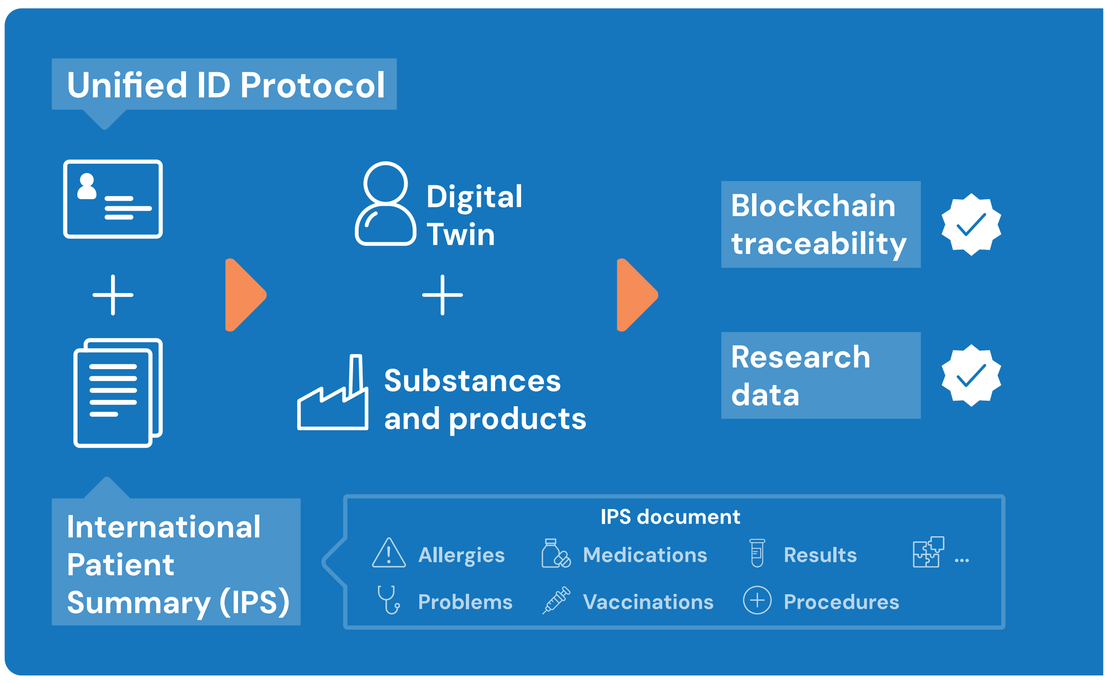
Donor-Centric interoperability for resilience, promotion and research

AUTHORS: F LATORRE[a,c,d], CE HAWKS[a], E BAHILLO[b], M GIL[a,d], B COLMENARES[a], D VERMA[c], N SALA[a,c,d]

Conéctate Soluciones y Aplicaciones, S.L., Soria, CYL, Spain.
Grupo de investigación GICE, Universidad de Valladolid, Soria, CYL, Spain.
Connecting Solution and Applications, Ltd., Vancouver, BC, Canada.
Fundación UNID, Soria, CYL, Spain.

BACKGROUND

- **Unified Identification Protocol (UIP):** Universal Donor ID linked to different donor and patient identifiers for cross-border healthcare (patented).
- **Secure data sharing** by using public/private keys generated by donors in the UIP (decentralized identity and **Web 3.0**).
- **Donors are the data owners** and the distinct donation facilities are the custodians of the information in Web 3.0 and data regulations.
- **International Patient Summary (IPS)** enables **cross-border data sharing (G7 approved)** and universal identification is enabled by UIP.
- **Blockchain enables Chain of Custody (COC)** for registering every donation, biological substance, derived product, adverse event and exclusion to donate, using the UIP.



AIMS AND METHODS

- Universal Identification and Holistic view of the donors
- Data resilience: offline data generation of donations, digital twins and raw materials for blockchain registration.
- Product quality: manufacturing traceability and digital twins.
- Transparency: product traceability.
- Anticipate supply chain disruptions and facilitate real-time order settlement.

Donors aggregate data from distinct facilities **and share their IPS document** containing the unified international health history.

Generation of digital twin from the IPS document containing anonymized and de-identified data, attached to the biological substance (raw material) by a donation facility.

Chain of Identity (COI) registration in Electronic Health Records (EHR) by donation facilities: Establishes unique links between donors, their biological materials, and any resulting medical products.

Unique Universal Identifiers (UUID v4) for resilience (online/offline) which can be registered and **linked to other identifiers** by software applications in the facility's EHR.

RESULTS

- Clinicians have **unified and immediate access to a holistic donor health dataset**, guaranteeing well-informed decisions and rigorous compliance with international donation protocols.
- **Digital twins** grant manufacturers an unparalleled insight into biological material quality.
- **Product precision and personalization:** manufacturers amplify therapeutic efficiency and curtailing potential side-effects.
- **Research Advancements:** an enriched dataset stemming from IPS documents facilitates deeper and more comprehensive research explorations.
- **Resilience in Disruptions:** Leveraging UUID v4 bolsters system resilience, safeguarding against unpredictable network interruptions.
- **Supply Chain Fortification:** AI proactively identify, analyze, and address potential disruptions in the supply chain, ensuring seamless operations and timely delivery.

CONCLUSIONS

Through the fusion of Web 3.0, Industry 4.0 and innovations like digital twins and the Unified Identification Protocol, we're pioneering a biomedical renaissance. This integration promises unparalleled precision and customization in production, while COC and COI enhance traceability. Together, these elements are reshaping a more agile and individualized healthcare future.