Supporting Information S2 Text for Talukder AK, Schriml L, Ghosh A, Biswas R, Chakrabarti P, Haas RE. Diseasomics: Actionable Machine Interpretable Disease Knowledge at the Point-of-Care

The diseasomics we constructed is both human understandable and computer interpretable. The computer interpretable diseasomics knowledge base is stored in a graph database.

This supplementary information contains screenshots of ancillary medical knowledge that supports the diseasomics to offer holistic healthcare. Because the medical knowledge in the diseasomics knowledge graph is machine interpretable, this knowledge is enhanced through controlled vocabulary with the help of semantic & thematic integration of external knowledge sources. Following screenshots show the advantage of machine interpretable actionable medical knowledge (physicians’ digital twins) that can be used by expert and non-expert health workers alike.

Fig 1 in S2 Text: Statistically significant (p-value < 0.05) spatial comorbidity for male of age between 60 to 69 population (1060069). This knowledge is thematically integrated with the diseasomics [1].
Fig 2 in S2 Text: The resistomics integration with the diseasomics knowledge graph. In Figure 3 first disease shown is pneumonia for co-occurring symptoms fever, night sweat, and coughing blood. When we click pneumonia (the first disease in Figure 3) in the Disease column a resistomics screen pops up as shown here. First column in the pop-up resistomics screen shows all disease causing bacteria for bacterial pneumonia. Second column in the resistomics screen shows the antibiotics that are resistant to the selected bacteria Escherichia coli in this case. The third column is the digital triplet of pneumonia. The Digital Triplet is constructed through vector embedding [2].
Fig 3 in S2 Text: The oncolomics knowledge for NCIt code NCIT:C3081. In Figure 3 of the main article, the second disease in the Disease column is heart cancer. The CodeInfo column for heart cancer includes the NCIT code NCIT:C3081 and NCIT:C3548. Here in this figure we see all nodes with their respective names and descriptions connected to NCIT:C3081 in the oncolomics knowledge graph [3].
Fig 4 in S2 Text: Semantic integration of patholomics with diseasomics. In this figure we show the pathology test with the disease description and the statistically significant age group. Here we show the hypophosphatemia and hyperphosphatemia for different age groups with associated diseases [1].
Fig 5 in S2 Text: This figure shows diseaseomics used in telemedicine for remote care integrated with patient records in the EHR [4]. During a telemedicine session, the doctor and patient are having an audiovisual chat using WebRTC technology. WebRTC is ultra-low latency real-time peer-to-peer and end-to-end encrypted communication between two browsers. WebRTC is standardized by W3C and IETF and works without any plugins or downloads or any intermediate servers. In this figure we can see differential diagnoses from the diseaseomics knowledge graph accessed through API. The care provider selects one of these diseases as the primary diagnosis. The caregiver also enters the medical notes and the prescribed medication which are saved in the EHR.

References