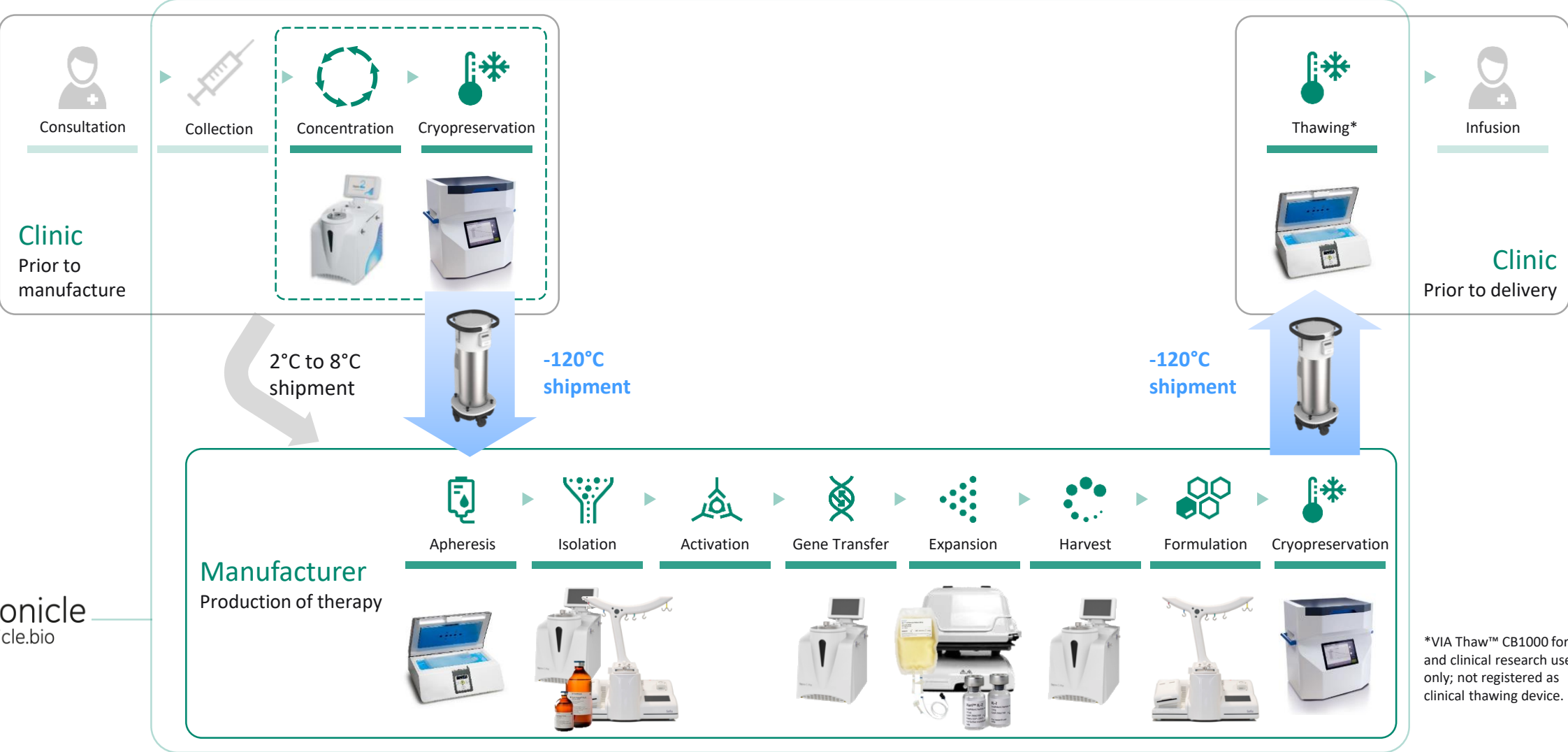




Automating the Cell & Gene Therapy Manufacturing Workflow

16-NOV-2020

The Cell Therapy workflow



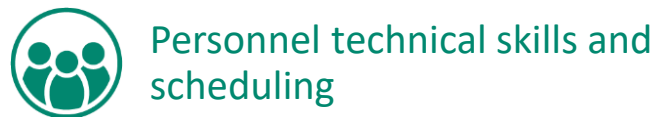
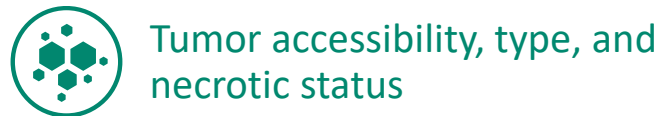
*VIA Thaw™ CB1000 for lab and clinical research use only; not registered as clinical thawing device.

2

Challenges associated with the acquisition of starting material

Tissue acquisition: multiple challenges

Clinical and patient constraints



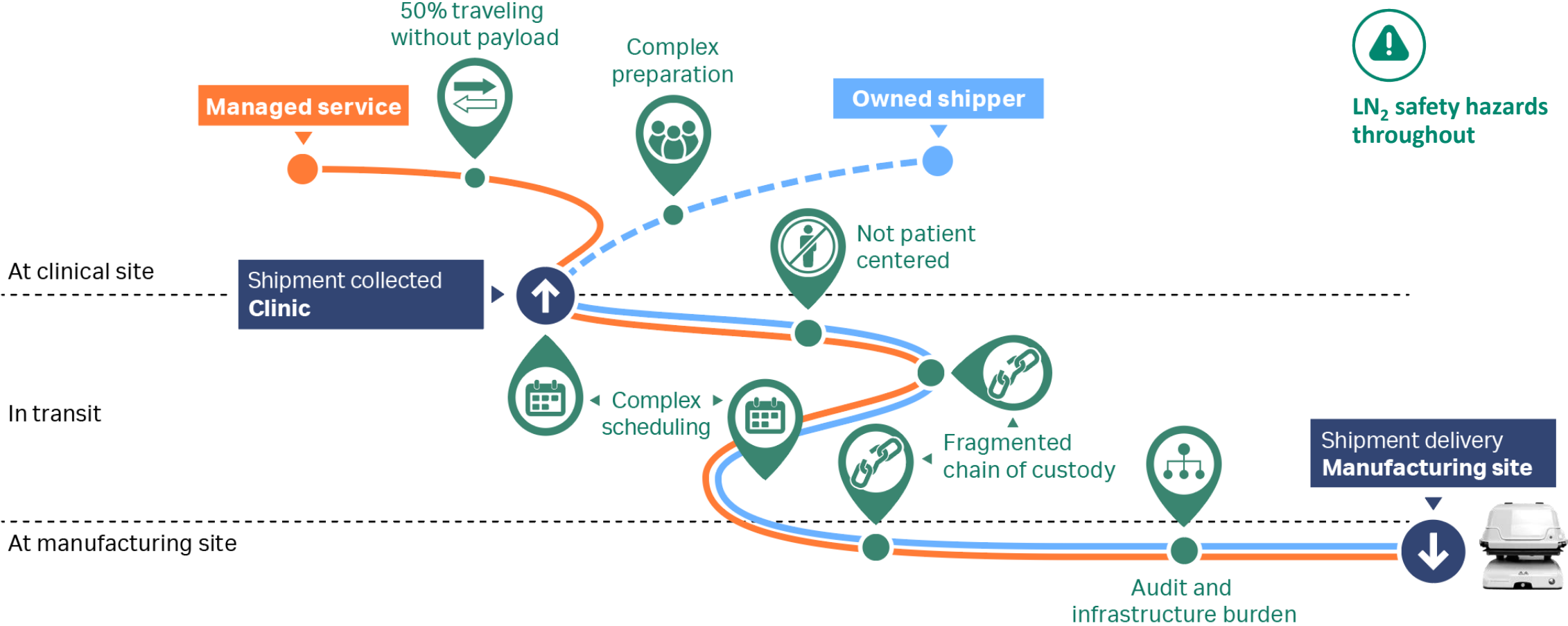
Logistics issues



Processing criticalities



The challenges of cryogenic shipments

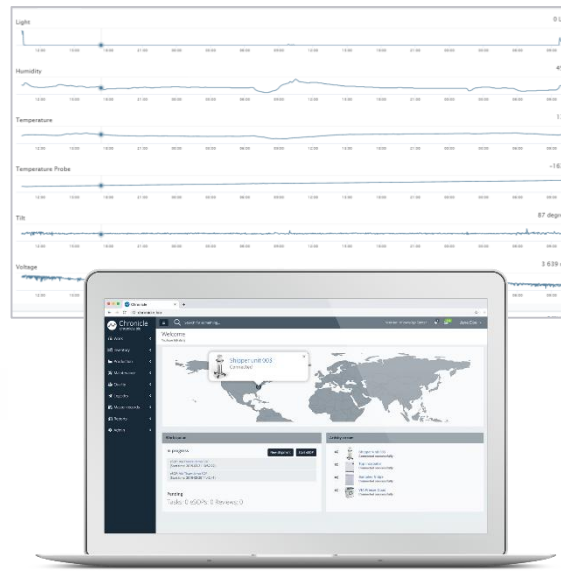


3

Technology developments to support the acquisition of starting material

VIA Capsule monitoring feed

Integrated smart monitor uploads continuous condition continuity data to Chronicle™ software

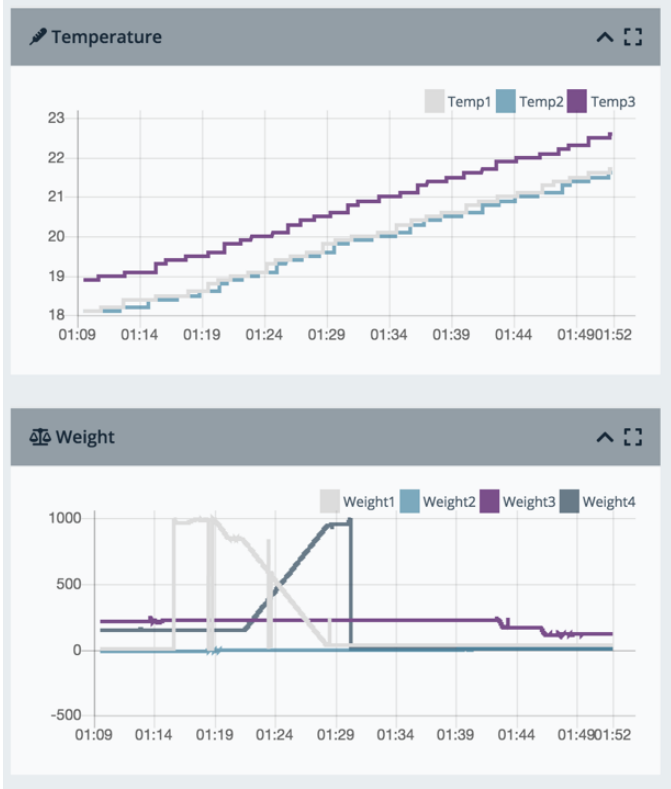


- **Chronicle software monitors shipment in real time** to verify that critical condition parameters are maintained
- **Multiple conditions constantly monitored:** core temperature, external temperature, light, humidity, tilt, and voltage
- **Alerts nominated person** if predetermined excursions occur
- **GPS feed** tracks location of sample throughout transit process

Utilizes standard Chronicle credit system

Chronicle manufacturing automation software

Directs operators and captures process data unites with hardware monitoring data in digital e-batch records



Chronicle logistics features

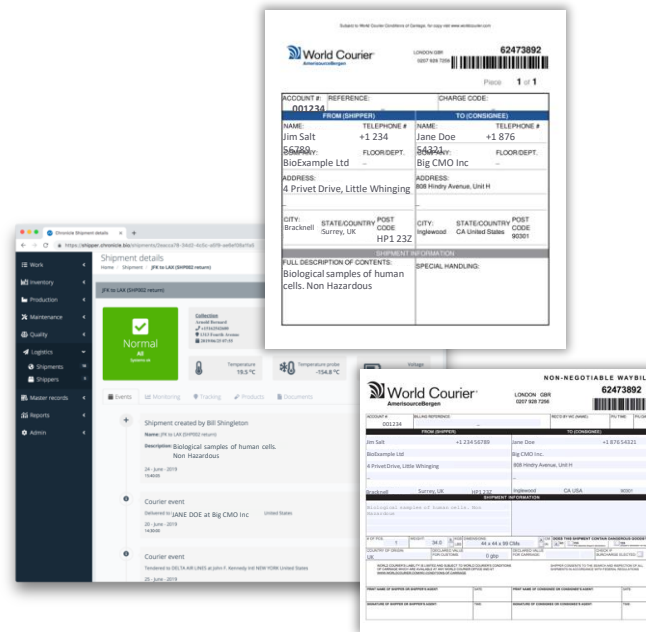
Logistics process control, monitoring, and documentation tools

eSOP tool



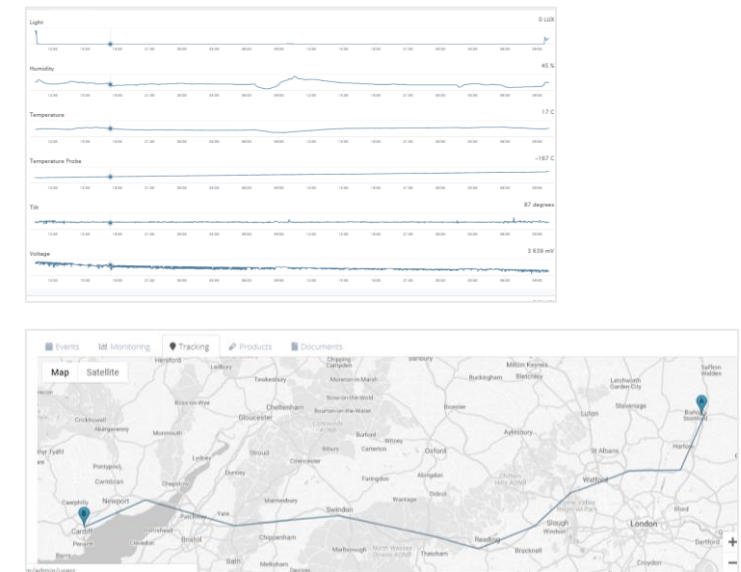
- Logistics process standardization
- Chain of custody captured
- Chain of identity controlled

World Courier™ integration



- e-booking shipments
- Shipment documentation portal
- Courier handling events

Condition and location dashboard

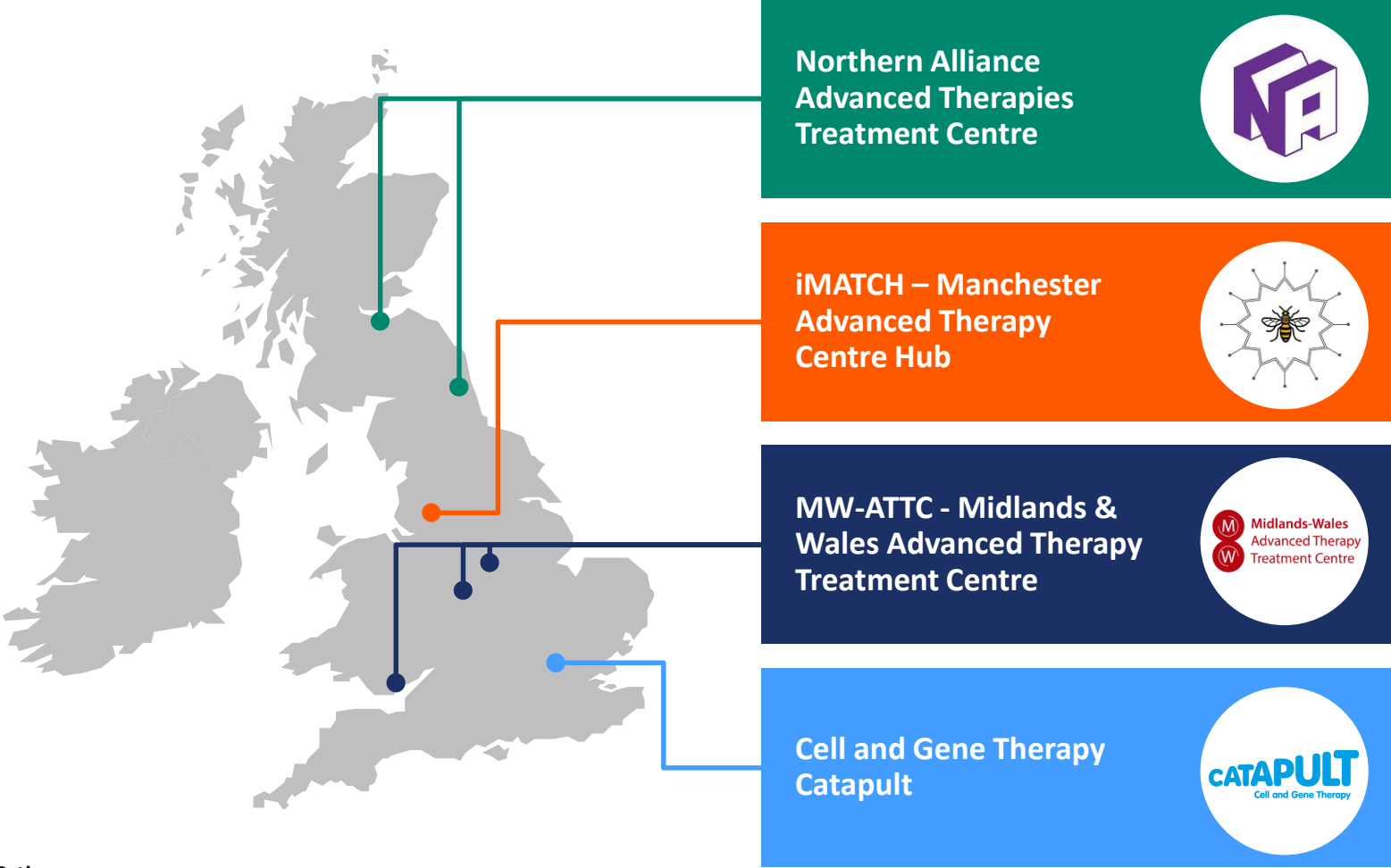


- Condition continuity monitoring

4

**Testing novel solutions for
automation, process control, and
logistics**

Advanced Therapy Treatment Centre (ATTC) network




SAMPLE
Building systems for the delivery of cutting-edge cell and gene therapies


www.theattcnetwork.co.uk

An integrated logistics network – MW-ATTC trialists

Multi-party trial involving Midland-Wales ATTC hub parties


 OrbsenTherapeutics

 **Cell therapy manufacture, UK mainland site**
Advanced Therapies Facility (ATF),
University of Birmingham


 **Cell therapy manufacture, Ireland site**
Galway

 **GIG Cymru NHS Wales**
Bwrdd Iechyd Prifysgol
Betsi Cadwaladr
University Health Board

 **Clinical site #2**
Morrison Hospital,
Swansea Bay University Health Board

 **Clinical site #1**
Cardiff Heath Hospital,
University Hospital of Wales

 **NHS**
Nottingham University Hospitals
NHS Trust

 **Clinical site #3**
City Hospital,
Nottingham University Hospitals NHS Trust


 **cytiva**

 **Cytiva**
Cambridge

 **ThermoFisher**
SCIENTIFIC

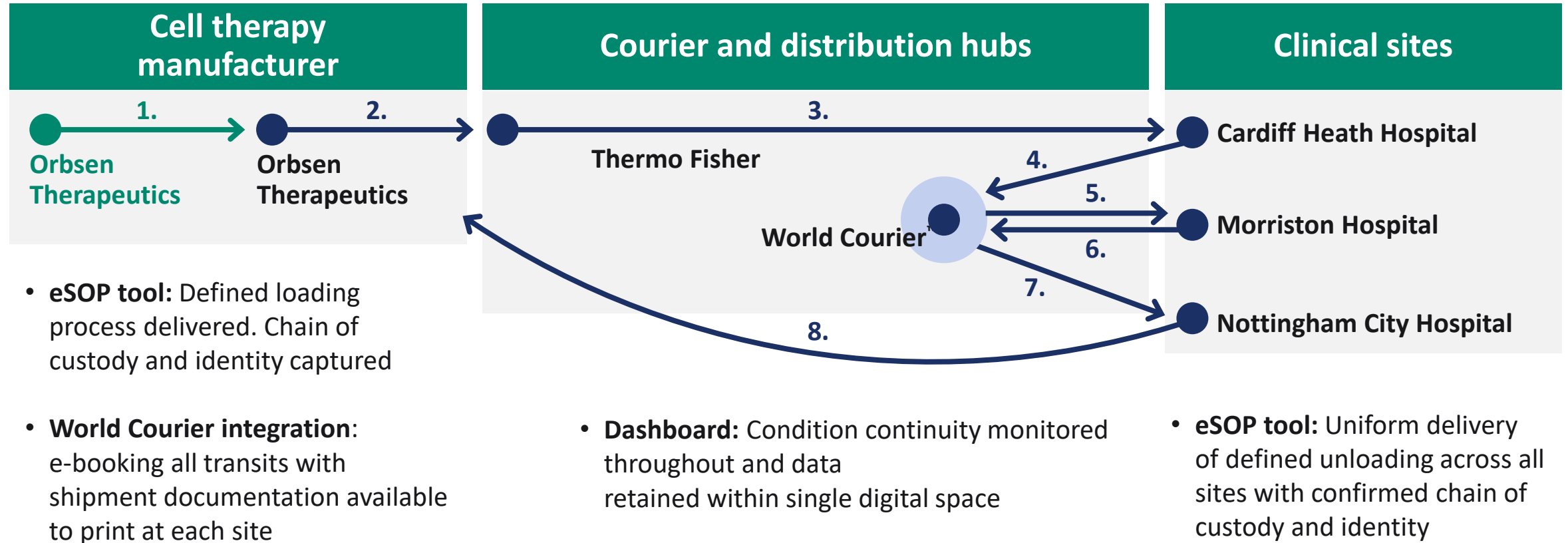
 **Storage distribution center location**
Bishop Stortford

 **World Courier®**
AmerisourceBergen

 **Courier hub location**
London Heathrow

Chronicle logistics features in practice

Complete electronic shipment record united with electronic batch record within Chronicle



A successful trial – post-thaw viability

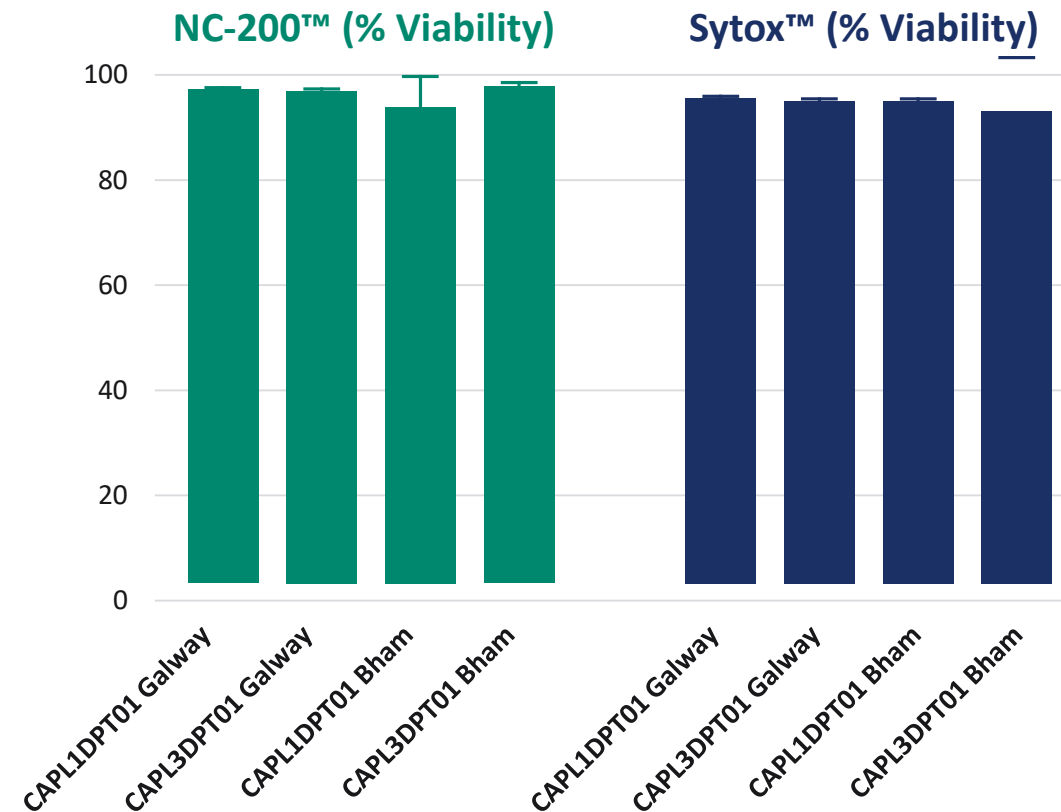
ORBCEL™ – post-thaw viability comparable with cell retained at source site

ORBCEL, a patented, highly purified, stromal cell immunotherapy manufactured by Orbsen Therapeutics, an allogeneic stromal cell immunotherapy company.

- Viability measured of cells retained at original site: Orbsen Galway site
- Compare to those received at final site in multi-leg shipment: Orbsen Birmingham (Bham) ATF site
- No substantial difference between viability measures

- Each error bar represents two independent vials.
- NC-200 viability is measured immediately post-thaw (fluorescent dyes acridine orange and DAPI automatically stain the total and dead cell populations, respectively.)
- SYTOX blue viability is obtained by flow cytometry within 2 h post-thaw.

End of multi-leg shipment trial viability comparison





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