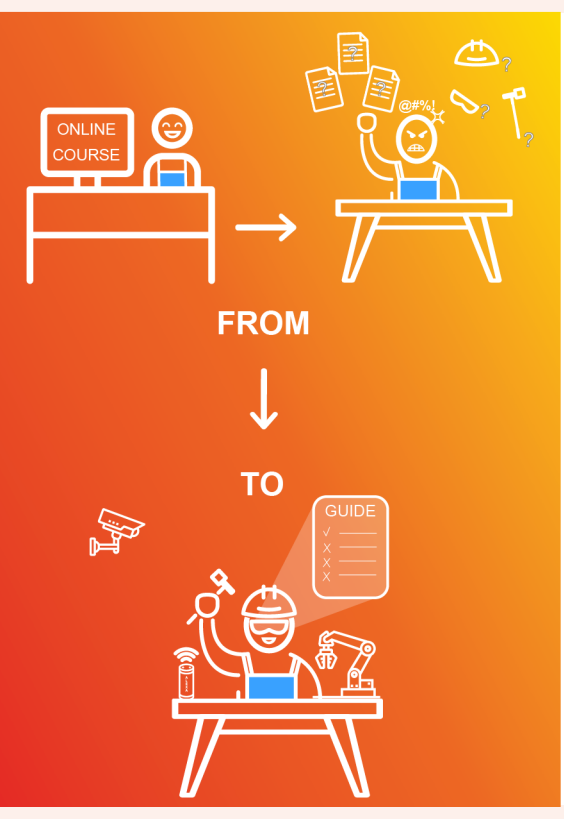
Any **question**? Any **additional information** needed? Still **not convinced** you can contribute to find (a) solution(s) to those challenges?
Please join us during a quick and interactive **webinar** next Monday **Jan. 21** either at **9.30 AM** (CET) or at **4 PM** (CET)

Challenge our training process to Standard Operating Procedure, keeping operations compliant when manufacturing vaccines in a regulated environment.



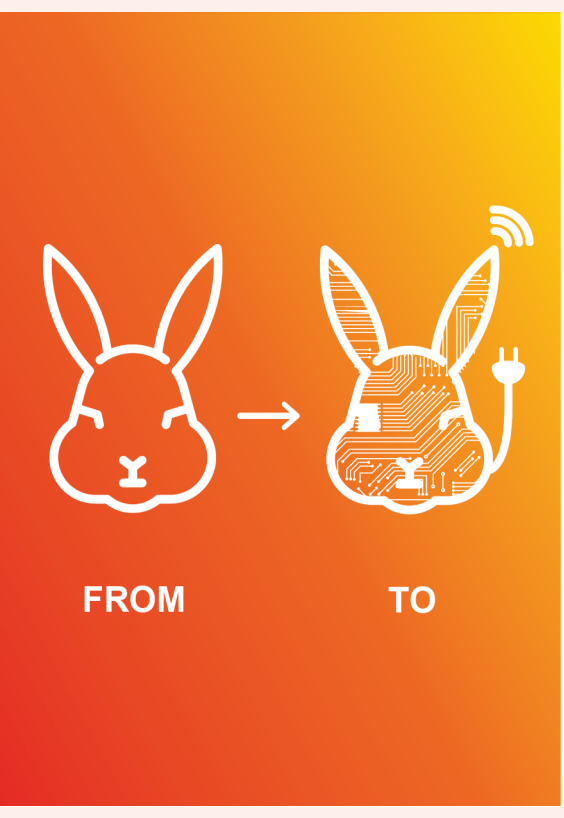
How to leverage the latest technology trends to train employees to Standard Operating Processes (SOPs)?

- How could you help us be trained **more efficiently** while being compliant and right the first time?
- How to train Employees **on-the-go** while ensuring the compliance of operations?
- How would you help us train Employees in a more practical and **user-friendly** approaches?
- Which solution to improve our learning experience?

Potential Solutions

- Virtual learning (augmented and virtual realities)
- Digital twin of the process
- Learning on the go (personal assistant through visual and/or vocal instructions)
- Cobotics

How emerging technologies could help limit the use of living models in vaccines development?



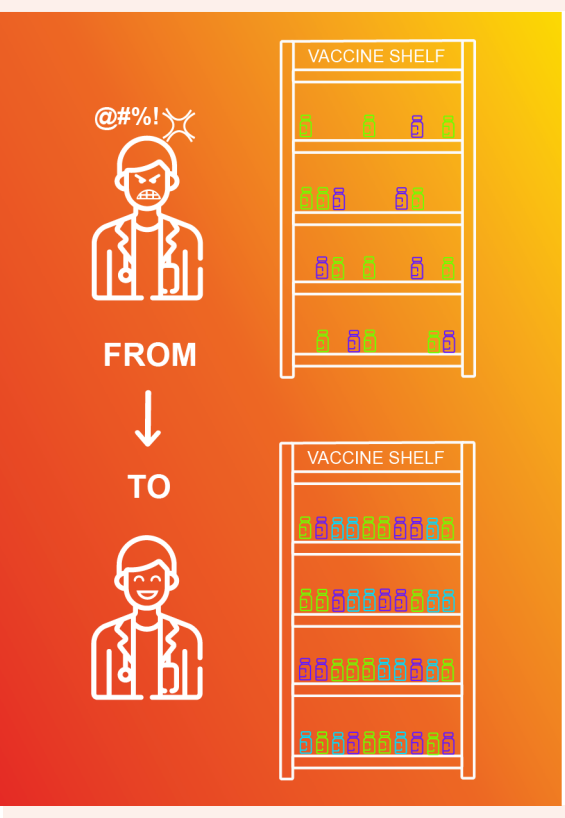
When animals are used in research, GSK is committed to acting ethically and practicing good animal welfare. Therefore:

- How could you help us **replace animal testing**?
- How could you help us **avoid or reduce the number of animals** used in a study?
- How could **artificial intelligence, machine learning, digital technologies** contribute to our objective? Help us **predict biological effect of new candidate antigens**?
- How could you help us **anticipate clinical outcomes** of new vaccines based on previous (pre)-clinical studies?
- How **organ-on-a-chip could help** us predict biological effect of new antigens?

Potential Solutions

- How to leverage past clinical data to better design future vaccines
- *In silico* model
- Organ-on-a-chip
- 3D-bioprinting organs

How to secure vaccination on demand even in the most remote region of the world?



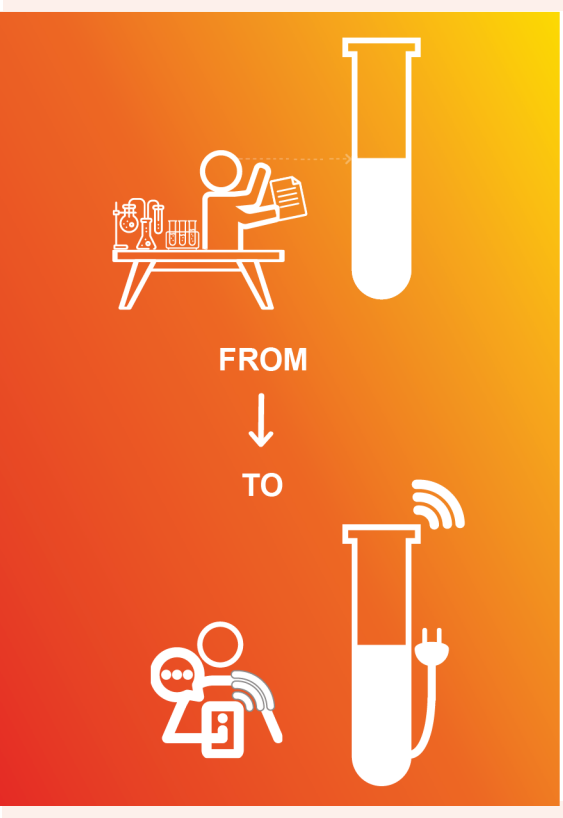
How to vaccinate anyone, anytime, anywhere, even in the most remote region of the world?

- How could you help us **ensure any physician in the world** would ever miss any vaccine, even in the most remote region?
- How could you help us to ensure vaccines are delivered **anywhere without being denatured**?
- How could you help us secure **vaccine production at anytime, anywhere**?

Potential Solutions

- Manufacture on-demand and on site
- Leverage learnings to anticipate logistic (shortage and distribution)
- Thermostable vaccines

How to quantify antigens online from the End-to-End process?



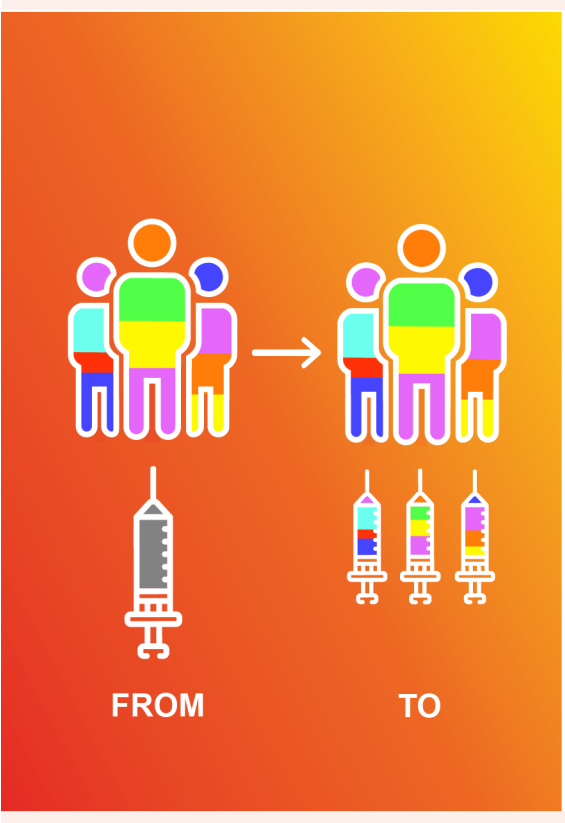
How antigens could be quantified in real-time during their production?

- How could you help us follow concentration of **specific antigens produced in real-time**?
- How could you help us follow concentration of antigens **without discontinuing their production flow**?
- Could you help us **remotely follow concentration of antigens produced** in real-time, without discontinuing the flow?

Potential Solutions

- Use physics' laws like Raman
- Use chemistry on-the-go
- Use sensors (IoT)
- Use robots
- Use modeling

How would you design the process that would allow production of a vaccine and vaccination of the patient within only 2 hours?



How to produce & administer a vaccine to patients within only 2 hours?

- What could be the **process flow**? The **principle**?
- **Which technology(ies) would you leverage** to reach this goal?
- What kind of devices would allow the production of personalized vaccines to vaccinate patients in only 2 hours?

How could we reach 100% transfer of a variety of different biological components such as nucleic acids, peptides, polypeptides, proteins, from low to high molecular weight, into the cytoplasm or nucleus of living cells?

Which methods could be used to reach 100% transfer of a variety of different biological components such as nucleic acids, peptides, polypeptides, proteins, from low to high molecular weight, into the cytoplasm or nucleus of living cells?

- **Which technology(ies)** would you leverage to reach this goal? **Physics? Chemistry? Nanotechnology?**
- Could any **bio-vector** such as viruses or bacteriophages or **chemical-vector** be used?
- Could different types of cellular compartment be targeted with your solution?
- What kind of biological components would you favor to transfer into living cells?
- Could your solution be used ***in vivo***? ***In vitro***?

Potential Solutions

- Nano-injection
- Electroporation
- Nanorobotics
- Physics and chemistry
- Virus and bacteriophage