Dear Colleagues,

The Point of Care Ultrasonography—performed by the clinician at the site of patient care, both in the medical office or at home—is an important tool to guide the case management for the early diagnosis and increase diagnostic accuracy. It represents an extension and complement to the clinical examination of the physician, to achieve an accurate positive and differential diagnosis. POC-US is now an investigation in development, which can complement the physical examination of the family doctors and can guide the case management to the bedridden patients. We need training and quality standards, to ensure, that this will be done in a way with positive benefits for our patients, being useful, to the implementation of ultrasound standards and practice guidelines of the primary care level. It involves personal contact between doctor and patient at "bedside", it is a fast in real-time method, repetitive, cheap, and harmless but dependent on the experience and expertise of the examiner. A new opportunity for PoC-US represents the application in primary care of the medical projects related to „telemedicine“ connections among specialists and family doctors for enhanced patient management. The Educational Needs of GPs on the new methods and technologies are increasing, but the resources and infrastructure are limited now. It is thus necessary, the collaborate among the family physicians trainers, or academics, on the one hand, and the other, of the specialty physicians in the preparation and continuing medical education in family medicine. Early diagnosis can help to save many patients in primary care, based on notions of good clinical practice. Therefore, we will involve, to inform family physicians about the latest diagnostic and treatment protocols in clinical ultrasound.

The workshop will include an interactive presentation and practice examples with ultrasound movies, role plays and a short Hands-On Session, and we will debate lectures and practical demonstrations by the interpretation of various ultrasound images of some applications of the Point of Care Ultrasonography in Family Medicine. Participants will enter the ultrasound semiology data on various smart software, that we will present, as a tool of support for unqualified doctors in PoC-US. These Smart Ultrasound Software are designed by us in the form of a modern diagnostic algorithm and represent a premiere in the PoC-US field.

Participants will receive practical information and tips on new Point of Care Ultrasonography applications in family practice. The participants of this EUROSON POCUS SCHOOL will be educated according to the latest EFSUMB guidelines in the field of clinical ultrasonography. This instrument (through which the doctor can visualize most parenchymal organs, see the vascularization using the Doppler technique, or perform electronic palpation using the elastography technique) can be used in current medical practice to increase the accuracy of positive and differential diagnoses.

With best wishes,

Dr. Mihai Iacob, MD, Senior Medical Expert, EUVEKUS President
Universitätszahnklinik Wien

Sensengasse 2A, 1090 Vienna, Austria
EUVEKUS Organization

EUVEKUS - Europäische Vereinigung für die Entwicklung von Klinischen Ultraschalluntersuchungen im Ambulanten Gesundheitswesen

EADUS - European Association for the Development of Clinical Ultrasonography in Ambulatory Health Care (Outpatient Health Care)

The governing body of EUVEKUS is the Board of Directors made up of the following founding members:

I. President - Dr. Mihai IACOB
II. Vice-President – Elvis Georgio STOICA
III. Vice-President - Andrea Eugenia IACOB
IV. Secretary - Mariane STOICA

Honorary Members

HONORARY MEMBERS are the members who, through their personality, adhere to the association and morally and/or materially support the maintenance and development of, or bring, or are able to bring special services to its association and activity.

EUVEKUS has the following honorary members:

I. Dr. Ilse Hellemann: National representative to the council of the European Society of General Practice/Family Medicine, Wonca-Europe
II. Executive Member of the Wonca Working Party on Education, National representative to EURACT.
III. Prof. Dr. Alina Popescu - Presedintele SRUMB (Societatea Romana de Ultrasonografie).
IV. Prof. Dana Stoian, MD, PhD, Hab, CCD, FECSM, senior endocrine consultant, Department of Endocrinology, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania
## CONFERENCE AGENDA

### DAY 1 | Friday, September 11, 2021

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<td>08:15 - 08:30</td>
<td>Welcome speech, Dr. Mihai IACOB, Chairman, EUVEKUS President</td>
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<tr>
<td>08:30 - 09:00</td>
<td>The future of technology in primary healthcare - will ultrasound replace the physical examination?, Prof. Dr. SHLOMO VINKER, WONCA Europe President</td>
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<td>09:00 - 09:30</td>
<td>Uses of PoC-US in primary care. The Point of Care Ultrasonography applications in Family Medicine and standard US. sections and plans usable in primary care, Dr. Mihai IACOB</td>
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<td>09:30 - 10:00</td>
<td>POC-US - Technical Examination and Sonoanatomy. Practical aspects of sonography in family medicine, Dr. Peter Sigmund</td>
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<td>10:00 - 10:15</td>
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<td>10:15 - 10:45</td>
<td>The basic ultrasound diagnosis in abdominal pathology – an efficient diagnostic tool for the family physicians’ practice, Dr. Mateusz KosiaK</td>
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<td>10:45 - 11:15</td>
<td>Ultrasound imaging for the evaluation of non-alcoholic fatty liver disease (NAFLD), Dr. Adrian Saftoiu, MD, PhD, AGAF, FASGE, EFSUMB Past President</td>
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<td>11:15 - 11:45</td>
<td>The ultrasonography in the abdominal emergency, Prof. Dr. Ioan SpoRea, MD, PhD</td>
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<td>11:45 - 12:15</td>
<td>Ultrasonography of the urinary tract. The pelvic ultrasonography. Sections and standard plans for ultrasound examination of the male and women pelvis, Dr. Carla Serra</td>
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<td>12:15 - 12:30</td>
<td>Equipment on stage. Coffee break</td>
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<td>12:30 - 13:00</td>
<td>FOCUS (Focused Cardiac UltraSound) Basic Cardiac Ultrasound for non-cardiologists, Dr. Gergely Agoston, MD, Vice president of the Working Group of Hungarian Ass. of Cardiovascular Imaging</td>
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<td>13:00 - 13:30</td>
<td>The scientific summary of the day, Prof. Dr. Shlomo Vinker, WONCA Europe President</td>
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<td>13:30 - 14:00</td>
<td>Lunch break</td>
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### SEMINARRAUM B1 AND B2

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<td>14:00 - 14:30</td>
<td>Democratization of ultrasound by hand-held systems: opportunities and problems. Dr. Christian Jenssen, EFSUMB President</td>
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| 14:30 - 15:00 | Artificial Intelligence (AI) methodologies for focused cardiac ultrasound in the primary care. Democratization of ultrasound by hand-held systems: opportunities and problems. Zicherman Y., Binenbaum M., Evron I., Lyons M., Chadi B., Polliack G.  
**Speaker:** Yehuda Zicherman D.Sc., Product Marketing, TRISO Technologies Ltd. Bet-Shemesh, Israel |
CONFERENCE AGENDA

15:00 - 17:30  Workshop | Hands-on sessions
   Practical elements of POCUS applications of the abdominal, pelvis, chest, thyroid and heart conducted together with our experts. Live transmission of ultrasonographic examinations (Live streaming broadcast).

15:00 - 15:30  WS.1.1 | Abdominal clinical ultrasonography, Prof. Dr. Ioan SPOREA
15:30 - 16:00  WS.1.2 | Ultrasonography of the urinary tract. The pelvic ultrasonography, Dr. Carla SERRA
16:00 - 16:30  WS.1.3 | Practical aspects of clinical ultrasonography (abdominal/pelvis US), Dr. Peter SIGMUND
16:30 - 17:00  WS.1.4 | FOCUS Real-Time Demonstration, Dr. Mihai IACOB
17:00 - 17:30  WS.1.5 | Basic Cardiac Ultrasound for non-cardiologists, Dr. GERGELY Agoston

DAY 2 | Saturday, September 12, 2021

AMPHITHEATER HÖRSAAL

08:15 - 08:20  Briefing, Dr. Mihai IACOB, Chairman, EUVEKUS President
08:20 - 08:50  EFSUMB as a leading organization in the field of ultrasonography at the European level. The role of PoCUS and the potential contribution or benefits of its use in primary healthcare, Prof. Dr. Paul SITHU, EFSUMB Past President, International Keynote Speaker
08:50 - 09:20  Uses of PoC-US in primary care. The Point of Care Ultrasonography applications in Family Medicine and standard US. sections and plans usable in primary care, Dr. Mihai IACOB
09:20 - 09:50  POC-US - Technical Examination and Sonoanatomy. Practical aspects of sonography in family medicine, Dr. Peter SIGMUND
09:50 - 10:10  Equipment on stage. Coffee break
10:10 - 10:40  The basic ultrasound diagnosis in abdominal pathology – an efficient diagnostic tool for the family physicians’ practice, Dr. Mateusz KOSIAK
10:40 - 11:10  Ultrasound imaging for the evaluation of non-alcoholic fatty liver disease (NAFLD), Dr. Adrian SAFTOIU, MD, PhD, AGAF, FASGE, EFSUMB Past President
11:10 - 11:40  The ultrasonography in the abdominal emergency, Prof. Dr. Ioan SPOREA, MD, PhD
11:40 - 12:10  Ultrasonography of the urinary tract. The pelvic ultrasonography. Sections and standard plans for ultrasound examination of the male and women pelvis, Dr. Carla SERRA
12:10 - 12:30  Equipment on stage. Coffee break
12:30 - 13:30  FOCUS (Focused Cardiac Ultrasound) Basic Cardiac Ultrasound for non-cardiologists, Dr. GERGELY Agoston, MD, VP of the Working Group of Hungarian Ass. of Cardiovascular Imaging
CONFERENCE AGENDA

13:30 - 14:00  Lunch break

SEMINARRAUM B1 AND B2

14:00 - 15:00  ROUND TABLE: The future of using PoCUS in ambulatory healthcare. Myth or reality?
- Dr. SHLOMO VINKER, WONCA Europe Elected President
- Prof. Dr. Adrian SAFTOIU MD Ph.D. MSc AGAF FASGE, EFSUMB Past President
- Dr. Mihai IACOB, EUVEKUS President
- Prof. Dr. Ioan SPOREA, MD, PhD, AGAF, FASGE, EFSUMB Past President
- Dr. Peter SIGMUND
- Dr. Carla SERRA
- Dr. GERGELY Agoston, MD, Vice president of the Working Group of Hungarian Assisant of Cardiovascular Imaging

15:00 - 17:30  Workshop | Hands-on sessions
Practical elements of POCUS applications of the abdominal, pelvis, chest, thyroid and heart conducted together with our experts. Live transmission of ultrasonographic examinations (Live streaming broadcast).

15:00 - 15:30  WS.2.1 | The ultrasonography in the abdominal emergency, Dr. Ioan SPOREA
15:30 - 16:00  WS.2.2 | Practical aspects of clinical ultrasonography (abdominal/pelvis US) Dr. Peter SIGMUND
16:00 - 16:30  WS.2.3 | Strain Elastography as a useful tool in daily practice, Dr. Carla SERRA
16:30 - 17:00  WS.2.4 | Thyroid ultrasound screening- Real-Time Demonstration. The use of artificial intelligence in the thyroid ultrasound screening. Presentation of a computerized diagnostic algorithm, that stratifies the risk of thyroid malignancy. Dr. Mihai IACOB
17:00 - 17:30  WS.2.5 | FOCUS for non-cardiologists, Dr. GERGELY Agoston
17:30 - 18:00  WS.2.6 | Basic notions of breast ultrasound for doctors in the outpatient clinics, Prof. Dr. Dana STOIAN

18:00 - 18:15  The scientific summary of the day, Prof. Dr. Shlomo VINKER, WONCA Europe President
18:15 - 18:30  Final evaluations from the participants

AWARD Certifications of Participations with
15 CME Credits by EACCME
and
EFSUMB endorsement to all conference attendees

Euroson PoC-US School 2021
**Background:** This project was launched five years ago and has the three main stages. The first step was the development of a computerized diagnostic algorithm, titled "Smart Thyroid Ultrasound Software", used to stratify the risk in thyroid pathology, based on conventional ultrasound, Doppler, and Strain Elastography. It set the optimum time for thyroid puncture (FNAB) and cytological examination for early diagnosis of malignant lesions. We have used the latest international classifications, as well as a "scoring" made by us, correlated with the cytological or histopathological results obtained from patients operated as "Gold Standard". The second stage included a targeted thyroid screening at high-risk population, conducted in a single medical clinic in the western region of the country, statistically significant. The third stage we are launching is an Interdisciplinary Multicentric Screening titled “Thyroscreen”.

**Aim:** Our objective was early diagnosis and treatment of the diffuse and focal thyroid pathology by screening on the high-risk population.

Research question: How can improve early diagnosis and differentiation of the thyroid diseases in primary care?

**Method:** We report the final results of a thyroid ultrasound screening performed on 4386 apparently healthy adults with oncological risk factors+, aged over 20 years, followed for three years. We used the TIRADS classification by Russ and Strain Elastography with both the elastographic score by Rago and semiquantitative Strain Ratio (SR), for standardization and to show when fine-needle aspiration biopsy (FNAB) should be performed. We designed an Ultrasound Scoring System (USS) for predicting thyroid malignancy and a diagnostic algorithm software. All patients who entered these studies were stored and counted in our electronic database. Finally, we compared ultrasound scores designed by us, with the histological results. We will demonstrate the utility of this diagnostic computer algorithm to perform thyroid US.

**Results:** A total of 861 patients with thyroid diffuse disease and 696 with benign and malignant thyroid nodules were found. Prevalence of thyroid pathology was: 38.99%(95%CI: 37.54% to 40.45%) with screening sensitivity: 96.49% and specificity: 96.52 % and a high accuracy of 96.51% PPV: 94.66%, NPV: 97.73 %, statistically significant p<0,01. The ROC statistical analysis of our US methods confirmed a higher level of diagnostic accuracy of Strain Elastography, p<0.001, AUC=0.995, 95%CI:0.97to1. In the ANOVA analysis - the most significant statistical methods used was USS, p<0.001. Our cut-off value of SR was: 2.5

**Conclusions:** Performing Doppler US Screening together with Strain Elastography, had the best accuracy in analysis of the vascular network and absence of elasticity, for differentiating “benign versus malignant” of the thyroid tumors and for diagnosis of the diffuse thyroid diseases. The high prevalence of thyroid pathology in our country requires a serious assessment and an early diagnosis of malignant nodules in the primary health care.
Background:
FOCUS is a complement of the clinical exam, for the evaluation of the structural and functional abnormalities of the heart, to the hemodynamic critical patient. Just a few studies have assessed the value and accuracy of focused cardiac ultrasound (FOCUS) performed by family physicians. This study aimed to evaluate the diagnostic accuracy of FOCUS performed by family doctors compared to echocardiography performed by a cardiologist.

Method:
We made FOCUS on the patients which present after clinical-examination the suspicion of cardiac pathology (cardiomegaly, valvulopathy, pericarditis, endocarditis, congenital malformations, aneurysms, and arrhythmias) and used five standard cardiac scans: Subxiphoid view, Parasternal long/short axis, Apical four chamber view, and IVC assessment. We conducted a prospective observational cross-sectional study of 1780 patients with high cardiovascular risk. High risk patients identified on inclusion-criteria, were first examined by a family doctor with expertise, subsequently compared with ultrasound review by cardiologists, to determine the accuracy of this application. We have developed a Computerized Diagnostic Algorithm of the cardiac pathology detected by non-cardiologists. The agreement between family-physicians and cardiologists on each finding, was evaluated using Cohen’s kappa coefficient with 95%CI.

Results:
We identified 585 patients with cardiac pathology and subsequently confirmed by the cardiologist. We did the descriptive statistical analysis of the echocardiographic cases detected. The accuracy of FOCUS screening in primary care, was 96.07% with a sensitivity: 95.12% and specificity: 96.57%, p<0.001, for all 1780 emergency patients which were subsequently confirmed by the cardiologist as the "Gold Standard" method. The prevalence of cardiac-pathology was: 34.55% with 95%CI: 32.34% at 36.81%. Reports of the two-groups for identifying cardiac-pathology showed 95% agreement (k=0.88; 95%CI=0.81–0.95), standard error: 0.037.

Conclusions:
FOCUS performed by trained family physicians is comparable to echocardiography performed by cardiologists. It could be a reliable tool and screening-test for the initial diagnosis of patients suspected of cardiac-abnormalities and we propose as a complementary diagnostic tool followed by referral to the cardiologist.

Points for discussion:
How can we evaluate the structural, functional and hemodynamic abnormalities of the heart to the high-risk patients of cardiovascular diseases? Will it be possible soon, practice of the Cardiac Focused Ultrasound (FOCUS), by family doctors who were trained in specialized centers, for conducting Rapid Cardiac Assessment? Will it be possible to use echocardiography with the stethoscope in the evaluation of heart disease by future family physicians?
Background:
Diabetic Nephropathy (DN) is the leading cause of Chronic Kidney Disease (CKD) being characterized, initially by increases in kidney length and renal parenchyma thickness, followed in late stages, when the DN deteriorates clinically, by persistent or slightly decreases in kidney sizes, and thus there would be not a specific sign of DN.

Our aim was to analyze the correlations of both, renal tissue stiffness (Strain Elastography) and US morphometry, with clinical biochemical indicators in patients with DN.

Materials and Methods:
We did a Kidney Ultrasound Screening on 500 patients with diabetes type 1 and 2. Patients were followed up with ultrasonography screening performed and also laboratory assays twice a year. Renal cortical thickness, length (volume), stiffness and estimated glomerular filtration rate (eGFR) values, were analyzed using the Pearson correlation and ROC curve analysis to assess the kidney function.

Results:
Our US screening, with an accuracy of 88%, found renal elasticity (Strain Ratio SR) worsened progressively from CKD Stage 3 to 5 (p<0.001). The correlation, between elasticity and proteinuria, may be a possible association between kidney stiffness and early renal fibrosis. The presence of proteinuria is characterized with infiltration of inflammatory cells into the renal interstitium and replacement of the tubulointerstitium by fibrous scar. The renal stiffness, measured by strain elastography, with renal ultrasonography, correlates well with proteinuria and rapid renal deterioration in patients with CKD. A statistically significant positive correlation was found between eGFR and both: Strain Ratio (r=0.66, p<0.01) with cortical thickness (r=0.85, p<0.01)and degree of kidney dysfunction.

Conclusion: Our US screening suggests that both, ultrasonographic cortical thickness measurements besides the renal stiffness (SR) measured by elastography, can be some important imaging techniques for the follow-up care of diabetic patients and could predict the rapid renal function deterioration (CKD).
AN EXPERIMENTAL ULTRASOUND SCREENING TO PATIENTS WITH ACUTE ABDOMINAL-PELVIC PAIN AT THE PRIMARY HEALTHCARE LEVEL – THE POINT OF CARE ULTRASONOGRAPHY (POCUS) SURVEY AMONG EUROPEAN FAMILY DOCTORS

Dr. Mihai Iacob

**Background:** The PoC-US performed by the clinician is an important tool to guide and improve the case management for the early diagnosis and treatment. It represents an extension and a supplement to the clinical examination of the physician, to achieve an accurate positive and differential diagnosis. The PoC-US represents practically an extension of the clinical examination in the medical family praxis. It is the right hand of medical specialties which are playing a role in acute pathology, especially in the family practice, this being a central pillar in the first contact with the patient.

**Method:** The main purpose of this study was to establish some PoC-US applications for family doctors based on their expectations in current medical practice. Indications of PoC-US are the detection of stones/tumors, pathologic fluid/gases accumulation, enlarged organs, digestive tube paresis, aneurysms and obstruction of vessels, pleural recesses effusions. All these had presented a typical ultrasound pattern, and simple diagnostic criteria can be used. In connection with the clinical picture, the diagnosis could be very accurate and enough to start the treatment. In the first step we did brainstorming and conducted an online POCUS survey, about what we can apply yet in primary care. In the second step of this study we made a PoC-US Screening on 3400 patients with acute abdominal pelvic pain, who were examined first time by the family physician with expertise, confirmed after, by the internal medicine or emergency specialist. Each patient followed an ultrasound protocol, designed by us, and was archived in a Smart PoC-US Software with a diagnosis algorithm preset.

**Aim:** Basically, we want to be the initiators for the recommendation to use some PoC-US applications (at Basic Level) in Family Physicians daily practice.

**Results:** We had a total of the 450 doctors respondent to this POCUS-survey. We made a comparative analysis of their answers. We wanted to find out which PoC-US-applications are of great interest to family physicians from Europe. At the Ultrasound Screening in Primary Healthcare, the results and accuracy of the method were: 94.54%, sensitivity: 96.43%, specificity: 91.16%, p<0.001. Inter rater agreement by Cohen between PoC-US screening performed by a trained GPs and clinical ultrasonography performed by an emergency specialist in diagnosis of abdominal emergencies was 91%, and reported a very good agreement K=0.88, CI = 0.79–0.91 Standard error 0.01.

**Conclusions:** Because of a significant number of advantages, ultrasonography should be a diagnosis tool besides the stethoscope in the GPs office. Early diagnosis can help to save many patients, in primary care, based on notions of good-clinical-practice(GCP). Accuracy of the PoC-US screening in primary care was very high for all 3400 patients with abdominal and pelvic emergency in the FD practice compared to the final diagnosis established by specialist physicians.
Ultrasound (US) is a patient-oriented and patient-friendly imaging modality compared to radiological cross-sectional imaging methods. The clinical value of US is not only based on the practical skills of the examiner and the technical quality of the imaging but above all on the clinical and emotional interaction between patient and examiner. The development of modern diagnostic ultrasound is characterized by two, at a first glance divergent, but at the second glance excellently complementary developments. On the one hand, increasingly complex high-end ultrasound systems allow the multiparametric characterization of complex diseases. The contrast-enhanced US, US elastography techniques, and other US techniques for tissue characterization as well as, more recently, artificial intelligence is required for this. This concept of "multiparametric ultrasound" (P. Sidhu, 2015) requires expensive US systems with limited mobility, which are only available in a few places, and require a high level of expertise of the US practitioner. The other development is towards small, very compact, ultrasound systems that are widely available due to their low price and - due to their mobility - can be used at various locations. The doctor working in family practice or hospital usually knows the history and symptoms of his patient, has examined him clinically, and uses ultrasound to confirm or modify his suspected clinical diagnoses specifically, quickly, and above all in his own hands.

In 1976, G. Rettenmaier established this concept of "continuation of clinical examination by other means", which was later also called "clinical ultrasound" and, in its focus on a specific clinical situation directly at the patient's bedside or in the practice, "point-of-care ultrasound". The advent and technical sophistication of battery-powered, low-cost, pocket-sized scanners (hand-held ultrasound systems) and the networking possibilities of the internet are now enabling a paradigm shift that I would like to call the democratization of ultrasound. “Democratization of ultrasound” means that shortly the US will be available to and affordable by all doctors and non-physician health workers who want to use the method at the bedside, in the patient's home, in the hospice, in the emergency room, or their practice - in developed countries as well as in developing countries. We can shape this paradigm shift, and family doctors and general practitioners can play a pioneering role in this. The lecture will discuss perspectives and problems of hand-held US devices and the ongoing process of “democratization of ultrasound”.

THE DEMOCRATIZATION OF ULTRASOUND BY HAND-HELD SYSTEMS: OPPORTUNITIES AND PROBLEMS

Prof. Dr. med. Christian JENSSEN
Shortness of breath is one of the most common symptoms patients present in emergency rooms, but also among patients in general practitioners' offices. A rapid and accurate on-site diagnosis immediately by the attending physician facilitates targeted and prompt treatment. Numerous studies have shown that lung ultrasound (US) can replace chest X-ray as a first-line diagnostic test for numerous causes of acute dyspnea, such as congestive heart failure, pneumothorax, atelectasis, and pneumonia. In the detection of pleural effusions, pulmonary US is even superior to chest X-ray, especially since immediate US-guided diagnostic and/or therapeutic thoracentesis can be performed immediately after diagnosis. This also applies to pericardial effusion. In addition to sonographic diagnosis, assessment of its hemodynamic relevance is feasible, and emergency decompression by US-guided aspiration or drainage can be life-saving. Acute diagnosis of pulmonary artery embolism is achieved with a high degree of certainty, and a triple-scan POCUS examination consisting of lung scan, focused cardiac ultrasound, and compression ultrasonography of the leg veins allows simultaneous detection of the cause and risk assessment.

Pulmonary POCUS can be performed with almost any functional simple ultrasound machine; linear and sector transducers are suitable in addition to convex transducers. Lung POCUS only requires few sonographic diagnostic criteria: two artifacts, namely the repetition artifacts of total US reflection at the air-filled lung (A-lines), the comet tail artifacts (B-lines), the presence or absence of pulmonary sliding, the occurrence of fluid in the pleural space (and/or pericardium), and the presence of lung consolidations. A simple examination algorithm (B. Liechtenstein’s BLUE protocol) with evaluation of these simple criteria allows detection of the underlying disease in acute dyspnea with greater than 90% accuracy (Liechtenstein B et al. Chest 2009;136: 1014-1020). Differentiation between acute cardiac and acute non-cardiac dyspnea is successful with lung POCUS in 97% of cases, whereas chest X-ray and pro-BNP have sensitivities of only 70% and 85%, respectively, and specificities of 82% and 62%, respectively (Pivetta E et al. Chest 2015;148: 202-210). Supplementary criteria can be used for specific questions: Lung pulse and lung point for the diagnosis of pneumothorax, diameter and respiratory variability of the inferior vena cava and visual assessment of the diameters and contractility of both ventricles for the diagnosis of congestive heart failure, broncho-aerogram, broncho-fluidogram, and vascularization of the consolidated lung parenchyma for the diagnosis of pneumonia, and diameters of both ventricles and septal kinetics for the diagnosis of pulmonary artery embolism. Mobile battery-powered hand-held ultrasound devices in smartphone format ideally complement the stethoscope ("echoscop") and enable preclinical causal diagnosis of the symptom dyspnea already in the preclinical setting, i.e., where a chest X-ray is not available: at the home visit, in the emergency ambulance, and in the emergency room. A steep learning curve, high accuracy and reproducibility of results, no radiation exposure, broad and immediate availability and a short examination time are the main advantages of lung POCUS in patients presenting with acute dyspnea. Therefore, in 2015, the European Society of Cardiology recommended lung POCUS as a first-line test in patients with suspected acute heart failure with pulmonary congestion in both the prehospital and clinical settings (Mebazaa A et al. Eur Heart J 2015;17: 544-558; Price S et al. Nat Rev Cardiol. 2017;14: 427-44.).
I graduated family medicine about twenty years ago. In my last year of internship, I converted the medical files of all my patients from paper files to electronic medical records. Less than a generation has passed, and the pace of changes is faster than ever.

But, I have in my doctor’s bag the same stethoscope I had when I was in medical school. In a meta-analysis evaluating 34 studies the overall pooled sensitivity for lung auscultation was 37% and specificity 89%. Likelihood ratios (LRs), area under the curve (AUC) of auscultation for congestive heart failure, pneumonia and obstructive lung diseases were low. The authors summarize “Lung auscultation has a low sensitivity in different clinical settings and patient populations, thereby hampering its clinical utility. When better diagnostic modalities are available, they should replace lung auscultation. Only in resource limited settings, with a high prevalence of disease and in experienced hands, lung auscultation has still a role.”

The editor of “Chest” had an opposite point of view and in an editorial he answers the question: should point-of-care ultrasound examination be routine practice in the evaluation of the acutely breathless patient? By a clear “No”.

These two different points of view may represent different clinical scenarios, different case mix, and different interpretation of the scientific evidence, but clearly represent the need to discuss the place of the stethoscope versus POCUS in evaluating patients with respiratory symptoms.

It is difficult to evaluate the accuracy of the physical examination in family medicine and primary care, as it is usually difficult to determine the “gold standard”. Most studies evaluated the accuracy of the physical examination in an emergency room setting or for specific diagnoses especially in orthopedics. One study that evaluated the diagnostic accuracy in the assessment of patients with acute abdominal pain found that trainees made a correct diagnosis in 44.4% of patients and surgeons in 42.9%.

In my lecture I will give a few more examples. Point of care ultrasound will not replace the radiologist. It is complementary to the traditional physical examination, and may be even superior in specific cases. For example on the case of hepatomegaly we can better estimate its size and cause using POCUS. On suspicion of pneumonia, we can make the diagnosis faster and without radiation. Using POCUS will improve the diagnosis and may even save time in the encounter.

This is the family medicine of the future, the family doctor must work in an advanced technological environment, will be able to do more, diagnose accurately and use the time saved to preserve the human touch and compassion that are, and will continue, to be the cornerstone of family medicine.
The European Federation of Societies of Ultrasound in Medicine and Biology (EFSUMB) celebrates 50 years, following establishment in Basle, and has grown to include nearly all national societies of Ultrasound form European countries. With nearly 20,000 member, EFSUMB is one of the largest societies of Ultrasound in the world, and is a member of the World Federation of Ultrasound in Medicine and Biology.

The organization and structure of EFSUMB is well established, with many committees providing guidance on professional issues, publications and safety. There is also a medical student committee providing a window for the future practice of ultrasound.

EFSUMB has an established reputation in setting standards worldwide with pertinent guidelines on all topics of ultrasound, recently including topics related to contrast enhanced ultrasound, elastography, musculo-skeletal ultrasound and paediatric practice.

Shortly new guidelines with respect to point-of-care ultrasound will be published. With the changing times, EFSUMB recognises the need to incorporate as many practitioners of ultrasound, and as such as opened the society to affiliate society membership as well as to individual membership.

This presentation will detail the processes of the structure of EFSUMB and will draw attention to the use of point-of-care ultrasound in practice.
Elastography became in the last 10 years a frequently used method in daily practice. For its correct use, multiple guidelines were published in the last years, authored by very well-known researchers in this field.

The first Guidelines were issued by EFSUMB (European Federation of Societies in Ultrasound in Medicine and Biology) in 2011. They were followed by guidelines of National Societies (Japanese, Romanian) and by the WFUMB (World Federation for Ultrasound in Medicine and Biology) guidelines. In 2017, EFSUMB issued a revised set of guidelines, followed by revised WFUMB Guidelines in 2018 and by the SRU (Society of Radiologists in Ultrasound from USA) Consensus in 2020. For the correct use and interpretation of ultrasound based liver elastography, these guidelines must be known and used in daily practice.

The latest EFSUMB Guidelines start with the classification of ultrasound based elastography into Shear Wave Elastography (SWE) and Strain Elastography. Secondly, SWE is divided into Transient Elastography (TE) and ARFI technologies - including point SWE (pSWE) and two dimensional SWE (2D-SWE) techniques. The guidelines provide 25 recommendations, starting with the training needed to perform different elastography techniques, continuing with the examination technique (patient’s position and probe placement, where the elastography box must be positioned, the number of measurements needed or what does a valid measurement mean). The recommendations refer to TE as well as ARFI technologies and for different diseases, starting with HCV chronic infection, HBV, NAFLD (non-alcoholic liver disease) or ALD (alcoholic liver disease). On the other hand, these guidelines state that strain liver elastography is not ready for daily practice.

A year after the EFSUMB Guidelines, the new WFUMB Guidelines were issued, with recent information regarding elastography, including fatty quantification with ultrasound. In 2020, SRU issued the latest published Guidelines, proposing elastographic cut-offs to rule-in and rule-out different stages of fibrosis, including the “rule of 5” for TE and the “rule of 4” for ARFI technology (cut-off values for different stages of liver diseases that can be easily kept in mind).

In conclusion, the EFSUMB Guidelines on Liver Elastography, together with the other new guidelines on liver elastography are very useful for people that perform or intend to perform this technique in daily practice.
In daily medical activity, abdominal emergencies are quite frequent. For the diagnosis of such conditions, we start with anamnesis, clinical examination, biological tests and imaging methods (starting with abdominal plain X-ray for occlusion or pneumoperitoneum, then abdominal ultrasound, CT or MRI). The imaging method used is dependent on the accessibility to one or another.

The advantages of ultrasound in emergency is that it can be used everywhere, it is mobile, a “point of care” method that can be used by many specialties, starting with the general practitioners, continuing with radiologists, gastroenterologists, surgeons, emergency doctors, anesthesiologists, vascular medicine specialists etc.

How we decide regarding the use of ultrasound in abdominal emergencies? I suggest to use it according to its value for the final diagnosis. Thus:

1. **US is a well established method for the diagnosis of gallstones and complications, of kidney stones and hydronephrosis, for the presence and quantification of ascitic syndrome, for the diagnosis of aortic aneurism, of chronic pancreatitis and its complications and of urinary bladder stones and urine retention. All these diagnoses are rather simple, possible with regular ultrasound machines, including small, portable devices, even by less experienced operators.**

2. **US is useful for the diagnosis of delayed gastric emptying, bowel occlusion, acute appendicitis, of ileal (colonic) Crohn’s disease, of acute diverticulitis, acute pancreatitis, of gynecological diseases (cysts, ectopic pregnancy), of palpable abdominal masses, in abdominal trauma for liver hematoma, spleen hematoma or for the diagnosis of hemoperitoneum. For these diagnoses, ultrasound experience is necessary and better ultrasound machine are needed (including linear probes).**

3. **Other diagnoses where US is useful**: for the diagnosis of liver cirrhosis complications, of enlarged abdominal lymph nodes, retroperitoneal tumors, splenomegaly, Budd-Chiari syndrome, other vascular thrombosis.

Thus, ultrasound should be the first imaging method used in abdominal emergencies and, very often, can solve the diagnosis. When needed, it can be followed by contrast enhanced imaging method, either contrast enhanced US (CEUS), or CE-CT, or CE-MRI. Accessibility, radiation and costs of these investigations must be taken into account. Personal experience is important for the diagnosis of abdominal emergencies using ultrasound.
Telemedicine is defined as a technique that comprises the usage of information and communication technologies (ICT) to enhance the access of patients to distant healthcare providers and technologies, while ultrasound is particularly well fitted for this kind of approach. Tele-ultrasound (TeleUS) uses remote transmission in order to provide enhanced ultrasound diagnosis, based on the opinion of remote experts. Nevertheless, a clear definition of the remote expert group is sometimes lacking.

Tele-ultrasound is frequently performed at the point-of-care (PoC) by primary care doctors, with a profound impact of patients located at remote destinations. The aim is to provide patient-centered care, with a certain enhancement in the clinical decision making for individual cases. The results of the procedures are however enhanced by the involvement of specialists as remote experts. This generates an effective strategy for the evaluation of patients, followed by high patient satisfaction and high-quality healthcare services.

Main applications of tele-ultrasound include emergency medicine (based on FAST protocols), obstetrics and gynecology, cardiology or gastroenterology, as well as pediatrics, requiring a definite pool of specialists involved in the telemedicine loop. Consequently, one of the main problems to overcome in the future would be to attain a certain number of specialists needed to solve the increasing demand of tele-ultrasound services.

In conclusion, tele-ultrasound is an exciting technique that certainly benefits from the creation of virtual healthcare collectives, assembled to enhance the quality of healthcare systems through increased availability of ultrasound examinations. Solving the equation at both ends is a pre-requisite for functional tele-ultrasound systems.
Ultrasound for visualizing the cardiovascular system and lung is an exceptionally versatile and advantageous diagnostic modality. Advances in the development of ultrasound machines allow high quality, portable, and low-cost imaging, making optimal circumstances for the FOCUS. Being able to rapidly diagnose cardiac pathologies at the bedside is a promising and valuable opportunity for many users from primary care to the intensive care unit. The general diagnostic power of echocardiography is strong; however, adequate interpretation in certain clinical situations is essential to reduce the likelihood of potentially catastrophic diagnostic and treatment errors.

Therefore, having a set of standards for optimal education and training and to identify the levels of competence are essential. FOCUS examination is aimed to detect a limited number of critical cardiac conditions, and may provide relevant clinical information regarding pericardial effusion/cardiac tamponade, left and right ventricular size and function and intravascular volume status. A rational supplementary diagnostic utility is lung ultrasound, which helps in differentiating acute dyspnoea and hemodynamic instability. The presentation gives an illustrated overview of the theoretical and practical features of basic FOCUS, highlighting the importance of education, training and levels of competence.
This should be no longer a vision or provocation: physical examination without ultrasound is incomplete! There are valid scientific data proving the usefulness of regular use of sonography in a family practice. Have a look at the vocational theory of general medicine. In primary care severe illnesses and pathological findings are less frequent. This is exactly why increased diagnostic mindfulness is required in order to avoid overlooking or ruling out serious processes. Time and again we are faced with the decision whether we permit the natural course of a disease to proceed and wait for spontaneous healing or we intervene therapeutically.

This is nothing less than the very task of general medicine. And considering all that, sonography can improve our own position significantly. In numerous examples I show how applying sonography can be practically implemented in a daily routine. Sonography-assisted examination constitutes a standard procedure and moreover it is significant for professional policies of general medicine.
The lecture is a presentation of various cases that family physician can face in everyday work. In all of those cases, medical history, physical examination together with point-of-care sonographic examination performed by family physician plays a key role leading to proper final diagnosis. The lecture consists of three parts. In the first part the lecture will focus on ruling in and ruling out the most frequent reasons of abdominal pain considering patient’s age. It is important to underline how appropriate examination technic may reduce the number of potential false positive as well as false negative results.

The second part of the lecture will analyze the impact of sonographic examination performed by family physician on early diagnosis of cancers. Especially considering not specific symptoms that patient may present.

The third part of the lecture will focus on the fact that the ability of family physicians to perform sonographic examination will reduce the total number of other physicians involved in the diagnostic pathway. The last point nowadays is becoming very important due to insufficient number of physicians in some European countries.
Thyroid ultrasound is considered the first morphological evaluation in thyroid disease. It is useful in thyroid morphological screening, more the 50% of the adult population having a nodular disease.

Thyroid ultrasound is performed with linear ultrasound probe, with high frequency, in order to get fine, details images. Lower frequency linear probes allow deeper penetration but with lower quality for details.

Conventional evaluation is using two basic scanning planes – longitudinal and transvers, evaluation thyroid volume, homogeneity, ecogeneity and relation to the surrounding tissue – trachea, esophagus, parathyroids, jugular vein and common carotid artery.

Ultrasound is the golden standard for morphological evaluation both in diffuse and nodular disease.

Ultrasound is useful in the evaluation of course of disease: Graves disease evolution, autoimmune thyroid disease evolution, sub acute thyroiditis staging, defining the normative volume for a predefined population.

Besides risk stratification of thyroid nodules, by recognized and validated models, such as European TIRADS or ATA TIRADS, thyroid ultrasound is used for characterization of cervical lymph nodes.

Ultrasound applications such as power Doppler, color Doppler are used for evaluation of thyroid hyperactivity, differentiation of hyper production versus aggression hyperthyroidism. Elastography has a very well defined place in nodular thyroid disease, but it has excellent application if diffuse disease, differentiating chronic autoimmune disease, sub acute thyroiditis from other form of thyroid disease.
The general accepted principle in elastography is the, the vast majority of malignant tumors are stiffer than the healthy surrounding tissue. This feature is assessed by elastography, both by strain elastography – evaluation the tissue deformation when exposed to an external pressure, respectively by shear wave elastography. Strain elastography offers qualitative results – color code map, and semiquantitative parameters- strain ration, comparing the lesion elasticity to the healthy surrounding elasticity. Shear wave elastography offers also qualitative results, color code maps, but also quantitative parameters such as speed of wave through the lesion or elasticity of the nodule, measured in kiloPascals, for minimum, mean, maximum and median elasticity, calculating also the strain ration between nodular and healthy tissue elastic modulus. In thyroid pathology, nodular elasticity is considered a risk factor, adding diagnostic quality in differentiation high risk versus low risk nodules, both in general nodular disease, but also in intermediate cytology nodules. Different strain elastography/shear wave elastography parameters thresholds are defined in the literature in order to differentiate cancer versus benign lesions. In breast ultrasound, the place of elastography is well defined. High elasticity, described both by strain/shear wave elastography can down grade BIRAS 4a, 3 and 2 lesions. High stiffness does upgrade any lesion. BITARS 4b and 5 in conventional ultrasound lesions cannot be downgraded regardless the aspect on elastography. Also elastographic characteristics, such as color code evaluation or stiffness ration, are defined for risk stratification of breast nodular disease – low, intermediate and high risk breast nodular disease. There are some exception, the so called soft tumors, that are missed by elastography such as tubular breast cancer, mucinous breast cancer, medullary thyroid carcinoma, multiple melanoma, cases that have to be taken into consideration when using elastography for tumor diagnostic.
Ultrasound of the pelvi and urinary tract is a rapid, inexpensive, and safe imaging modality that in the hands of an experienced provider, can expedite diagnosis and reduce harm by limiting exposure to ionizing radiation from unnecessary and repeat CT scans. As with any imaging modality, a variety of pathology can be identified in symptomatic patients or incidentally during the ultrasound of the urinary tract and pelvi.

Abdominal and pelvic ultrasound should be performed with a low frequency (1 to 5 MHz) curvilinear transducer to allow visualization of deep structures. A phased array transducer may also be used if the curvilinear is not available. The patient should be lying completely supine with his or her abdomen fully exposed.

The most common indication for a US of the urinary tract is flank pain and about 20% of patients presenting with flank pain have nephrolithiasis. While CT imaging is the gold standard for diagnosing urinary tract stones, US is increasingly recognized as a primary initial imaging modality and can detect nephrolithiasis without significant differences in missed diagnoses, complications, average pain scores, serious adverse events, hospitalizations, or return visits for the same complaint. US also can visualize incidental findings during a scan performed for not urinary symptoms and this includes asymptomatic nephroliths in the renal pelvis, renal cysts, and masses in the kidneys, adrenals, or bladder. Detection of such “incidentalomas”—often benign and asymptomatic—frequently triggers additional testing and require careful triage by the patient’s primary care physician. The vast majority of renal cysts are benign and do not require further workup while complex renal cysts and masses, do require further workup and imaging.

The ultrasound is a critical modality for the evaluation of the contents of the female pelvis. It allows ready and portable imaging of the uterus, ovaries, and other structures at a reasonable cost, without ionizing radiation or contrast. Ultrasound use for the male pelvis is more limited. In the male patient, pelvic US can evaluate the prostate and seminal vesicles. The prostate volume can be detected, but the prostate, particularly when looking for malignancy, is best assessed with a transrectal probe and recently magnetic resonance imaging is supplanting transrectal imaging for the evaluation of the prostate and seminal vesicles.

Patients who present with pelvic pain can be evaluated by US. In woman often the diagnoses of pelvic inflammatory disease, ovarian torsion, ectopic pregnancy, and normal pregnancy are made. Less often during pelvic US, appendicitis, inflammatory bowel disease, or diverticulitis is diagnosed. Pelvic masses palpated on physical examination can be further evaluated with US.

Other indications for pelvic US are ascites or other free fluid and US can be utilized for assistance in performing needle biopsies and aspiration of free fluid.
Introduction: Empowering internists to assess patients using Point of Care Ultrasonography (POCUS) is an inevitable change in the practice of internal medicine that is being disseminated. The ability to visualize pathologies in physiological features in real time using POCUS can provide expedited, high-quality, safe, and cost-conscious patient care. As new clinical and educational research emerges, our understanding of how to integrate POCUS into clinical practice will improve, and routine use of POCUS in clinical practice will establish new standards of care.

TRISO is an Israeli development-stage start-up company that aims to enable clinicians with limited sonographic training, to use echocardiography routinely for cardiac screening. First, TRISO aims to guide a user in the optimal positions of the echo's probe. Second, TRISO automatically and in real-time calculates relevant heart functionalities for each acquired position. When completed, TRISO’s technology will enable early screening of heart functions to large populations at no additional net cost to the health care systems.

Methods: We developed end to end algorithms (deep learning based) using Convolutional Neural Network (CNNs), in order to extract customized features, in addition to transformer networks based on attentions mechanism. A Confidence level of the probe’s positions and the image quality are provided for enabling self-test of performance together with user’s ability to validate her/his confidence in the analysis that TRISO technology provides. Our algorithms are optimized to run real time analysis on edge devices. About 100,000 patient clips are being used for training the AI system and for validating the outcomes. Then another set of clips are used for testing the system performance.

Outcomes: Current levels of quality of our model (still in progress): Image quality: Accuracy and Precision = > 0.9; Matthews = 0.8 (position dependent). View Classification: Accuracy and Precision = > 0.95; Matthews = 0.9 (position dependent). Position quality: Accuracy and Precision = 0.85; Matthews = 0.71, Segmentation: Dice-similarity = 0.9 (position dependent).

Conclusions: The survey "POCUS project in Family Medicine" presents the response of 400 Europeans family doctors on the need of POCUS in their practice. TRISO is aiming to provide all the first four ranked applications and beyond. Beyond pursuing its technology, TRISO should continue its dialogue with family physicians on the relevancy of its offering to the primary-care practice. The dialogue should include the importance of the measured cardiac parameters and the need for software assisted guidance for achieving optimal positions and machine parameters. Regarding other organs, for example the abdomen, the urinary bladder, and the chest it is required to understand the needs in primary care for guidance and for calculating functional characteristics during echo visualization.
FEEDBACK QUESTIONNAIRE

LAST NAME:  
FIRST NAME:  
INSTITUTION:  
EMAIL:  

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<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
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<td>The Workshop session is carried out according to the objective announced before?</td>
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<td>The quality of the speakers are appropriate.</td>
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<td>I have learned something from this event.</td>
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<td>The quality of the session was satisfactory</td>
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<td>This event will contribute to my practice. Relevance of the event.</td>
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<td>New colleagues and methods I knew at this Workshop session will contribute to my professional life.</td>
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<td>Ways the event affected the participant’s practice.</td>
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<td>Suitability of formats used during the event. I would like to join the same Workshop session.</td>
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<td>The location was appropriate for the event.</td>
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<td>The Workshop session was well organized.</td>
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<td>Was any commercial bias in this event?</td>
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COMMENTS AND SUGGESTIONS:  

SIGNATURE:  DATE:
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