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DATA INTEGRITY IN PHARMA: GOING OVER THE BASICS

With a new guidance on Data Integrity (DI) being prepared by the World Health Organization (WHO) [1] to replace its previous one [2] and add to those already issued by regulatory agencies, such as the European Medicines Agency (EMA) [3, 4], the Medicines & Healthcare Products Regulatory Agency (MHRA) [5], and the Food and Drug Administration (FDA) [6], let us recap a few essential concepts related with DI.

The above guidelines set up the requirements for a compliant data governance system across all GxP pharmaceutical activities (good laboratory practice, good clinical practice, good manufacturing practice, good distribution practice and good pharmacovigilance practice) and regulatory submissions. DI compliance is required for active pharmaceutical ingredients and finished products drugs (including biologics).

For practical advice on meeting DI regulatory requirements, see the International Society for Pharmaceutical Engineering (ISPE) guidance documents [7, 8, 9, 10].

ADDRESS: Av. António Augusto Aguiar Nº 108 Floor 4 / 1050-019 Lisboa, Portugal
PHONE: +351 21 606 2788 | **EMAIL:** hello@4TuneEngineering.com

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Data Integrity can be defined as the *"degree to which data are complete, consistent, accurate, trustworthy, reliable and that these characteristics of the data are maintained throughout the data lifecycle"* [5]. Data integrity is crucial throughout the data lifecycle, covering many activities that go from data creation to data disposal, and applies equally to manual (paper-based) and electronic systems (including data records such as photographs, microfilm, audio or video files). Besides, under the DI framework, both data lifecycle and systems lifecycle should be considered together.

Ensuring DI is a shared cross-level responsibility within an organization going from senior management to the shop floor personnel and extending to the company's suppliers and distributors.

DATA LIFECYCLE

Data Lifecycle comprises all phases in the life of the data from generation and recording through processing (including analysis, transformation or migration), utilisation, data retention, archive/retrieval until retirement and disposal.

DATA GOVERNANCE

Data Governance consists in the procedures and measures defined and implemented to assure the integrity of the data. I.e., to ensure that data, irrespective of the process, format, or technology in which it is generated, will follow the ALCOA+ principles throughout the data lifecycle.

ALCOA (OR ALCOA+)

ALCOA+[1] defines the attributes of data quality required for regulatory purposes. Data should be:

= **A**ttributable to the person generating the data, *i.e.*, data should be traceable to an individual.

= **L**egible and permanent.

= **C**ontemporaneous with the task being performed, *i.e.*, people should record data and information at the time these are created and acquired.

= **O**riginal. The first (or source) capture of data/information (original record) or a copy of the original record that has been verified to have the same the same information as the original (true copy).

= **A**ccurate.

= Complete – the data must be whole; a complete set,
Consistent - the data must be self-consistent,
Enduring - durable; lasting throughout the data lifecycle for the defined retention period,
Available - readily available for review/audit/inspection purposes.

[1]The "+" was added later on to the ALCOA definition to emphasise the data quality requirements for regulatory purposes, but formally, there is no difference in expectations.

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A commitment to Quality Culture

Regulatory agencies expect companies to implement effective strategies to manage DI risks, based on *Quality Risk Management* foundations (as per ICH guidance for industry Q9 Quality Risk Management [11]). The endeavours related with a data governance program should be adequate with the risk and impact of a DI failure to the patient safety, product quality or environment.

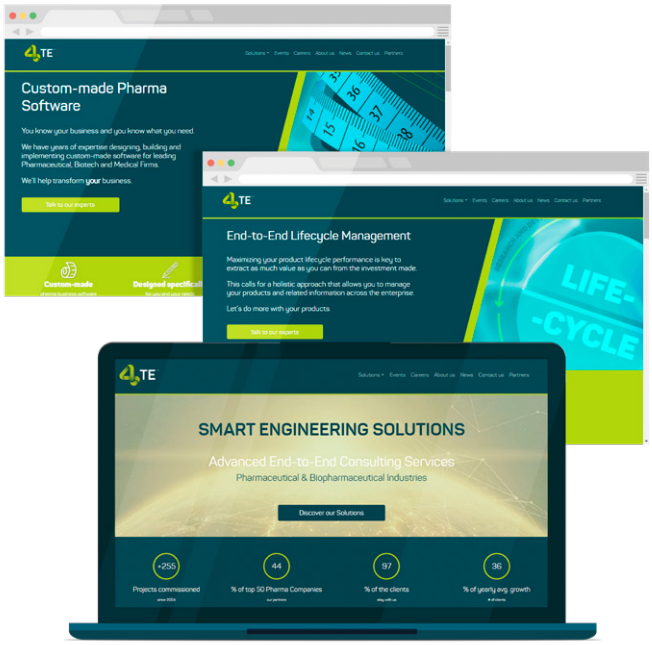
> *Assuring data integrity requires appropriate quality and risk management systems, including adherence to sound scientific principles and good documentation practices* [5]

Every top organization should be committed and persevere in adopting a **critical thinking** path and promoting a **quality culture**. Pursuing a **continuous improvement** landscape requires well-integrated and articulated Quality and Data governance systems. The use of **Quality Risk Management** (QRM) tools [12] as those advocated by ICH Q9 [11] is paramount: it allows identifying the risks to DI and establishing systems/procedures and controls to minimize potential risks.

Where does Data Integrity fit into 4TE's business?

At 4TE, we apply DI principles in our business, namely in the development of our products and on the services we provide. Digital products' lifecycle management, in particular, incorporates DI principles from its design, development, testing and change management until retirement.

4TE also supports clients in the development of enhanced and new functionalities on existing digital products, and on the development of custom-made applications. At 4TE, we establish a close collaboration with clients to understand their business processes and concerns, so that DI principles are applied throughout the relevant project phases to ensure a smooth GxP system validation and corresponding system roll out.



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PHONE: +351 21 606 2788 | **EMAIL:** hello@4TuneEngineering.com

4TE provides 4.0 intelligent & Integrated solutions to support Pharma and Biopharma Industries' Digital Transformation. Focused on operational excellence, we assist companies improve decisively the entire lifecycle of their products and processes.
Founded in 2004 with offices in Lisbon and São Paulo.

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