DIGITAL HEALTH, TELEMEDICINE, INNOVATIVE TECHNOLOGY AND ARTIFICIAL INTELLIGENCE

[Abstract:0040]

IMPACT OF TEACHING IN HEALTH BIOETHICS ON THE ATTITUDE TOWARDS ARTIFICIAL INTELLIGENCE, ON OUR FUTURE PROFESSIONALS

Laisa Socorro Briongos Figuero[1], *Natalia Vázquez Pardo*[2], *Miriam Gabella Martín*[2], *Luis Pastor Mancisidor*[2], *Begoña Morejón Huerta*[2], *José Pablo Miramontes-González*[1], *Luis Corral-Gudino*[1], *Juan Carlos Martín-Escudero*[1]

[1] Internal Medicine Service, Rio Hortega University Hospital. Medicine Department, Valladolid University, Valladolid, Spain

[2] Internal Medicine Service. Rio Hortega University Hospital, Valladolid, Spain

Background: Artificial intelligence (AI) is here. Our future professionals will face ethical dilemmas with hardly any legislation. Our aim was to describe medicine and biomedicine and advanced therapies students' attitude toward AI. Furthermore, we wonder if a 50-minute class on bioethics can change attitudes.

Methods: Descriptive-correlational study in two stages: students were asked to voluntarily complete an anonymous survey on Google form (via QR) regarding bioethical implications of AI (closed-ended responses) before and after class. Data analysed using SPSS Statistics v.25.0 applying Wilcoxon signed-rank test for paired data.

Results: We obtained 65 answers before and 59 after class. 40% agreed before with statement "We can encode moral values in AI-systems" vs 42.2% after (Z statistic -1.986; p=0.47). Regarding "We must encode moral values in AI-systems" 58.5% agreed before vs 61% after (Z statistic -0.480; p=0.631). With "Responsibilities arise from possible errors of an insufficiently developed algorithm" 66% initially agreed vs 44.8% after (Z statistic -5.059; p<0.001). 35.4% agreed with "Massive biomedical data analysis respects confidentiality and anonymity" vs 5.2% after (Z statistic - 4.951; p<0.001). Finally, 54.7% of students disagreed with "AI reduces the poverty gap, minorities discrimination, and can be generalized to different environments" compared to 83% after (Z statistic -3.254; p<0.001).

Conclusions: Change of opinions towards AI in future professionals have relationship with knowledge of its functionality, consequences, and bioethical implications. Short teaching times are able to change opinions and attitudes. Moral games for teaching bioethics are essential for future of healthcare workers and possibly for already trained professionals.

Keywords: *bioethics, artificial intelligence, students*

[Abstract:0190]

CAPACITY TO RESOLVE TELECONSULTATION IN A REGIONAL HOSPITAL

Esther Luna Chaves Rodriguez, Enrique Sanchez Relinque, Alejandro Sanchez Conrado

Department Internal Medicine, Hospital Nuevo de La Línea, Cádiz, Spain

The application of teleconsultation (CT) has made it possible to accelerate the diagnosis and treatment of different specialties, improving the resolution capacity of consultations in health centres. This study, carried out in a Regional Hospital, with a reference population of 100,000 inhabitants, aims to assess the resolution capacity of CT in specialized care (SC), both medical and surgical specialties at the hospital level to increase the resolution capacity of the primary care (PC) consultation. Cases of patients who were included in the CT program between January 1 and October 16, 2023, from PC to SC, have been studied.

To assess the resolution capacity, data were related from the total number of patients seen in the TD clinic with those in whom referral to the hospital dermatology clinic was not necessary. With the final result of 1,216 discharges, 273 erroneous referrals, 148 require CT follow-up and 667 are referred to face-to-face consultations. In other words, 50.02% of the patients treated in the CT scan did not need to go to the hospital consultation, and a diagnosis and treatment was established at the health centre.

It can be seen that all the patients included in CT have been evaluated. The usefulness of CT as a tool for reducing the demand for care and unnecessary hospital consultations has been assessed. CT has been found to be useful for increasing the resolution capacity of the primary care consultation.

Keywords: *teleconsultation, specialized care, primary care, consultation*

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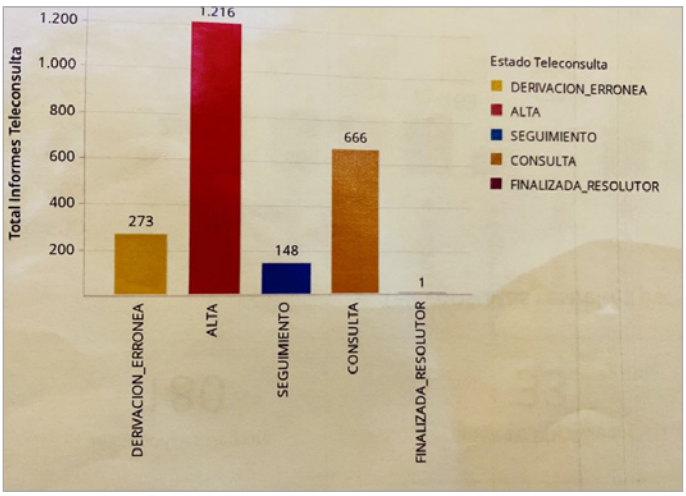

Figure 1. *Teleconsultation according to state.*

[Abstract:0355]

PREDICTING EMERGENCY ATTENDANCE AT A TERTIARY HOSPITAL - AN EMERGENCY DEPARTMENT DATA WAREHOUSE PROJECT

Catarina Goncalves, Raquel Boto, Carolina Carreiro, Alexandra Wahnon, Maria Pires, Marisa Silva

Medicina Interna, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal

Summary: The overcrowding of emergency departments (ED) has been a well-known problem worldwide. Many solutions have been proposed, demonstrating that improving task processes and management through business intelligence (BI) applications results in better outcomes. C.H.U.L.N. is the largest Portuguese hospital, providing third-level services. Consequently, the excessive influx of patients to the ED is an important issue. This work intended to create a data warehouse (DWH) for the C.H.U.L.N.'s Emergency department.

Purpose: The purpose is to create a DWH for the C.H.U.L.N.'s ED, enabling the development of focused algorithms.

Methods: The method used was the design of scientific research and also empirical experience of the institution.

Findings: The patient's demographics, admission details, diagnosis, Manchester triage system priority (used system), and discharge status were significant in similar projects. Focused on emergency assistance and outpatients, this project accesses ED patient data, comparable to service ward and medical appointment records. Analysing C.H.U.L.N.'s ED flowchart highlights the need to factor in waiting times. This thesis aims to create a data warehouse for an influx prediction algorithm and potential projects.

Conclusions: The application of BI is an important step in the development, improvement, and sustainability of healthcare, which is the primary focus of this work. The next step of this project is to create the DWH to develop the influx prediction algorithm. This project aims to help improve a better and more efficient management of human resources and logistics.

Keywords: *data ware house, digital health, emergency department, healthcare management*

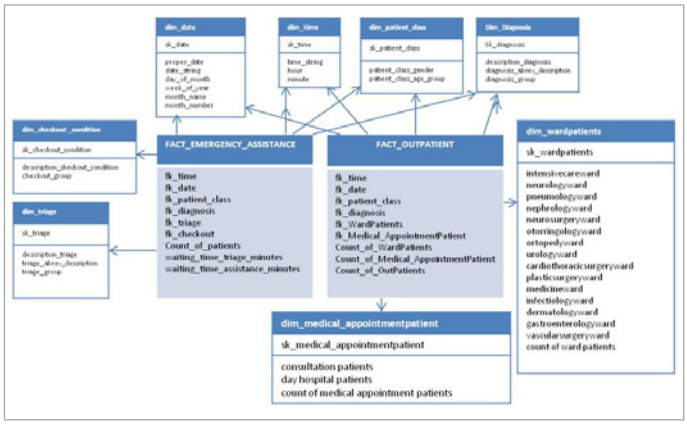

Figure 1. *Data Warehouse Diagram.*

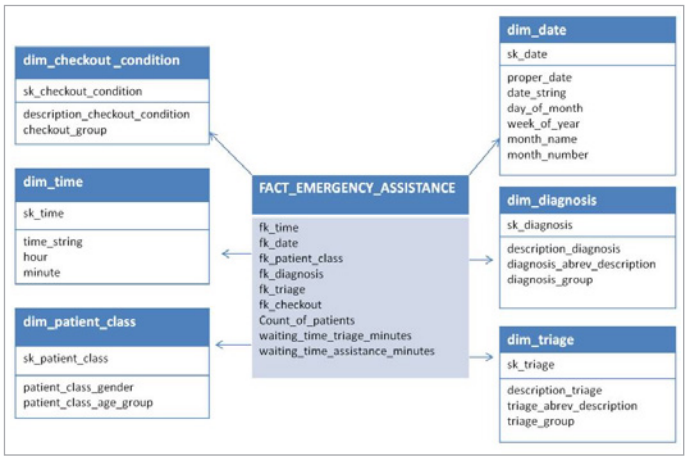

Figure 2. *Emergency Assistance schema diagram.*

The analysis of the inpatient process will include the count of patients as measures in a specific date, time, for a specific inpatient, for a specific diagnosis, specific triage (Manchester Triage colour code priority) and specific checkout condition. The fact calculation of Emergency Department admissions is the number of inpatients based on the patient's gender and age (patient class), Manchester triage colour code, diagnosis, date and time. It is also possible to analyse the sum of patients (count_of_patients), the waiting time triage minutes and waiting time assistance minutes. This is the representative diagram of the emergency assistance fact table

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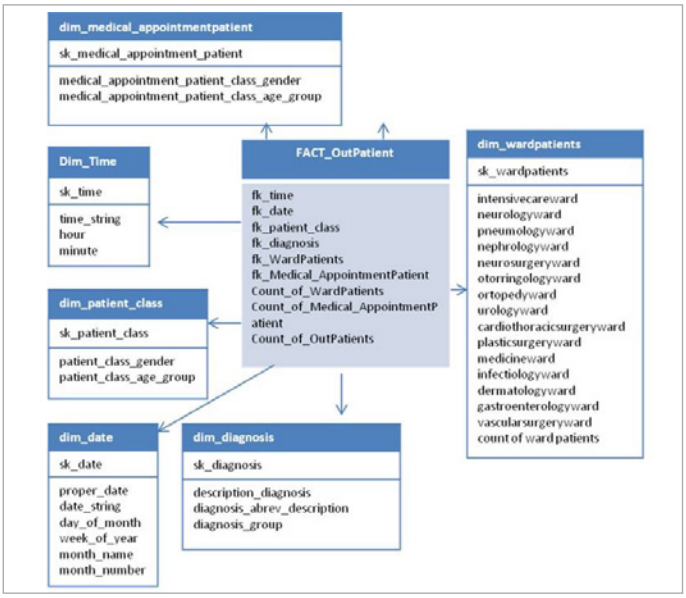

Figure 3. *OutPatient schema diagram.*
The fact outpatient calculation is based on patient's gender and age (patient class), diagnosis, date and time that had a medical appointment and patients that are being treated in the C.H.U.L.N.'s ward services. It is possible to analyse the OutPatients at total. This is the diagram of the fact OutPatient.

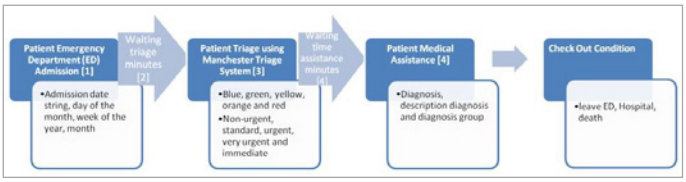

Figure 4. *Selection process to design the Data Warehouse.*
The process that patients go through since they enter the ED explained. To construct the project of the data warehouse Emergency department it was necessary to understand what happens to the patient when is admitted in the ED.

[Abstract:0657]

CLINICAL DECISION SUPPORT SYSTEMS DURING TEACHING: A HANDS-ON COMPARISON

Marco Montagna[1], *Filippo Chiabrando*[1], *Rebecca De Lorenzo*[1], *Patrizia Rovere Querini*[2]

[1] Department of Internal Medicine, Vita-Salute San Raffaele University, Milan, Italy

[2] Unit of Medical Specialties and Healthcare Continuity IRCCS San Raffaele Scientific Institute, Milan, Italy

Physicians use clinical decision support systems (CDSS) as an aid in the crucial task of clinical reasoning and decision making. Traditional CDSS are online repositories (OR) and clinical practice guidelines (CPG). Recently, large language models (LLMs) like ChatGPT have emerged as potential alternatives. They have proven to be powerful innovative tools, yet they are not devoid of worrisome risks. This study aims to explore how medical students utilize ChatGPT as a CDSS in a teaching environment. The authors randomly divided medical students into three groups and assigned each group a different type of CDSS for guidance in answering prespecified questions, assessing how students' ability at resolving the same clinical case varied accordingly. Four external reviewers evaluated all answers based on accuracy and completeness metrics (Score: 1-5, Table 1). The authors analysed and categorized group scores according to the skill investigated: differential diagnosis, diagnostic workup, and clinical decision making.

Answering time showed a trend for the ChatGPT group to be the fastest (Fig 1). The mean scores for completeness were: 4.0 (CPG), 3.7 (OR), 3.8 (ChatGPT). The mean scores for accuracy were: 4.0 (CPG), 3.3 (OR), 3.7 (ChatGPT). Aggregating scores according to the three students' skill domains, trends in differences among the groups emerge more clearly (Fig 2).

This hands-on session provided valuable insights into the potential perks and associated pitfalls of LLMs in medical education and practice. It suggested the critical need to include in MD Courses teachings on how to properly take advantage of LLMs, as the potential for misuse is real.

Keywords: *medical education, ChatGPT, LLM, clinical decision support system, clinical practice guidelines*

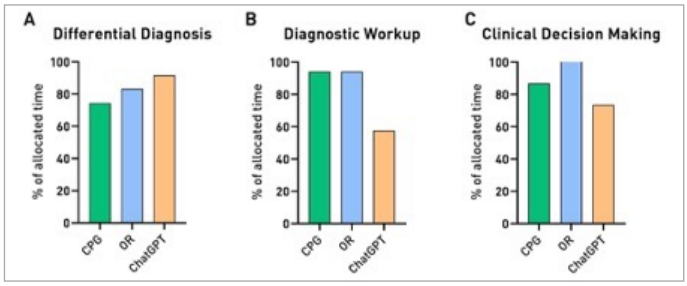

Figure 1. *Sum of times taken by the three groups of students to answer questions in the three domains. Results are shown as the percentage of the total allocated time for that domain.*

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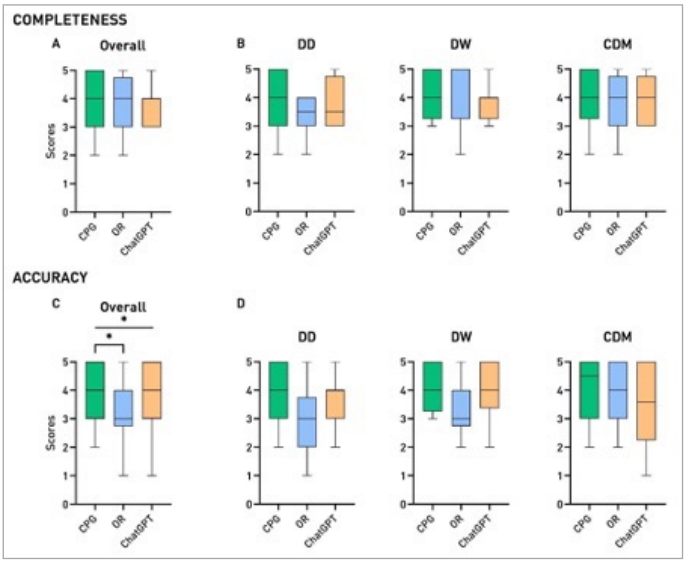

Figure 2. Box plots of scores obtained by the three groups of students for: (A) overall completeness, (C) overall accuracy, (B) completeness in the three domains, (D) accuracy in the three domains. DD: differential diagnosis, DW: diagnostic workup, CDM: clinical decision making. (p<0.05)*

	Clinical Practice Guidelines			Online Repositories			ChatGPT		
	Time (min)	Quality		Time (min)	Quality		Time (min)	Quality	
		Completeness	Accuracy		Completeness	Accuracy		Completeness	Accuracy
Q1. Rank the possible differential diagnoses in terms of probability. 8 min	8	4 (4, 3, 5, 4)	3,75 (4, 2, 5, 4)	8	3,5 (3, 3, 4, 4)	3 (3, 2, 3, 4)	8	4 (3, 5, 4, 4)	3,75 (4, 4, 3, 4)
Q2. Based on the previous list, which diagnostic workup would you set up? 8 min	7	4 (3, 4, 5, 4)	3,75 (3, 4, 4, 4)	7	4,75 (5, 5, 5, 4)	2,5 (3, 3, 3, 1)	6	3,75 (4, 3, 4, 4)	3,75 (5, 2, 4, 4)
Q3. Which values are altered? 5 min	3	4 (4, 4, 5, 3)	4,25 (5, 4, 5, 3)	5	3,75 (4, 3, 5, 3)	4 (5, 3, 5, 3)	2	4 (4, 3, 5, 4)	2,25 (1, 2, 4, 2)
Q4. Which treatment do you start? 5 min	5	4,3 (5, 5, 5, 2)	3,75 (5, 3, 3, 2)	6	4 (4, 4, 5, 3)	4,25 (5, 4, 5, 3)	4	4 (4, 4, 5, 3)	4,25 (5, 4, 5, 3)
Q5. Which are the possible causes of hypercalcemia? 8 min	5	3,8 (3, 4, 5, 3)	3,75 (5, 3, 4, 3)	4	3,75 (4, 4, 4, 3)	3,75 (5, 3, 4, 2)	6	3 (3, 3, 3, 3)	3,25 (5, 2, 3, 3)
Q6. Can you narrow down the previous list based on these findings? 5 min	3	4 (4, 5, 5, 2)	4,25 (5, 5, 5, 2)	5	3 (3, 4, 3, 2)	2 (1, 2, 3, 2)	5	4,25 (4, 5, 5, 3)	4 (5, 4, 4, 3)
Q7. Which are the primary diagnostic tests that you order? 5 min	5	4,3 (4, 5, 5, 3)	5 (5, 5, 5)	5	3,75 (3, 5, 5, 2)	3,67 (4, 4, 3)	2	4 (4, 4, 5, 3)	4,67 (5, 4, 5)
Q8. Which therapeutic choice do you offer to the patient? 5 min	5	3,8 (4, 4, 4, 3)	4,67 (5, 4, 5)	5	3,5 (5, 2, 4, 3)	3,67 (5, 2, 4)	5	3,75 (4, 3, 5, 3)	4,33 (5, 3, 5)
TOT/Median	41	4	4,5	45	3,75	3,67	38	3,84	4

***Table 1.** Time (min) required for answers, mean score and individual scores received at the external assessment in terms of completeness and accuracy for each answer given by each group. Overall time for completion and median score across all answers for each group are also reported. Times reported in bold are the fastest for that question. The number in red is the only one exceeding the allotted time. Table rows are coloured according to the three areas of questions: white for Differential diagnosis, light blue for Diagnostic workup, pink for Clinical decision-making.*

[Abstract:0680]

ARTIFICIAL INTELLIGENCE AND INTERNAL MEDICINE DOCTOR: A CONVERSATION SHAPING THE FUTURE OF HEALTHCARE

Derya Koc

Department of Internal Medicine, Istanbul Medeniyet University, Istanbul, Turkey

This presentation explores the intricate relationship between artificial intelligence (AI) and healthcare, focusing on challenges and opportunities in their intersection. AI serves as both an assistant and innovator in medicine, transforming diagnosis and treatment.

The discourse delves into balancing AI and the human touch, evaluating the impact of empathy on the treatment process.

The presentation highlights AI's advantages in hospital management through big data analytics, emphasizing data-driven decisions for healthcare organizations. Ethical considerations, patient privacy, and security in AI healthcare are discussed.

Looking forward, the presentation envisions the evolving collaboration between AI and healthcare professionals, anticipating technological advancements in medical practices. In conclusion, the dialogue between AI and healthcare signifies a transformative paradigm.

Shifting to internal medicine, the discussion explores AI's role in elevating patient care, emphasizing personalized treatment and utilizing big data analytics. Despite promising advancements, ethical concerns and security issues persist. This abstract aims to provide insight into the synergy between AI and internal medicine, influencing healthcare services in the coming years. Notably, the presentation was predominantly crafted on an AI-supported platform, complemented by an application featuring an artist with hallucinatory experiences.

Keywords: artificial intelligence, internal medicine, future healthcare, personalized treatment, ethical considerations

[Abstract:1055]

EXPERIENCE WITH THE USE OF MOBILE APPLICATIONS FOR COLLECTING AND ANALYZING ULTRASOUND DATA IN A CLINICAL ULTRASOUND UNIT

Maider Olaizola Guerrero, June García Bascones, Gracia Lanzas Pro, Raquel Rodil Fraile, Javier Anniccherico Sánchez, María Vicenta Bonilla Hernández, Sergio Arnedo Hernández, Joao Modesto Dos Santos, Julio Oteiza Olaso

Department of Internal Medicine, HUN University Hospital of Navarra, Navarra, Spain

Introduction: Ultrasound complements physical examination and facilitates clinical decision making. Our clinical ultrasound unit is accredited for advanced training in clinical ultrasound. A form was created in the Google forms application to easily collect

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ultrasound findings at bedside, and it was found to facilitate both data collection and subsequent analysis.

Purpose: To explain the need for the use of mobile applications to collect data from ultrasound examinations and their implementation in our Unit.

Methods: An online form, named EcoHUNMI, was created using the Google forms application to collect and evaluate data from clinical ultrasounds performed at bedside.

Results: Traditionally, we collected data manually and transferred them to an Excel spreadsheet. A study was conducted to evaluate the implementation of an online form to collect data from bedside ultrasounds. It showed that using this application would enhance training and save time in both data collection and analysis. Therefore, all team members would use it and the decision was made to implement the application Google forms. A form was created with sections that allow a comprehensive approach to clinical ultrasound: lung, abdomen, muscle, vascular, echocardiography and ultrasound-guided procedures. The form also records the time spent on the studies.

Conclusions: It is necessary to create and use mobile applications that allow clinical ultrasound data collection. They help reduce both the time spent on it and transcription errors. Additionally, they facilitate a faster and more systematic use of data by providing automatic statistics.

Keywords: *clinical ultrasound, application, EcoHUNMI*

[Abstract:1295]

IMPACT OF THE TEACHING IN CLINICAL ULTRASOUND

June García Bascones, Francisco Javier Anniccherico Sánchez, Raquel Rodil Fraile, Maider Olaizola Guerrero, Laura Valderas Monge, Enara Echauri Carlos, Maddi Taboada Palacios, Pablo Aragón Muñoz, Nerea García De Vicuña Bilbao, Gracia Lanzas Pro, Julio Oteiza Olaso

Internal Medicine Department, University Hospital of Navarra, Pamplona, Spain

Summary: The Internal Medicine Department of the University Hospital of Navarra is accredited with excellence in clinical ultrasound teaching. A survey was conducted to all clinical ultrasound trainees in the last two years, in order to evaluate the knowledge acquired and the degree of satisfaction after training. There is a great impact on the degree of learning and satisfaction, with modification of their usual medical practice.

Purpose: Analysing the degree of satisfaction and knowledge acquired during the month of rotation in clinical ultrasound.

Methods: We created a survey using Google forms. It was sent to the 16 Internal Medicine residents who completed the ultrasound rotation. The data received were analysed using Google forms and Microsoft Excel.

Findings: 86% had no skills in echocardiography; after one month, 100% claim to have acquired it. Regarding abdominopelvic ultrasound, a 60% increase in the knowledge gained was observed. 50% of those who had not performed ultrasound-guided techniques before, said they had learned to apply them.

Once the training was completed, 92.9% continued to use ultrasound, even if only 86.6% have the device at their workplace. 86.6% stated it has changed their clinical practice. The average score for the teaching was 9/10.

Conclusions: 1. The previous knowledge in ultrasound was limited, reaching the training objectives in 100% after the training.

2. Most of them include the ultrasound in their routine practice, which is valued positively.

3. For most residents the rotation has meant a change in the way they work.

Keywords: *ultrasound, teaching, form*

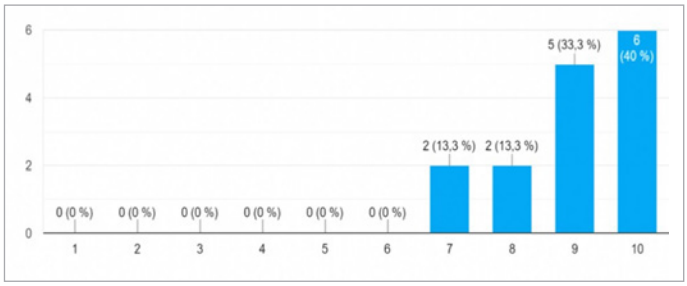

Figure 1. *Score for the rotation in clinical ultrasound.*

[Abstract:1423]

IMPLANTATION PROJECT OF A TELEPRESENCE PROGRAM BETWEEN PRIMARY CARE AND THE CARE CONTINUITY UNIT (UCA)

Pablo Garcia Carbo[1], María Antonia Martín Delgado[2], Raixa Noemí Perez Martín[2], Victoria Elena Ramos Macías[2], Francisco Javier Martin Morales[1], Victoria Palomar Calvo[1], Lidia Moreno Terán[1], Maria Montserrat Chimeno Viñas[1]

[1] Medicina Interna, Complejo Asistencial de Zamora, Zamora, Spain

[2] Servicio de Investigacion e Innovacion Sanitaria, Consejería de Sanidad, Junta de Castilla y Leon, Valladolid, Spain

Purpose: The geographical dispersion of the population and the progressive aging and pluripathology is conditioning health care. Implementing telemedicine care systems for chronic patients will make it easier to maintain the current way of living in areas of greater population dispersion.

Methods: This is telemedicine project under the JADECARE project of the European Union. It is proposed for complex chronic patients who need support in the UCA. Through a closed-circuit video call connection, a joint consultation is carried out between family medicine and internal medicine UCA.

Findings: The patient is in his health centre with is family doctor. The internist is at the hospital. The consultation is carried out following the usual scheme of a face-to-face consultation, with the logistical support of primary care staff, who also participate in joint decision-making. The pilot project begins by connecting

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with a health centre 60 kilometres away from the hospital. The image and sound quality had a good degree of acceptance by the patient and his family. The registration of the consultation is made in the Electronic Medical Record. All patients receive a care report at home.

Conclusions: 1. Telepresence will facilitate access to the health system in areas of greater population dispersion.

2. It involves taking advantage of technological advances to care for the most fragile patients.

3. The implementation of the tool will be essential for the sustainability of the health system and in maintaining the quality of life and care of our patients.

Keywords: *telemedicine, chronic, geographical dispersion*

[Abstract:1431]

IMPLEMENTATION PHASE OF A TELEPRESENCE PROGRAM BETWEEN PRIMARY CARE AND THE CARE CONTINUITY UNIT (UCA)

Pablo Garcia Carbo[1], María Antonia Martín Delgado[2], Raixa Noemí Perez Martín[2], Victoria Elena Ramos Macías[2], Francisco Javier Martin Morales[1], Victoria Palomar Calvo[1], Lidia Moreno Terán[1], Maria Montserrat Chimeno Viñas[2]

[1] Medicina Interna, Complejo Asistencial de Zamora, Zamora, Spain

[2] Servicio de Investigacion e Innovacion Sanitaria, Consejería de Sanidad, Junta de Castilla y Leon, Valladolid, Spain

Purpose: After the implantation phase of the telemedicine project, the second objective was to expand the coverage of telepresence.

Methods: This is telemedicine project under the JADECARE project of the European Union.

Telepresence care is proposed for complex chronic patients who require support in the UCA. After a first implementation phase, we proceed to increase the installation of telepresence devices in all peripheral centres in our health area. In a next step, it was expanded to the rest of the provinces of our autonomous community. As the last step of the implementation, we sought to involve patients.

Findings: During the implementation phase a total of 335 telepresence devices were installed (practically in all health areas), and then we sought to involve all actors related to care through in telepresence. A doctor in each health centre was in charge to centralize consultations. The training was carried out through several informative sessions on device management and operation of the tool. Then the project was presented to patient societies to make suggestions for his development. It has been important to identify "leaderships people" who promote the use and usefulness of the telepresence.

Conclusions: 1. The implementation phase has been based on the extension of telepresence to the rest of the health areas of the autonomous community.

2. 335 telepresence devices have been installed.

3. Staff training has been a key pillar in the implementation phase.

4. The involvement of patients, through collaboration with their associations, has been another of the work points.

Keywords: *telemedicine, chronic, implementation, patients societies*

[Abstract:1456]

ACTIVITY SUMMARY OF A TELEPRESENCE PROGRAM BETWEEN PRIMARY CARE AND THE CARE CONTINUITY UNIT (UCA)

Pablo Garcia Carbo[1], María Antonia Martín Delgado[2], Raixa Noemí Perez Martín[2], Victoria Elena Ramos Macías[2], Francisco Javier Martin Morales[1], Victoria Palomar Calvo[1], Lidia Moreno Terán[1], Maria Montserrat Chimeno Viñas[1]

[1] Medicina Interna, Complejo Asistencial de Zamora, Zamora, Spain

[2] Servicio de Investigacion e Innovacion Sanitaria, Consejería de Sanidad, Junta de Castilla y Leon, Valladolid, Spain

Purpose: Describe the activity carried out through the implantation and implementation phases of the telepresence project under the JADECARE project of the European Union.

Methods: Retrospective observational study between January 2021 and January 2023. The implantation phase was based on telepresence with a health centre and a nurseries centre. In the implementation phase, the project was expanded to the rest of the health areas of our province. Data are reviewed through consultation activity records and review of electronic medical records.

Findings: A total of 45 telepresence consultations have been carried out in our unit in the study period (13 during the implementation period and 32 during the implementation period). Of them, 17 consultations have been for new patients and 28 follow-up consultations. The patients come from 9 health areas of the total of 14 peripheral areas of our province. The pathologies under follow-up have been several. The consultations have lasted an average of 20 minutes and without major problems. The consultation was carried out in a time and manner similar to a face-to-face one. Only two patients have rejected telepresence.

Conclusions: 1. Telepresence consultations have progressively increased in number during the study period.

2. The range of pathologies treated has been similar to that of the UCA in-person consultation.

3. The consultations have passed without major technical problems.

4. Patient acceptance has been good.

5. Work remains to be done to achieve full implementation.

Keywords: *telemedicine, chronic patient, activity summary*

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[Abstract:1536]

PREDICTION OF MORTALITY FROM SPIROMETRY DATA USING A MACHINE LEARNING

Yun Seong Kim[1], *Eunjeong Son*[2], *Taehwa Kim*[2]

[1] Department of Internal Medicine, Pusan National University School of Medicine, Yangsan, Republic of Korea

[2] Department of Internal Medicine, Pusan National University Yangsan Hospital, Yangsan, Republic of Korea

Background: Many previous studies have shown a significant association between lung function decline and mortality in patients with respiratory diseases.

Purpose: This study is to develop an AI-based mortality prediction model using PFT data to analysis the association between mortality and PFT data in various groups that conduct PFT.

Methods: We collected PFT data conducted at Pusan National University Yangsan Hospital from 2008 to 2021. We divided them into three groups (the health promotion centre visit group, the preoperative evaluation group, and the respiratory medicine centre visit group) and evaluated 1-year mortality data after PFT. We interpreted the predictions of the machine learning model and adjusted for potential confounding variables (age, gender, weight, height, comorbidities) using SHapley Additive exPlanations (SHAP).

Findings: The model achieved a similar high performance when predicting all-cause mortality among all participants in all statistics methods. The AUC of logistic regression was 0.904, multi-layer perceptron was 0.900. In SHAP for Mortality predictor, FVC was found to be the second most relevant after age using 21 features in the overall group. Age is the biggest predictor of mortality in each three groups. FEV1 was the significant factor associated with mortality in only the health promotion centre visited population (7 features).

Conclusions: The model performed remarkably well at prediction mortality. In different populations, FVC was associated with mortality at 1 year after PFT implementation. These findings suggest that screening for PFT may be beneficial in all populations to identify mortality-related factors.

Keywords: *prediction, mortality, spirometry, pulmonary function test, machine learning*

[Abstract:1780]

THE USE OF EMBEDDED FORMS IN THE ELECTRONIC HEALTH RECORD AS A METHOD OF CLINICAL REGISTER AND TRAINING ACTIVITY RECORDING IN POCUS FOR RESIDENT DOCTORS

Jie-Wei Oscar Li-Zhu[1], *Cesar Augusto Henríquez Camacho*[1], *Andrea Perez Rodriguez*[2], *Christian Aram Tsouroukdissian Alcalá*[2], *Alejandro Becerra Wong*[2], *Sara Weronika Snopkowska Lesniak*[2], *Maria Fatima Delgado Vallejos*[2], *Victor Julian Moreno Cuerda*[1]

[1] Department of Internal Medicine, Hospital Universitario de Móstoles, Madrid, Spain; Universidad Francisco de Vitoria, Majadahonda, Madrid, Spain; Universidad Rey Juan Carlos, Madrid, Spain

[2] Department of Internal Medicina, Hospital Universitario de Móstoles, Madrid, Spain

In Spain, training programs in Point-of-Care Ultrasound (POCUS) for Internal Medicine residents are based on the guidelines set out by the Clinical Ultrasound Working Group of the Spanish Society of Internal Medicine. The certification as POCUS Units ensures the fulfilment of these guidelines for training. At least 100 supervised multi-organ POCUS are required, following the different levels described by Torres-Macho et al. in order to acquire competence in this skill. The traditional method to corroborate the performance of this number of POCUS has been by paper portfolio. Traditional paper-based recording methods are becoming obsolete. The recording of POCUS examination in the Electronic Health Record (EHR) and at the same time in paper port-folio cause duplications in the recording, which is not efficient in the daily work. For this reason, it was considered a more efficient way to record the POCUS performed and its findings. It was also important that this register could be used to record the POCUS skills acquired by the residents throughout the residency without the risk of losing the documentation.In collaboration with the Informatics Service, an electronic form was designed in the Selene® EHR, which includes not only the explorer, but also the supervising physician and the different findings for each type of POCUS.This form also makes possible to obtain the data of all the POCUS performed by each resident from the computer system, and it also serves as a formative accreditation in this area at the end of the residency.

Keywords: *electronic forms, POCUS, point-of-care ultrasound, POCUS formative accreditation*

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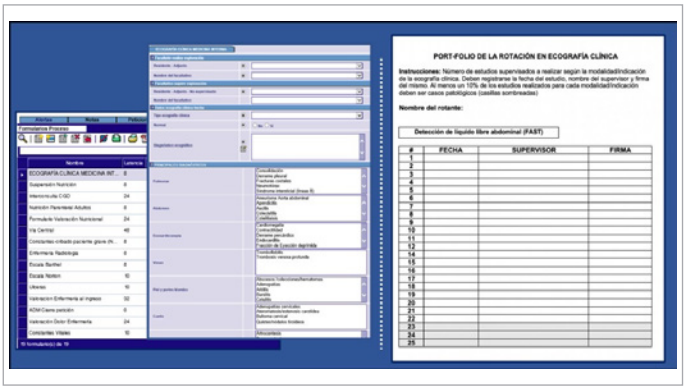

Figure 1.- Comparison between the implemented electronic form and the classic paper registration portfolio. On the left we can see the electronic form designed with the resident who performs POCUS, the supervising physician and the examination report.

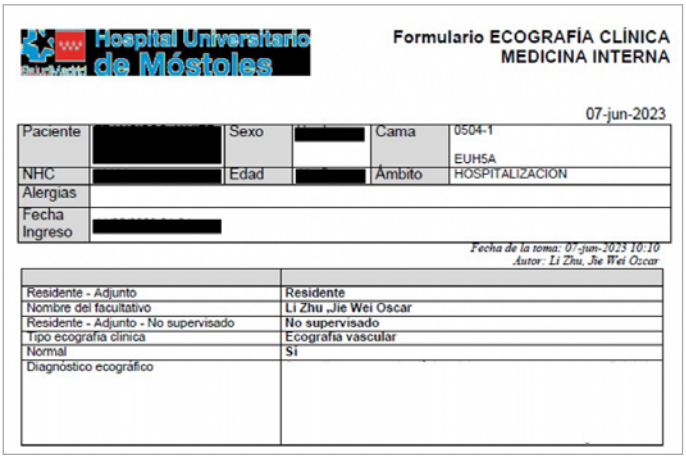

Figure 2. Example of the Clinical Ultrasound report after fulfilling the form showing the resident who performs the POCUS, the supervising physician and the examination carried out.

[Abstract:1820]

DIGITAL TECHNOLOGIES IN PRIMARY HEALTHCARE

Grigorij Roitberg, Sharkhun Olga, Petukhov Maksim, Janna Dorosh

JSC Medicine, Moscow, Russia

New challenges of modern society require further development of practical medicine. On the one hand, this is the growth of socially significant diseases, the rapid spread of infectious diseases, problems of aging, healthy lifestyle, etc. On the other hand, the patient has become completely different - the level of his medical knowledge cannot be compared with the topic that existed 10 years ago. The patient present knew much more about his illnesses than his attending physician. Finally, in modern society there is a clear shortage of medical personnel, especially primary care doctors.

JSC «Medicine», accredited by the JCI, one of the best examples of the successful implementation of the digital technologies and artificial intelligence (AI). All processes from making an appointment to monitoring the treatment effectiveness are digitized. In One-Click App you can select a doctor, date, and time of appointment. At a doctor's appointment, AI helps to make a preliminary diagnosis, generates the necessary diagnostic tests, and writes prescriptions electronically. The AI allows to describe a picture (MRI, CT or X-ray) in 3 seconds, while the accuracy of the system is 95-98%. The telemedicine technologies make it possible to ensure a dialogue between the patient and his physician or medical expert, to adjust the treatment and increase its effectiveness.

Despite the fact that AI shows its effectiveness, a number of fundamental issues remain, the main one is the legal assessment of the AI, its legal responsibility for the correct diagnosis, treatment prescription and responsibility for the patient.

Keywords: *JSC «Medicine», JCI, digital technologies, artificial intelligence (AI)*

[Abstract:1891]

EARLY AND PRECISE DETECTION OF LIVER STEATOSIS: ARTIFICIAL INTELLIGENCE (AI)-BASED ULTRASONOGRAPHY

Sergio Giovanni Santoro[1], Mohamad Khalil[2], Hala Abdallah[2], Ilaria Farella[2], Elisa Lanza[2], Leonilde Bonfrate[2], Agostino Di Ciaula[2], Piero Portincasa[2]

[1] Clinica Medica "A. Murri", Department of Precision and Regenerative Medicine and Ionian Area (DiMePre-J), University of Bari "Aldo Moro" Medical School, Bari, Italy; Eurisko technology srl, Modugno, Bari, Italy

[2] Clinica Medica "A. Murri", Department of Precision and Regenerative Medicine and Ionian Area (DiMePre-J), University of Bari "Aldo Moro" Medical School, Bari, Italy

Background: Steatotic liver disease has become the most common chronic liver disease worldwide. Early detection of fat deposition is of paramount importance to prevent late, less common but still harmful complications including steatohepatitis, fibrosis, and carcinoma. Despite ultrasonography (US) is commonly employed as first-line assessment of liver steatosis, the role of AI to improve US diagnostic performance is largely unknown.

Methods: An AI-based algorithm was created by a dataset of 523 US images. A total of 134 patients (BMI 26.4 Kg/m^2) underwent abdominal US and magnetic resonance imaging fat fraction (MRI-PDFF) as reference for steatosis quantification. The hepatorenal index was calculated manually (mHRI) by four operators and automatically by algorithm (aiHRI). The efficacy of aiHRI in distinguishing fatty liver grades was derived by ROC analysis of MRI-PDFF thresholds.

Results: MRI-PDFF identified 32% of subjects as steatotic with a cut-off value of 6.4%. At US, median aiHRI was 1.11 (IQR 0.32) vs. mHRI 1.08 (IQR 0.26) (15% inter-operator variability). Both iaHRI (R=0.79, P<0.0001) and mHRI (R=0.69, P<0.0001) significantly correlated with MRI-PDFF liver fat percentage. iaHRI showed better discrimination between steatotic and non-steatotic subjects (AUC=0.87) compared to mHRI (AUC=0.82). For grading

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liver steatosis, iaHRI had AUC of 0.98 with a 1.64 cutoff. Early liver steatosis was detected by US at 7.2% with best performance (sensitivity=0.86, specificity=0.80) by iaHRI.

Conclusions: AI significantly improves US accuracy and efficiency in diagnosing steatotic liver disease. Further research is warranted to assess the benefits of its routine use in managing patients with liver steatosis at high cardio-metabolic risk.

Keywords: *liver steatosis, artificial intelligence, ultrasound*

[Abstract:1943]

ADD ON DIGITAL CARTOON VIDEO VERSUS PAPER BASED COUNSELLING FOR MEDICATION ADHERENCE IN HYPERTENSIVE PATIENTS FOLLOWED AT A REFERRAL HOSPITAL IN YAOUNDÉ (CAMEROON): A RANDOMIZED CONTROL TRIAL. (E ADHERENCE STUDY)

Rudy Arnaud Nana[1], *Serge-Clotaire Billong*[2], *Jérôme BOOMBHI*[3], *Hilaire Djantio*[3], *Francky Teddy ENDOMBA*[4], *Alain Menanga*[3]

[1] Department of internal medicine,Faculty of medicine and biomedical sciences, University of Yaounde 1, Yaounde, Cameroon; Centre specialising in the production of digital health educational tools,Yaounde, Yaounde, Cameroon

[2] Department of public health, Faculty of medicine and biomedical sciences, University of Yaounde 1, Yaounde, Cameroon

[3] Department of Cardiology, Faculty of medicine and Biomedical sciences, University of Yaounde 1, Yaounde, Cameroon

[4] Psychiatry Internship Program, University of Burgundy, Dijon, France

Treatment adherence is a milestone in the care of hypertensive patients, with new information and communication technologies as potential educational tools. This study aimed to evaluate the add-on effect of a digital cartoon educative video on the therapeutic adherence of patients followed up in the General Hospital Yaoundé compared to standard of care. We conducted a randomized simple blind clinical trial at the cardiology unit of the Yaoundé General Hospital. We enrolled 110 patients and randomized them in blocs of 4 creating two groups of 57 and 53, respectively, without (G1) and with (G2) intervention. Treatment adherence was assessed using the Morisky Medication Adherence Scale (MMAS). In G1, we provided standard paper-based clinical counselling, including oral advice, and in G2, we did the same and added a digital cartoon video containing exactly the same message as images and audio. The primary outcome was medication adherence after three months. The mean age was 56.65 ± 10.98 years in G1 (paper) and 56.42± 10.46 years in G2 (paper + video). Both groups were similar regarding the proportion of females (36.8% in G1 and 49.3% in G2) and educational levels. Preintervention, the proportions of patients with good, medium and low adherence in G1 and G2 were 7%, 25.6%, 67.4%, and 5.1%, 43.6%, 51.3%, respectively. After interventions, good adherence moved from 7 to 11% in G1 and 5.1 to 20% in G2. The intragroup variation in treatment adherence in the intervention group (before-after) tended to be significant, with a p-value = 0.0572.

Keywords: *digital videos, hypertensive patients, therapeutic adherence*

[Abstract:2279]

CHATTING FOR LIFE - THE USE OF ARTIFICIAL INTELLIGENCE IN CLINICAL DIAGNOSIS AND INTERNAL MEDICINE PRACTICE

Sina Karimi[1], *Aimilios Kaklamanos*[2], *Eleni Pappa*[3], *Johann Stuby*[4], *Valentini Samanidou*[5], *Maria Baldursdottir*[6], *Emine Sena Sozen*[7], *Alfredo Caturano*[8], *Leonardo Bencivenga*[9], *Raphael Matthias Buzzi*[10], *Emanuele Guerrieri*[11], *Anna Mavromanoli*[12]

[1] Department of Internal Medicine, Hôpital Erasme, Université Libre de Bruxelles, Brussels, Belgium

[2] Department of Pathophysiology, School of Medicine, National and Kapodistrian University of Athens, Athens, Greece

[3] Ludwig Maximilian University of Munich, Munich, Germany

[4] Department of General Internal Medicine, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland

[5] 1st Division of Internal Medicine University Hospital of Ioannina, Ionnina, Greece

[6] Department of Internal Medicine, Landspitali University Hospital, Reykjavik, Iceland

[7] Department of Internal Medicine, Ankara Bilkent City Hospital, Ankara, Turkey

[8] Department of Advanced Medical and Surgical Sciences, University of Campania Luigi Vanvitelli, Naples, Italy

[9] Department of Translational Medical Sciences, Università degli Studi di Napoli Federico II, Naples, Italy

[10] Division of Internal Medicine, Universitätsspital and University of Zurich, Zurich, Switzerland

[11] Emergency Medicine Residency Program, Università Politecnica delle Marche, Ancona, Italy

[12] University Hospital Zurich, Zurich, Switzerland

Introduction: The rapid advancement of artificial intelligence (AI), particularly large language models (LLMs) like ChatGPT, has gathered significant interest in medical applications (1-2). However, there is a gap in evidence regarding its utility and limitations in clinical settings (3-4). The aim of this study is to evaluate ChatGPT-4's diagnostic performance applied to internal medicine cases.

Methods: ChatGPT-4 was provided with specific medical guidelines from UpToDate® in PDF format to mirror the information available to clinicians. We presented the AI with real-life-like internal medicine cases, requiring an initial differential diagnosis and recommendations for further diagnostic workup. Subsequently, ChatGPT-4 formulated a final diagnosis and treatment plan based on the results of the proposed workup. The AI's responses were independently evaluated by seven clinicians

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through a custom scoring system (Table 1). Statistical analysis was conducted to assess diagnostic and decision-making efficacy.

Results: Ten internal medicine cases were evaluated by seven clinicians. In 9 out of 10 cases the final diagnosis provided by ChatGPT was correct and was also included in the initial differential diagnosis. Treatment recommendations were 58.6% correct, 41.4% incomplete, with none deemed incorrect.

Conclusions: This study unveils ChatGPT-4 potential as a diagnostic tool in internal medicine. However, its disease-cantered approach resulted in standard non-personalised treatment plans. These findings highlight the need for tailored healthcare-specific AI systems, demonstrating AI's ability in diagnosis but also its limitations in treatment planning. The integration of human expertise remains crucial, underscoring the indispensable role of medical professionals in accurate and personalised diagnosis.

Keywords: *artificial intelligence, clinical decision making, internal medicine, large language model*

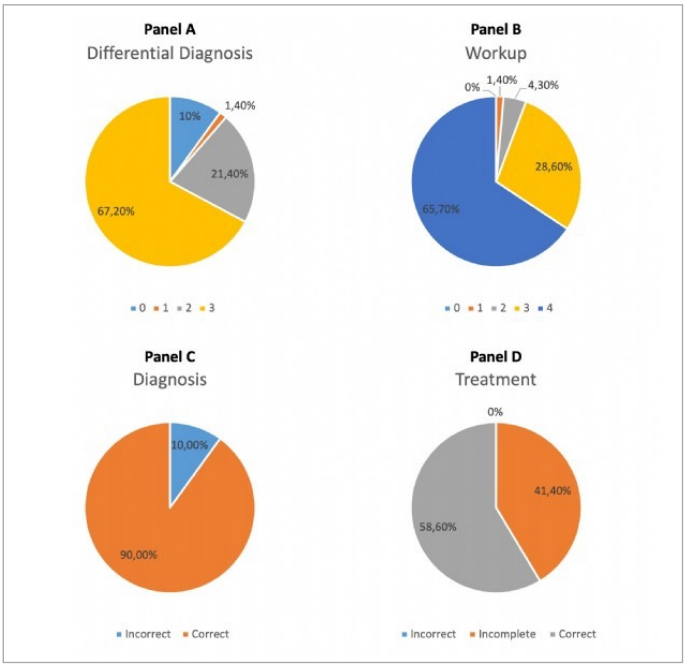

Figure 1. *Distribution of ChatGPT-4 Performance according to differential diagnosis (Panel A), workup (Panel B), Diagnosis (Panel C) and treatment (Panel D).*

1) Differential diagnosis provided by ChatGPT	points (0-3)	
final diagnosis is included in the differential diagnosis	1	plus
no important diagnoses are missing	1	plus
differential diagnosis does not contain wrong answers	1	
2) Further workup	points (0-4)	
targeted workup	1	plus
not too wide (does not contain unnecessary tests)	1	plus
does not contain wrong tests	1	plus
no "vital" test missing	1	
3) Final diagnosis	score (0-1)	
correct diagnosis	1	or
wrong diagnosis	0	
4) Treatment	score (0-2)	
correct targeted treatment	2	or
partially correct/correct but not personalised	1	or
wrong treatment	0	

Table 1. *Scoring system used for evaluation of ChatGPT-4 performance.*

[Abstract:2542]

DEVELOPMENT OF ARTIFICIAL INTELLIGENCE TRANSFORMER MODEL FOR PROGNOSTICATION IMPROVEMENT IN PATIENTS WITH MIOCARDIAL INFARCTION AND MALIGNANCIES

Elizaveta Gennadevna Skorodumova, Elena Andreevna Skorodumova, Anna Viktorovna Siverina, Victor Avenirovich Kostenko, Isa Supianovich Magamadov

I.I. Dzhanelidze research institute of emergency medicine, St. Petersburg, Russia

Objective: To elaborate a scale to predict cardiovascular death in patients with myocardial infarction and malignancies.

Methods: 106 patients with myocardial infarction and cancer were included in the study, (64 men (60.4%) and 42 women (39.6%), mean age 63.8±13.4 years. Among the study group, 56 patients had a negative prognosis, which corresponded to the minimum level of statistical significance $p<0.05$.

Results: This model showed following diagnostic levels of the scale values: total cholesterol (TC) level 6.26 mmol/l, RDW-CV - 16.3%, neutrophils - 53.1%, eosinophils - 6.3%, leukocytes - 9.1 $x10^9$(l). In individuals with TC levels less than 6.27 mmol/l, without increases in ultrasound hepatic density, non-obstructive lung disease/level of RDW-CV less than 16%, only 1 patient deceased versus 24 patients with cholesterol level less than 6.26 mmol/l, who demonstrated increased hepatic density and neutrophils above 51.3%, eosinophils above 6% against a total leucocyte count of 9,1 $x10^9$/l. The F-criterion of the full model was -6.3, and the coefficient of determination R2=4.5; the significance level was p=0.03. The sensitivity of the model was 85.7%, and the specificity was 87.5%. The area under the ROC-curve was 0.798, which corresponded to a score of 'good' on AUC.

Conclusions: The model haematological parameters used in routine practice were as follows: RDW-CV, leucocyte count,

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segmented neutrophils, eosinophils, TC, as well as increased hepatic density according to ultrasound scanning and the presence of chronic obstructive pulmonary disease. All parameters are maximally reproducible in clinical practice not only for inpatients, but also for outpatients.

Keywords: *artificial intelligence, myocardial infarction, malignancy*

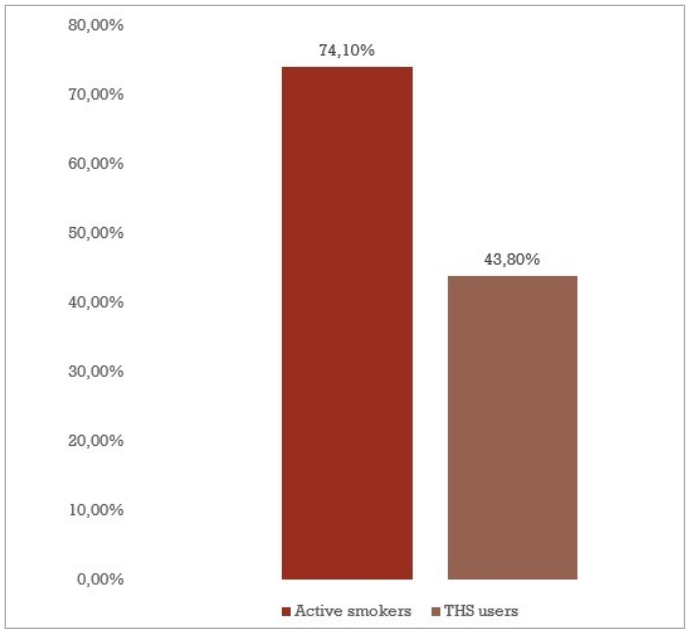

Figure 1. *Artificial Intelligence Proposal.*
To reduce the number of deaths from heart attack in combination with cancer, artificial intelligence recommends switching to nicotine replacement therapy.

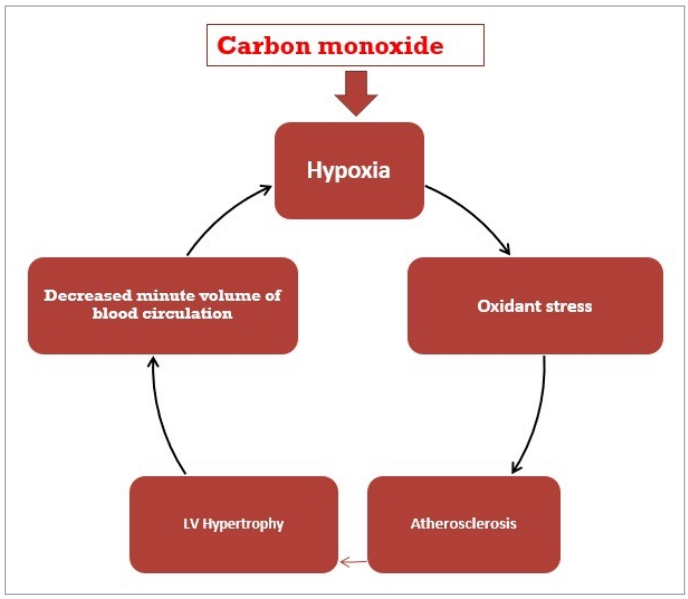

Figure 2. *Formation of a vicious circle for lung cancer*

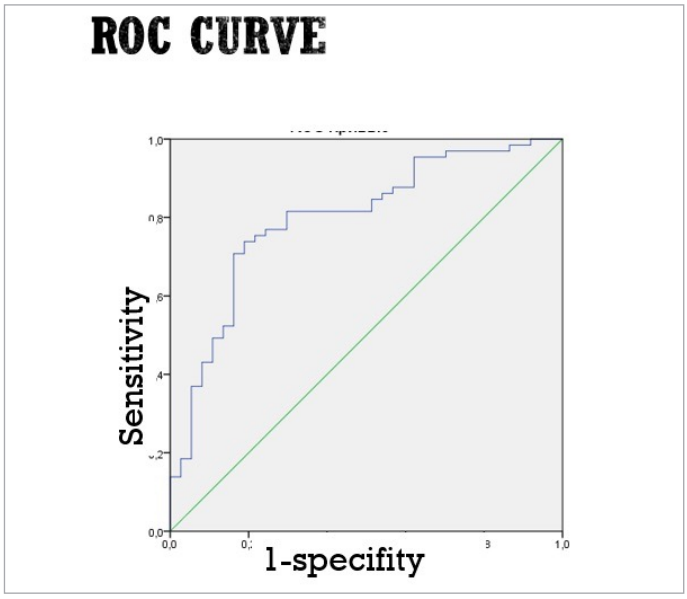

Figure 3. *ROC-Analysis.*
Predictive Value. The sensitivity of the model was 85.7%, and the specificity was 87.5%. The area under the ROC-curve was 0.798, which corresponded to a score of 'good' on the area under the curve scale.

[Abstract:2916]

CLINICAL ANALYSIS OF GLYCEMIC TRENDS IN PATIENTS USING MOBILE HEALTH APP FOR BLOOD GLUCOSE MONITORING

Zeynep Pelin Polat[1], Selahattin Colakoglu[1], Asli Yildiz[2], Beyzanur Yoldas[3]

[1] Department of Clinical Research and Development, Albert Health Ltd., Istanbul, Turkey
[2] Faculty of Medicine, Biruni University, Istanbul, Turkey
[3] Faculty of Pharmacy, Bezmialem Vakif University, Istanbul, Turkey

Summary: Digital diabetes solutions can enhance patient self-management, leading to improved glycaemic control.
Purpose: The goal of this research is to evaluate the effect of self-monitoring blood glucose (BG) with a mobile app on diabetes management and estimated HbA1C reduction in users monitoring their glucose levels for at least one month.
Methods: We conducted a retrospective analysis on glucose-tracking behaviours and levels of diabetic users of a mobile health app (Albert Health) over one-month period. We measured the difference between average BG levels in the first and last weeks to identify any decrease in BG levels.
Findings: Data from 117 users were found eligible for the analysis. The mean age of the eligible users was 50.88 years and with a 1:5 female to male ratio. The mean number of glucose recordings was calculated as 79.7 per user. The median day difference between the first and last recordings of users was 102 days. Data shows that 62.39% of users who have been tracking their BG for at least one month showed an improvement in their BG levels. 55.56% of these users exhibited a reduction in their estimated HbA1C, with an average difference of 1.35.

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Conclusions: The findings suggest that regular monitoring of BG levels via mobile health apps can lead to significant improvements in glycaemic control. This underscores the potential of mobile health applications as effective tools for chronic disease management and patient self-care.

Keywords: *glucose monitoring, diabetes management, mobile health, digital health*

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