Patients' EHR **Sequential Events Medical Events Prediction Layer Attention Layer** X3 • 571.6 • 571.8 Demographics Family Pedigrees Activation Recurrent Neural Networks **Function** Name Age Sex Address Account **Patient Representation** $h'=\sigma(\Sigma(\alpha'Wh))$ Medical Ontology Representation Ontology $g=\Sigma(\alpha e)$ **Knowledge Graph** v2 Structure of International Classification of Diseases Cd Ce Coding Weighted Sum Visit Representation System [v1,v2,v3,...,vt]=tanh(GH') **Embedding Matrix**