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Big Data in Healthcare

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EHR – The Benefits

- Electronic Health Records (EHRs) are digital versions of a patient's medical information
- They benefit patients allowing medical records to be available across all healthcare facilities
- They allow quick cross-referencing across various datasets
- They decrease costs to the healthcare provider
- They enable data mining and machine learning approaches

Big data in Healthcare Industry

- Heterogeneous distributed Electronic Heath Records (EHRs)
- Unstructured data
- Longitudinal health records
- Transition to digital health model
  - Combination of EHR and mobile health (mHealth)
  - Wearable solutions and emerging markets

Big data in Healthcare - Users

- Patients
- Clinicians
- Healthcare providers
- Government agencies
- Decision-Makers
- Insurance companies
- Other third-party associates

Primary clinical vs Secondary Research Use

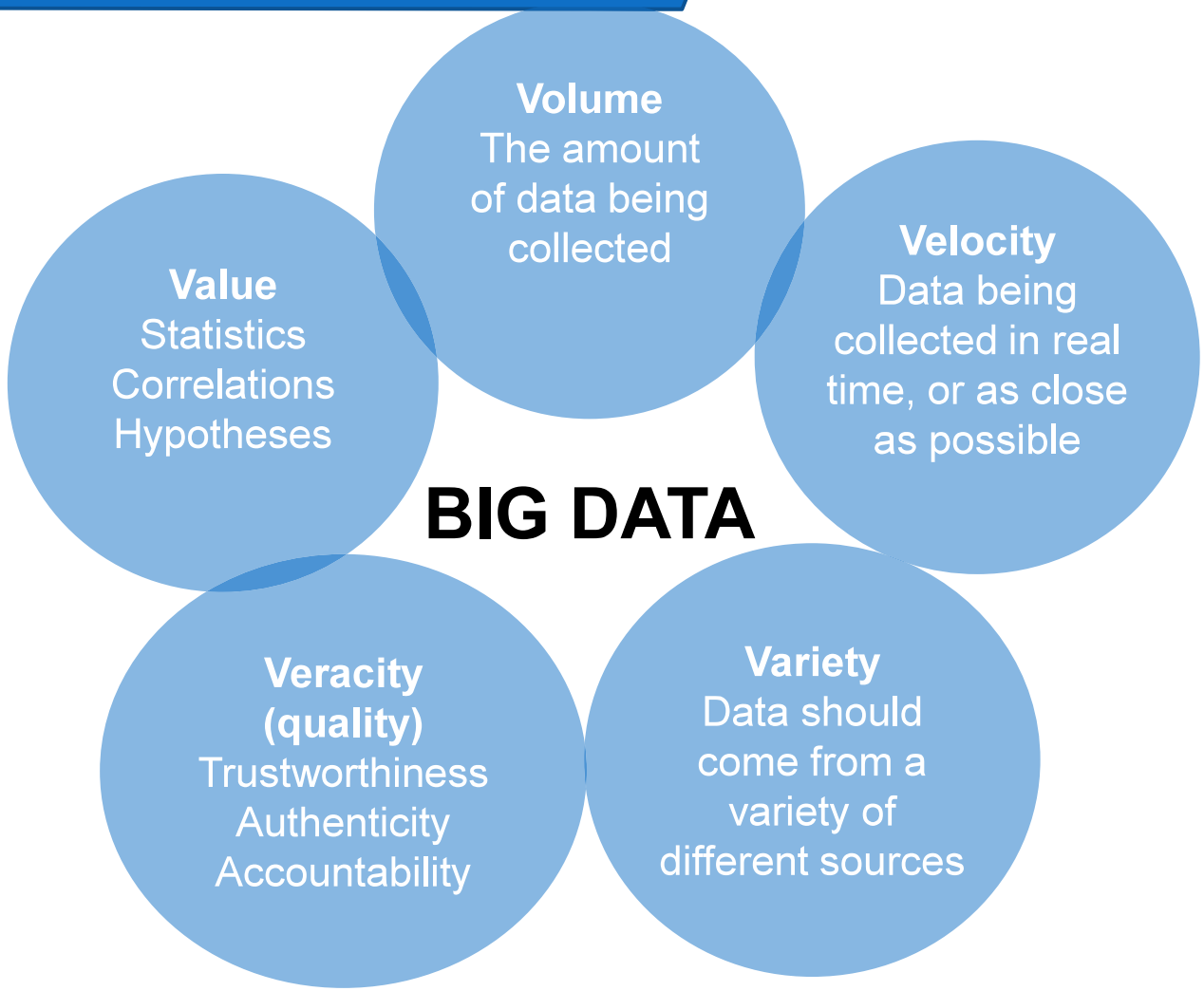
Primary Clinical Use

- Single Patient Data
- Administrative
- Billing Insurance data
- Laboratory results

Secondary Research Use

- Groups of patient data
- Immunisations
- Radiology reports
- Allergies Lists

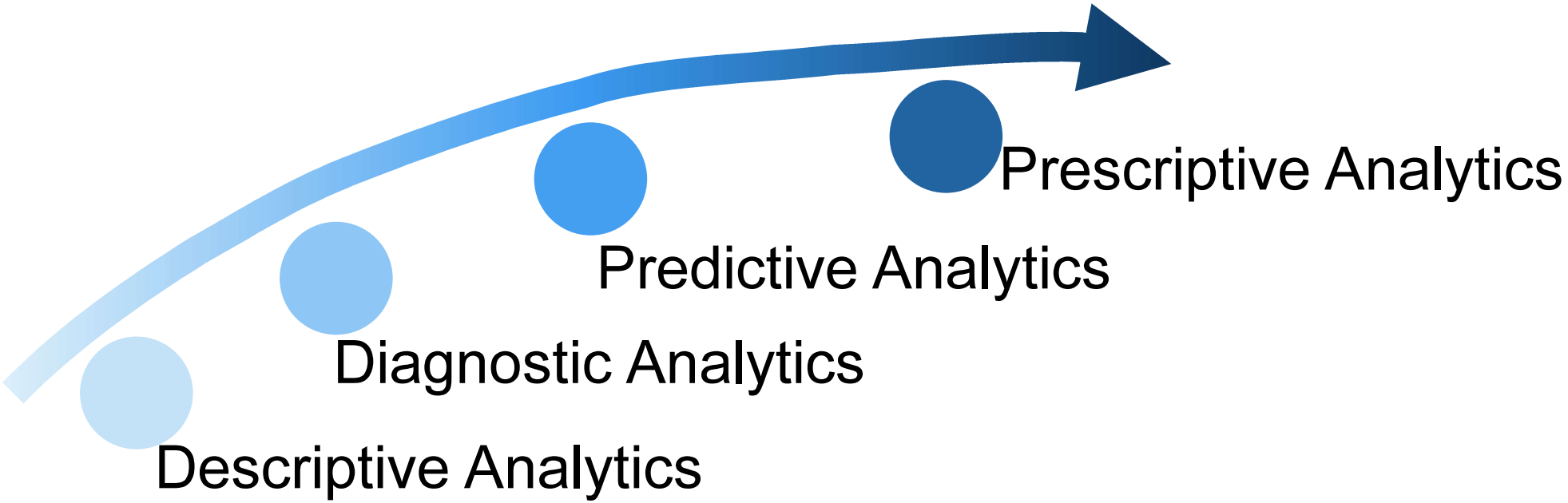
The 5 V's of Big Data



Metadata – data about data

- Facilitates quicker dataset linkage
- Maintains consistent methodology
- Ensures information is easy to find, retrieve, and distribute
- Ability to retrieve information in nearly real-time
- Enables more robust and descriptive information extraction

Healthcare Information Retrieval from Data



Challenges of Big Data

- Interoperability
- Siloes Policies and Governance
- Volatility
- Vulnerability
- Lack of Intuitive Visualisations
- Data Growth
- Lack of Expertise

Summary

- Big data in Healthcare present unique opportunities and challenges
- Healthcare data is a valuable asset defined based on their Volume, Variety, Velocity, Veracity and Value
- Clinical decision support systems exploit information via descriptive, diagnostic, predictive and prescriptive analytics

References

- Panesar, ‘Machine Learning and AI for Healthcare: Big Data for Improved Health Outcomes’, Apress, 2019.
- Johnson et al. ‘Standardized electronic health record data modeling and persistence: A comparative review’, Journal of Biomedical Informatics, 2020.