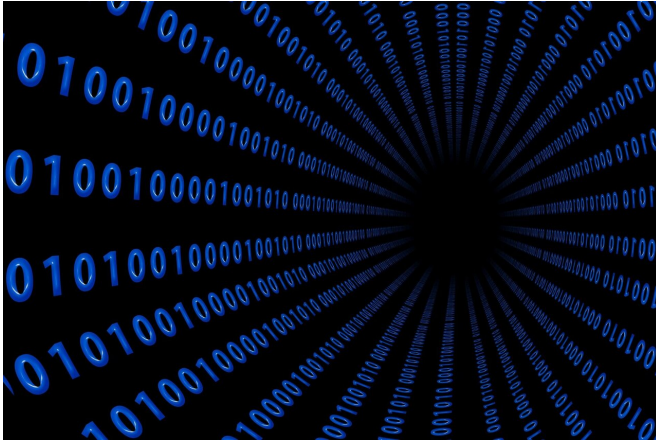


Improved use of databases could save billions of euro in health care costs

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Years of suffering and billions of euro in global health care costs, arising from osteoporosis-related bone fractures, could be eliminated using big data to target vulnerable patients, according to researchers at Lero, the SFI Research Centre for Software.

A study of 36,590 patients who underwent bone mineral density scans in the West of Ireland between January 2000 and November 2018, found that many [fractures](#) are potentially preventable by identifying those at greatest risk before they fracture, and initiating proven, safe, low-cost effective interventions.

The multi-disciplinary study, led by Lero's Prof. John J. Carey, Consultant Physician in Medicine and Rheumatology, Galway University Hospital, Mary Dempsey, Mechanical Engineering and Dr. Attracta Brennan, Computer Science, National University of Ireland Galway has just been published in the *British Medical Journal*.

The Irish dual-energy X-ray absorptiometry (DXA) Health Informatics Prediction (HIP) project on bone

mineral density now plans to assess current diagnostic classification and risk prediction algorithms for osteoporosis and fractures, according to Prof. Carey.

"This will identify which predictors are most important for Irish people at risk for osteoporosis, and develop new, accurate and personalized risk prediction tools using the large, multicentre, longitudinal follow-up cohort.

"Furthermore, the dataset may be used to assess, and possibly support, the assessment and management of other chronic conditions such as cardiovascular disease, cancer and other illnesses due to the large number of variables collected in this project," he added.

Prof. Carey points out that while Ireland has one of the highest osteoporosis rates globally, currently there is no national public or government policy to address the healthcare requirements of osteoporotic fractures, with costs rising rapidly.

"In Ireland, public hospital bed days have increased by almost 50% in the past decade for osteoporotic fractures and outnumber heart attacks, cancer, diabetes and many other illnesses that receive much greater attention," he added.

"Preliminary estimates suggest the number of fragility fractures and deaths following fracture for Irish adults aged 50 years and older in 2020 was similar or greater to the numbers with COVID infection, but there is no daily report on the numbers tested, hospitalized or who die following a fracture. Use of these and other data could help close those gaps," he added.

Prof. Carey says there is a global osteoporosis health crisis, with predictions of American medical costs associated with osteoporotic-related fractures including productivity losses and caregiving expenditure to exceed \$94 billion (€77.6bn)

annually by 2040.

Provided by Science Foundation Ireland

Prof. Carey said previous studies have shown, for example in 2010, approximately 43,000 European deaths were fracture-related while expenditure related to osteoporosis exceeded €37 billion. "A modest 5% reduction in those costs would result in an annual saving of €1.85bn at 2010 prices," he added.

"We now have big datasets, similar to the one utilized in our study, available throughout the globe. Cost-effective, innovative forms of data interrogation such as AI(Artificial Intelligence) will enable the timely identification and treatment of patients vulnerable to osteoporosis fractures, providing them with better care and using precious resources efficiently. There will be many opportunities to provide better patient outcomes and save billions of euro," he added.

Prof. Carey believes this collaboration between clinicians, [big data](#) scientists, engineering and computer scientists in Ireland, Britain and China will help leverage innovation, critical thinking and international partnerships to accelerate their program and opportunities.

Director of Lero, Professor Brian Fitzgerald, said the utilization of AI, as envisaged by Prof Carey and his team, shows how software development initiatives can directly impact people's lives at a fundamental level. Lero is a world leader in research on connected health and human performance.

"When Lero's work can help alleviate suffering, improve patient outcomes and freeup resources, then we are doing the job we were established to do, and that's very rewarding for all concerned," he added.

More information: Erjiang E et al. The Irish dual-energy X-ray absorptiometry (DXA) Health Informatics Prediction (HIP) for Osteoporosis Project, *BMJ Open* (2020). [DOI: 10.1136/bmjopen-2020-040488](https://doi.org/10.1136/bmjopen-2020-040488)

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