer
- Non-invasive distinction of breast cancers from benign changes to reduce the need for invasive diagnostic biopsies
- Delineation of the local extent of breast cancer to improve local treatment planning in surgery, radiotherapy and future minimally invasive treatment approaches
- Systemic treatment planning by improved non-invasive prediction as well as monitoring of response of breast cancers to neoadjuvant treatment
- Identification of novel imaging-derived biomarkers that will help improve treatment stratification of women with known breast cancer by improved non-invasive biological classification and prognostication of breast cancers, their immediate precursors (DCIS), and so-called borderline breast lesions, as an amendment to established and novel histologic, immunohistochemical and genomic/proteomic assessment

These achievements, an introduction to the HYPMED device, and how the consortium plans to transfer its results to the clinic to the benefit of Europe’s patient were the main objectives of a proposed end-user workshop. Due to delays in project progress from the COVID-19 pandemic and prolonged device finalisation, the consortium determined to hold instead an open-access session during the online portion of the 2022 European Congress on Radiology (ECR), known as the ECR 2022 Overture. The dates of this event, 2–6 March 2022, featured access to a broad audience within the medical and scientific communities and also allowed completion of this deliverable before the end of the project.

A programme was developed, representing volunteer speakers and important topics, and submitted to the European Society of Radiology (ESR), the organisers of the ECR. The session was selected for presentation as a free event, i.e., not requiring conference registration or payment of the registration fee, in a hybrid format on 3 March, 16–17:00 in order to maximise the audience.

## 2. Target Group and Dissemination

To gather interest and encourage participation, a multi-pronged campaign was organised, incorporating email, web and social media outreach. An email describing the project background, ECR 2022 Overture, session programme, and how to create an ESR Connect login to access the free session was drafted. Invitations were sent via ESR, who provided from their contact database a mailing list of more than 30,000 entries with an interest in breast imaging or screening who also gave their consent to receive mailings. In addition, the European Society of Breast Imaging (EUSOBI) promoted the session via its newsletter and Twitter and Facebook accounts. Similar invitations were issued to the ESR Patient Advisory Group and HaDEA project officer. A targeted invitation was distributed to these contacts, which gathered significant response in the week before the session.

The HYPMED website ([link](#)) was updated with a news item describing the session. A screenshot is included below.



Having finalised a PET-RF insert for precision imaging of breast cancer, the achievements of the HYPMED project will be presented in an online session "Digital Hybrid Breast PET/MRI for Enhanced Diagnosis of Breast Cancer" at the 2022 European Congress of Radiology Overture on 3 March from 16:00-17:00 CET. The session is open access upon creation of a free ECR account. Payment of the ECR registration fee is not required.

Participants will learn how the HYPMED PET-RF device improves breast cancer detection and treatment and how it will be evaluated for integration in clinical applications.

Follow the link below, log in and select the HYPMED session to tune in!

[Access the ECR 2022 March session](#)

### EIBIR Research Session: Digital Hybrid Breast PET/MRI for Enhanced Diagnosis of Breast Cancer

Thursday, March 3, 2022, 16:00-17:00 Streamed online via ESR Connect (1 CME credit)

[View session details on the ECR 2022 interactive programme planner](#)

Chairperson's introduction - *Christiane Kuhl, Aachen/DE*

Introduction of the HYPMED device: a dedicated ultra-low-dose, ultra-high-sensitivity, PET-RF insert for clinical 1.5T MRI with integrated vacuum biopsy capability - *Volkmar Schulz, Aachen/DE*

Comparative whole-body PET/MR data for future clinical comparison study - *Thomas H. Helbich, Vienna/AT*

How to get HYPMED's innovation into the clinic - *Christiane Kuhl, Aachen/DE*

Panel discussion

**Fig. 1: Screenshot of HYPMED website post**

Finally, the HYPMED Twitter handle (@hypmed\_eu) issued a series of tweets promoting the session during the two previous months. All tweets were shared and liked by various relevant societies and organisations. Some examples are depicted below.



**HYPMED Project @hypmed\_eu** · 17 Jan



We invite you all to the end-user workshop "Digital hybrid breast PET/MRI for enhanced diagnosis of breast cancer " to recount the achievements of the HYPMED project!

During ECR2022, Thursday, 3 March, 16:00-17:00 CET

Register 🙋

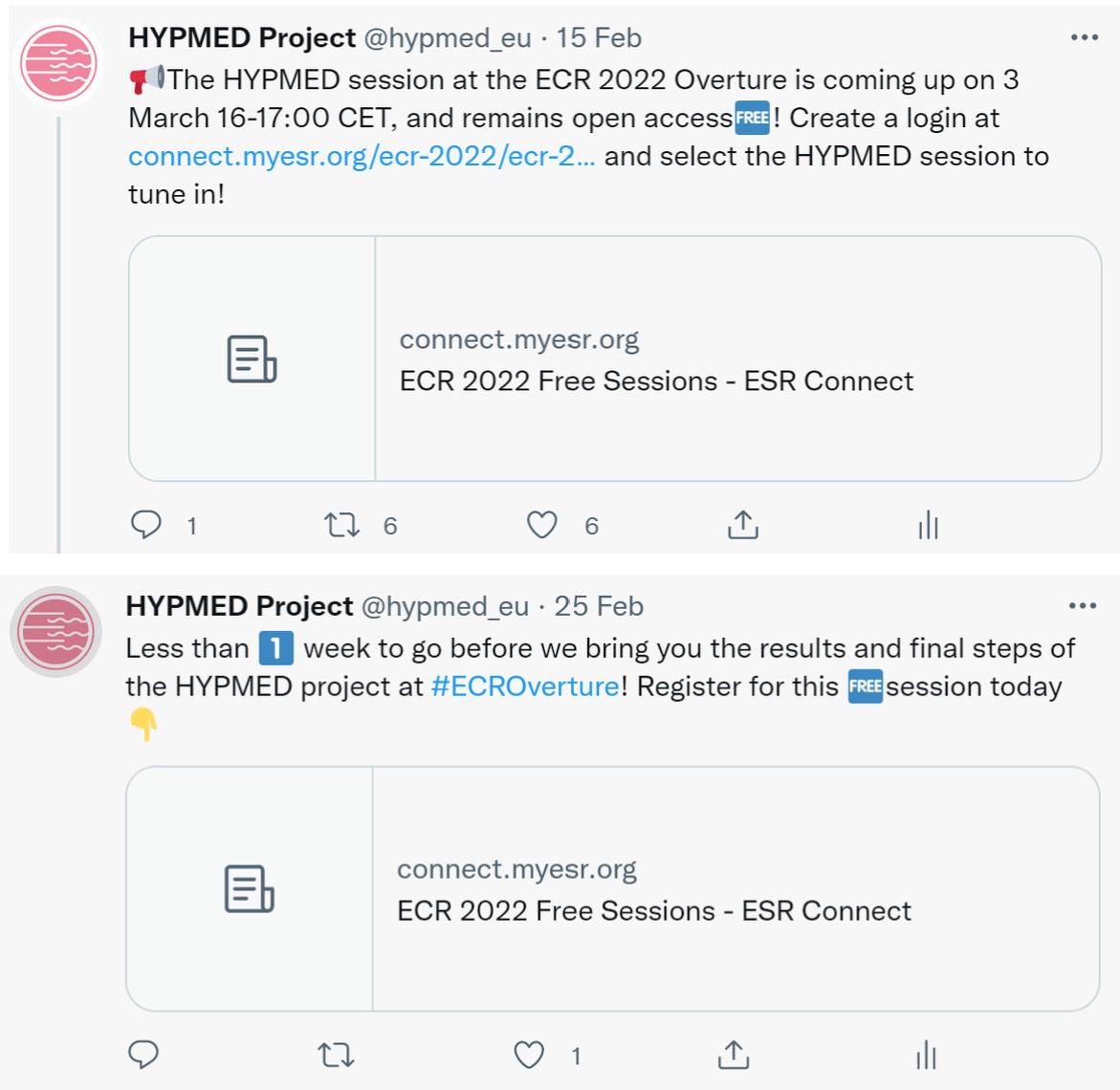


myesr.org

ECR 2022 Registration

The ESR has made the decision to organise the ECR on March 2-6 as an online-only event and to hold ...





**Fig. 2:** Tweets promoting the HYPMED session during the ECR 2022 Overture

EIBIR, as the project coordinator, also assisted in promoting the HYPMED session, as illustrated in the following figure.



*Fig. 3: EIBIR tweet for promotion of the HYPMED session*

### 3. Programme

The programme for the HYPMED session during the ECR 2022 Overture contained the following elements.

#### **Digital hybrid breast PET/MRI for enhanced diagnosis of breast cancer – achievements of the HYPMED Project**

Categories: Breast, Research / ETC Levels: II-III

Thursday, March 3, 2022 / 16:00–17:00

At the end of the session, participants will be able to:

1. Understand the ambition and structure of HYPMED, a Horizon 2020 European collaborative research and innovation project
2. Explain how the HYPMED PET-RF device improves breast cancer detection and treatment.
3. Describe how the HYPMED PET-RF device will be evaluated for integration in clinical applications.

**Chairperson's introduction: The HYPMED ambition (15 min)...**Christiane Kuhl, Aachen/DE

**Introduction of the HYPMED device: a dedicated ultra-low-dose, ultra-high-sensitivity, PET-RF insert for clinical 1.5T MRI with integrated vacuum biopsy capability (15 min)...**Volkmar Schulz, Aachen/DE

**Comparative whole-body PET/MR data for future clinical comparison study (10 min)...Thomas Helbich, Vienna/AT**

**How to get HYPMED's innovation into the clinic (10 min)...Christiane Kuhl, Aachen/DE**

**Panel discussion (10 min)**

The programme appeared on the ESR Connect website ([link](#)) as depicted in the following figure.

**HYPMED Session - Organised by the EIBIR**  
**HYPMED 11 - Digital hybrid breast PET/MRI for enhanced diagnosis of breast cancer: achievements of the HYPMED Project**  
 March 3, 16:00 - 17:00 CET

**HYPMED**  
 FINDING BREAST CANCER. SAVING LIVES.

**DESCRIPTION**

**HYPMED 11-1 Chairperson's introduction: The HYPMED ambition**  
 15 min Christiane K. Kuhl, Aachen / Germany

At the end of the session, participants will be able to:

1. Understand the ambition and structure of HYPMED, a Horizon 2020 European collaborative research and innovation project.
2. Explain how the HYPMED PET-RF device improves breast cancer detection and treatment.
3. Describe how the HYPMED PET-RF device will be evaluated for integration in clinical applications.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 667211.*

**HYPMED 11-2 Introduction of the HYPMED device: a dedicated ultra-low-dose, ultra-high-sensitivity, PET-RF insert for clinical 1.5T MRI with integrated vacuum biopsy capability**  
 15 min Volkmar Schulz, Aachen / Germany

**HYPMED 11-3 Comparative whole-body PET/MR data for future clinical comparison study**  
 10 min Thomas H. Helbich, Vienna / Austria

**HYPMED 11-4 How to get HYPMED's innovation into the clinic**  
 10 min Christiane K. Kuhl, Aachen / Germany

**HYPMED 11-5 Panel discussion**  
 10 min

**CME INFORMATION**  
 This session is accredited with 1 CME credit.

**CATEGORIES AND TAGS**  
 LEVEL: **Basic** CHANNEL: **1**  
 Breast Research

**MODERATORS**  
 Christiane K. Kuhl, Aachen / Germany [PROFILE](#)

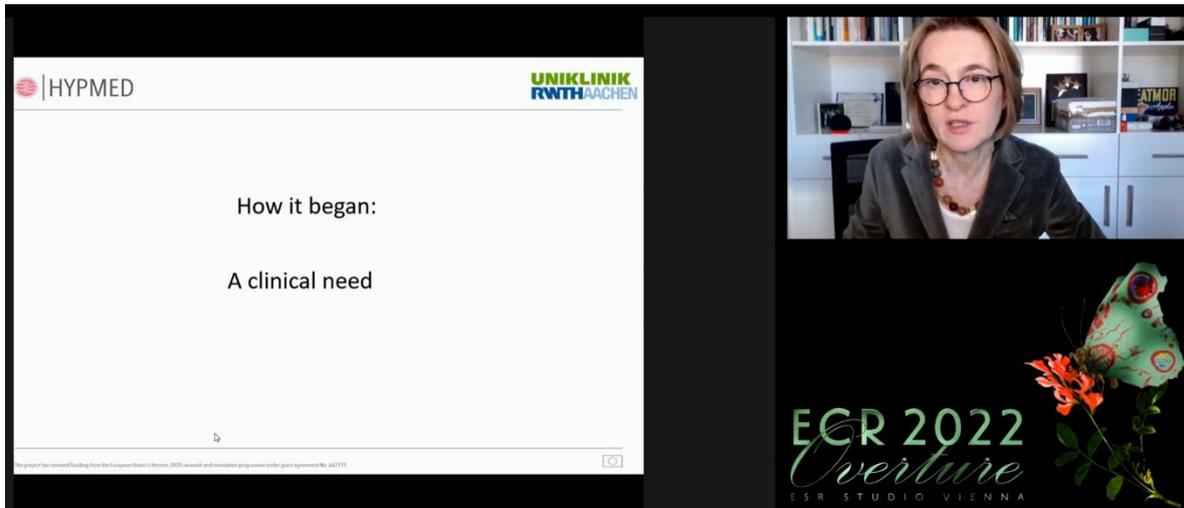
**SPEAKERS**  
 Christiane K. Kuhl, Aachen / Germany [PROFILE](#)  
 Volkmar Schulz, Aachen / Germany [PROFILE](#)  
 Thomas H. Helbich, Vienna / Austria [PROFILE](#)

**Fig. 4:** Screenshot of the HYPMED session programme

## 4. Session Report

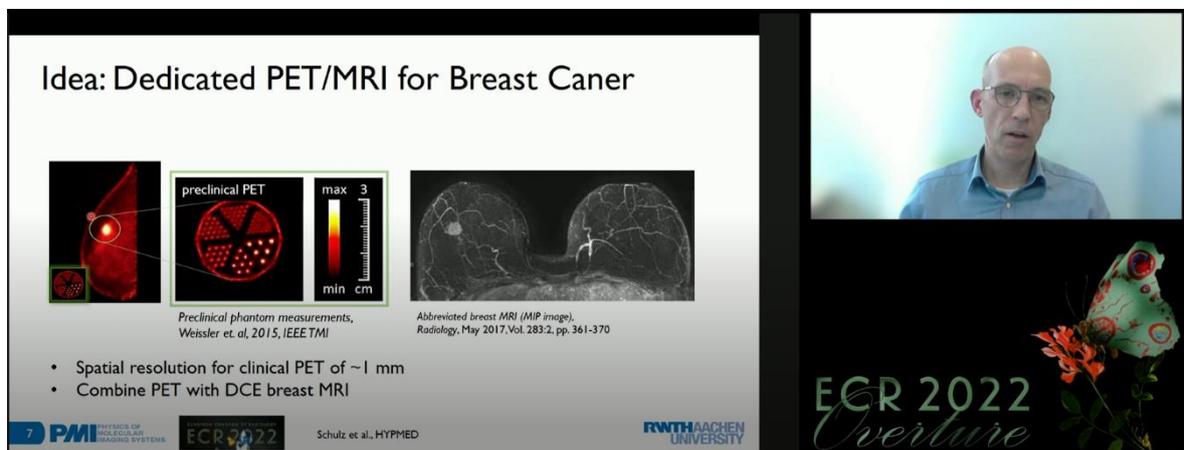
Hosted on ESR Connect, the session opened with an overview by the project's scientific coordinator, Dr. Christiane Kuhl (UKA), illustrating the current status and key facts of breast cancer detection and treatment before describing the contribution of HYPMED through combined PET and MR imaging with its PET–MRI RF insert device to improve early prediction and detection. It was stated this contribution addresses the clinical need for earlier detection, as this has been proven to correlate with improved survival rates, although breast cancer mortality rates have remained relatively unchanged over the last 30 years. Creating a dedicated PET–MRI device for breast screening offers an almost tenfold increase in sensitivity and resolution, adds a capability to perform PET- and MRI-guided biopsy, and brings the procedure in line with the targeted focus of the majority of

contemporary applications of precision imaging. The consortium partners and project objectives were also given.



**Fig. 5:** Screenshot of Dr. Kuhl presenting an overview of the project

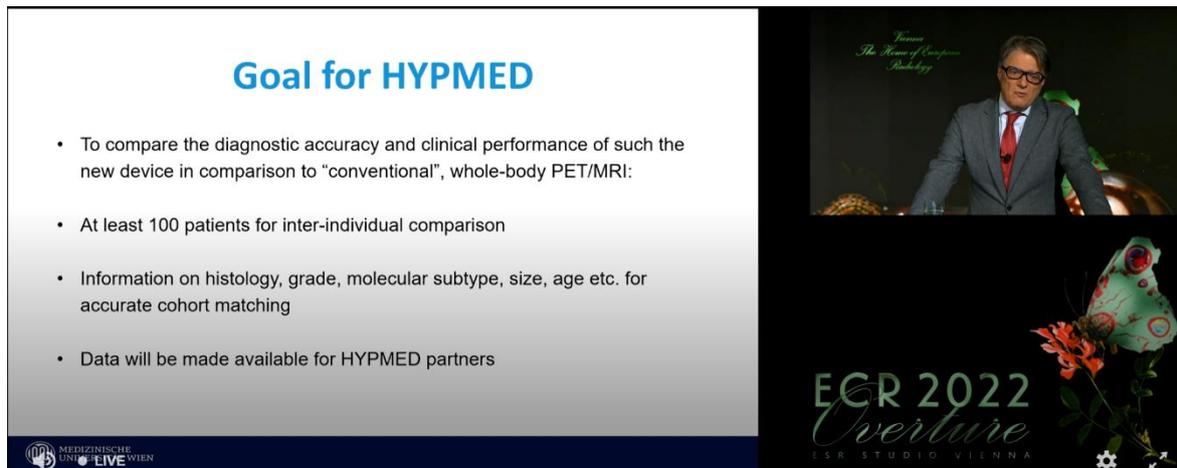
Dr. Volkmar Schulz (UKA) discussed the improvements of the HYPMED device to overcome the limitations of PET and MRI for breast cancer screening. Combining the efforts of five partners, the components, operation and performance of the device were also illustrated, particularly the spatial resolution of 1 mm for precision imaging of breasts. The operation of the two movable half-rings of the PET detector to accommodate the breasts and improvement in sensitivity versus whole-body PET were demonstrated. The first image with the PET detector gives the team confidence in the system's performance in a future clinical trial.



**Fig. 6:** Screenshot of Dr. Schulz presenting characteristics of HYPMED device operation

Dr. Thomas Helbich (MUW) followed with a description of the project's handling of whole-body PET-MRI data for clinical comparison to enable more accurate and non-invasive assessments of breast tumours. The efforts of HYPMED to derive prognostic indicators from tumours, find significant cancers, improve tumour characterisation and enable tailored treatment and improved response prediction were outlined. Breast cancer phenotypes, biomarkers and tracers were discussed. The protocol used at MUW and Vienna General Hospital and examples for multiparametric PET-MRI acquisition were given, noting that the combination of data collection from PET and MRI will allow for a cohort study to compare the HYPMED device with conventional whole-body PET-MRI. The contribution of artificial intelligence via modelling has proven successful to characterise breast

lesions with PET-MRI and its combination of perfusion, diffusion and metabolic parameters and radiomics features.



**Fig. 7:** Screenshot of Dr. Helbich presenting the project's goals in data collection and management

Finally, the three presenters were joined by ESR Chair Dr. Michael Fuchsjäger to elaborate on the project according to audience questions submitted online. Many participants complimented the potential advancement in breast cancer screening and inquired regarding the future use of the device.

Comments received on Slido during the session and discussed during the final question and answer portion are listed below.

- Sounds like a paradigm shift driving forward precision imaging
- Which city in France has Intrasense machine?
- Is the insert going to be vendor neutral?
- Examination time?
- Has it been clinically tested?
- Great work!
- Great talks! Dr. Kuhl: Do you intend to merge PET with abbreviated MRI?
- How about accessibility of this technology to BC patients once introduced into clinic. Can it be widely applied?
- Do you expect more artefacts? What about different size of the breast?
- Will the PET insert be able to image the axilla and/or chest wall?
- Congrats!
- You mentioned that hopefully, this new technology would improve early diagnosis of cancer but also that it would be used for women (who are) already cancer patients. Can you please expand this?
- I guess this technology would (be used) for presurgical staging, but do you usually use CT, etc., to stage patients with small luminal A cancers, for example? Or what type of cancer patients would be eligible for this PET/MRI?
- New MDR requirements slow down implementation of research results in clinic. The community should work together to raise these issues towards policymakers.
- Is there any chance in the future for the breast MRI to have a lower (cost)?
- Many thanks for the presentations: The project is fascinating. (Are) there any drawbacks except for cost?

The project also received notice on the radiology and medical imaging community website [Aunt Minnie](#), and the articles intended for American and European audiences were both promulgated on the HYPMED website and Twitter account. The International Society of Radiology also tweeted the Aunt Minnie article.



**Fig. 8:** Tweet from @ISR\_Radiology promoting the Aunt Minnie article on the HYPMED session

The HYPMED session drew 272 participants during the scheduled broadcast and remains publicly available on [ESR Connect](#) as a free course. Continued access was also promoted on the HYPMED website and multiple Twitter channels.