

# HOW CAN THE SKILLS FOR WASTEWATER MONITORING AND EARLY WARNING SYSTEMS FOR PANDEMICS BE ACQUIRED AND PROMOTED?

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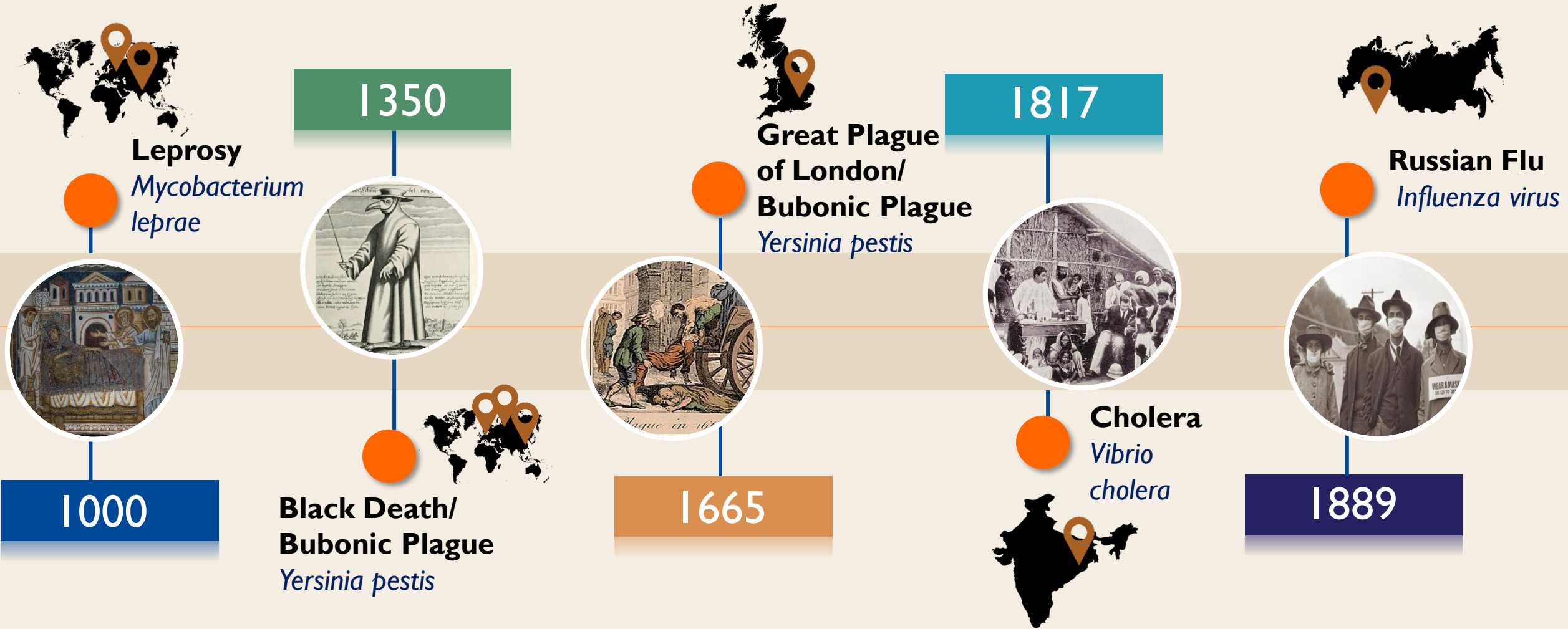
**Water Research Commission**

SFSA Discussion Forum on Skills to prepare South Africa for Future Pandemics

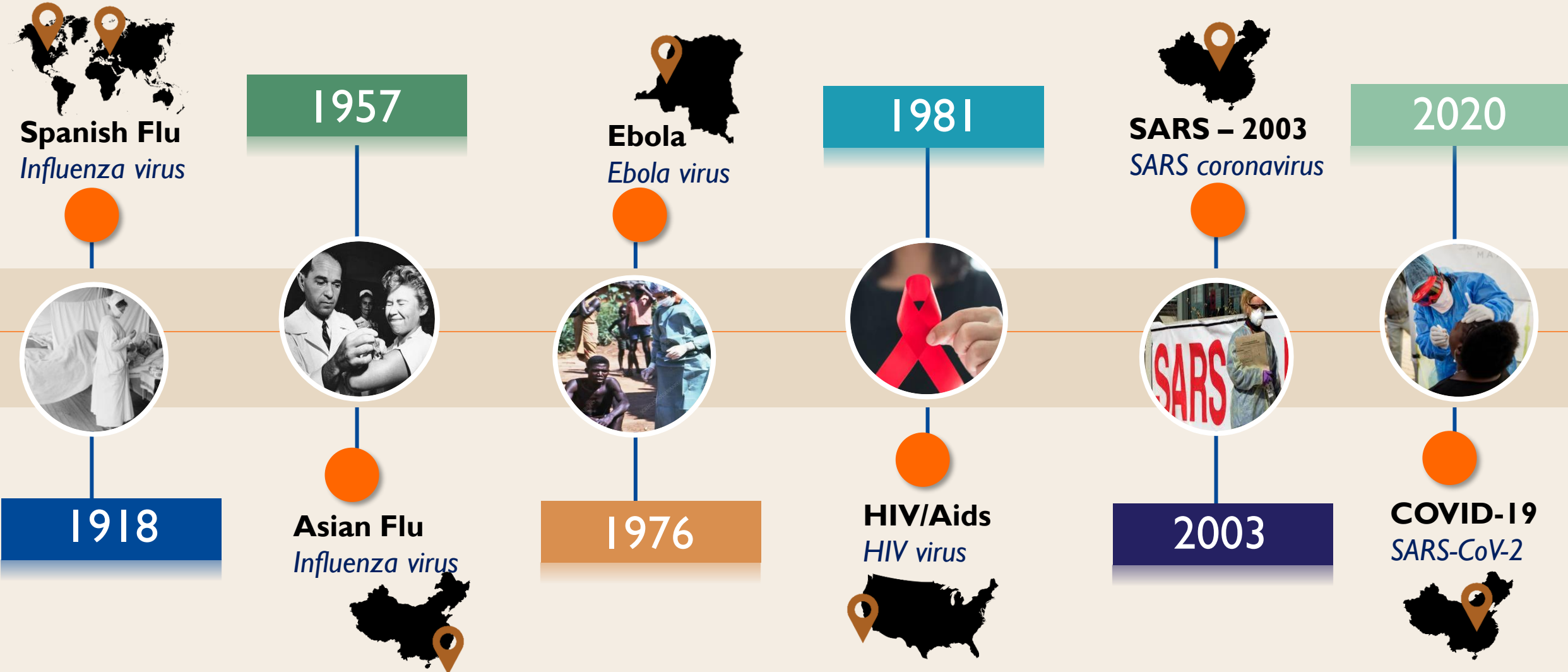
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# TIMELINE OF DISEASE OUTBREAKS, EPIDEMICS AND PANDEMICS



# TIMELINE OF DISEASE OUTBREAKS, EPIDEMICS AND PANDEMICS



# “NEW” DEVELOPMENTS IN SURVEILLANCE – WASTEWATER BASED METHODS(e.g., SARS-COV-2)



- Environmental surveillance is not new (polio surveillance in Johannesburg, Ekurhuleni and Tshwane.)
- Estimation of pharmaceutical and illicit drug use among residents.
- Environmental surveillance however has not been used as an early warning system.
  - Identify areas thought to be free from infectious cases
  - Determine re-emergence and persistence of infections
  - Verify whether COVID-19 has been eradicated in local populations
- Ideally communities have to be connected to a sewer line.



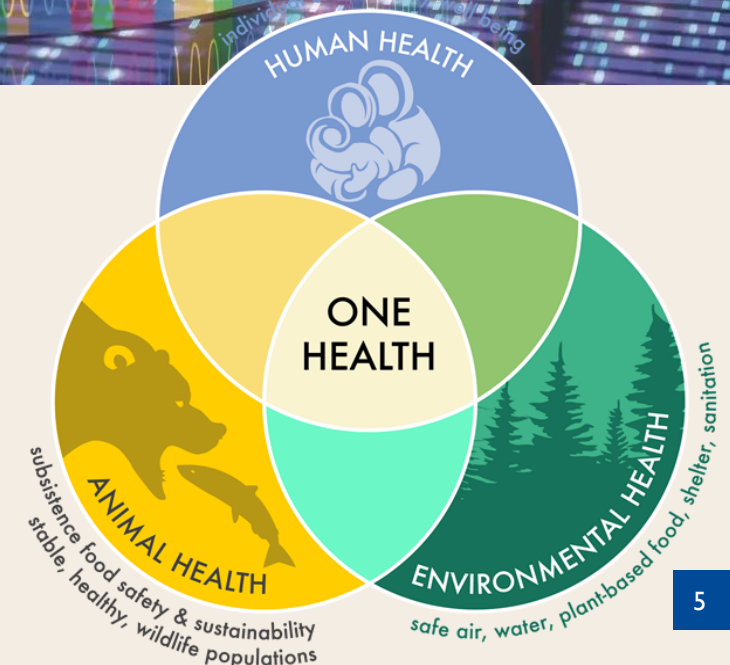
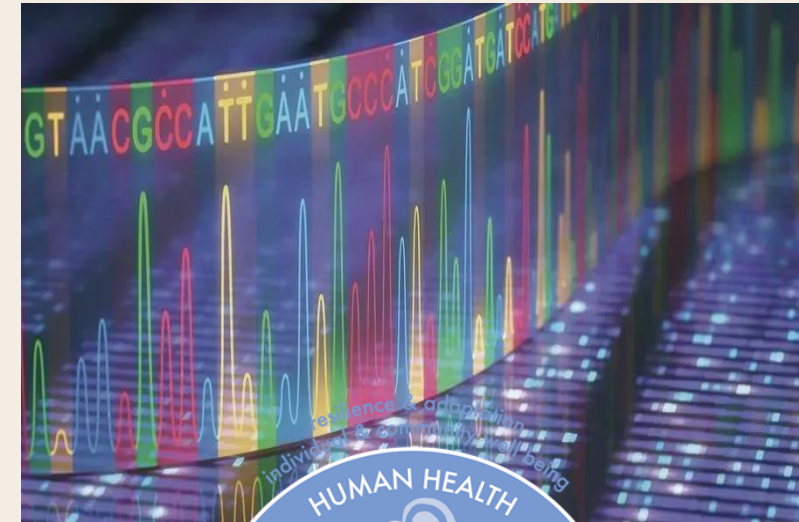
# NECESSARY SKILLS IN AN ERA OF PANDEMICS

## Theoretical skills

- Undergraduate courses – biology, molecular biology, computer programming, genetics, statistics, public health
- Masters level - bioinformatics, computational biology, epidemiology, or bio-Statistics, public Health

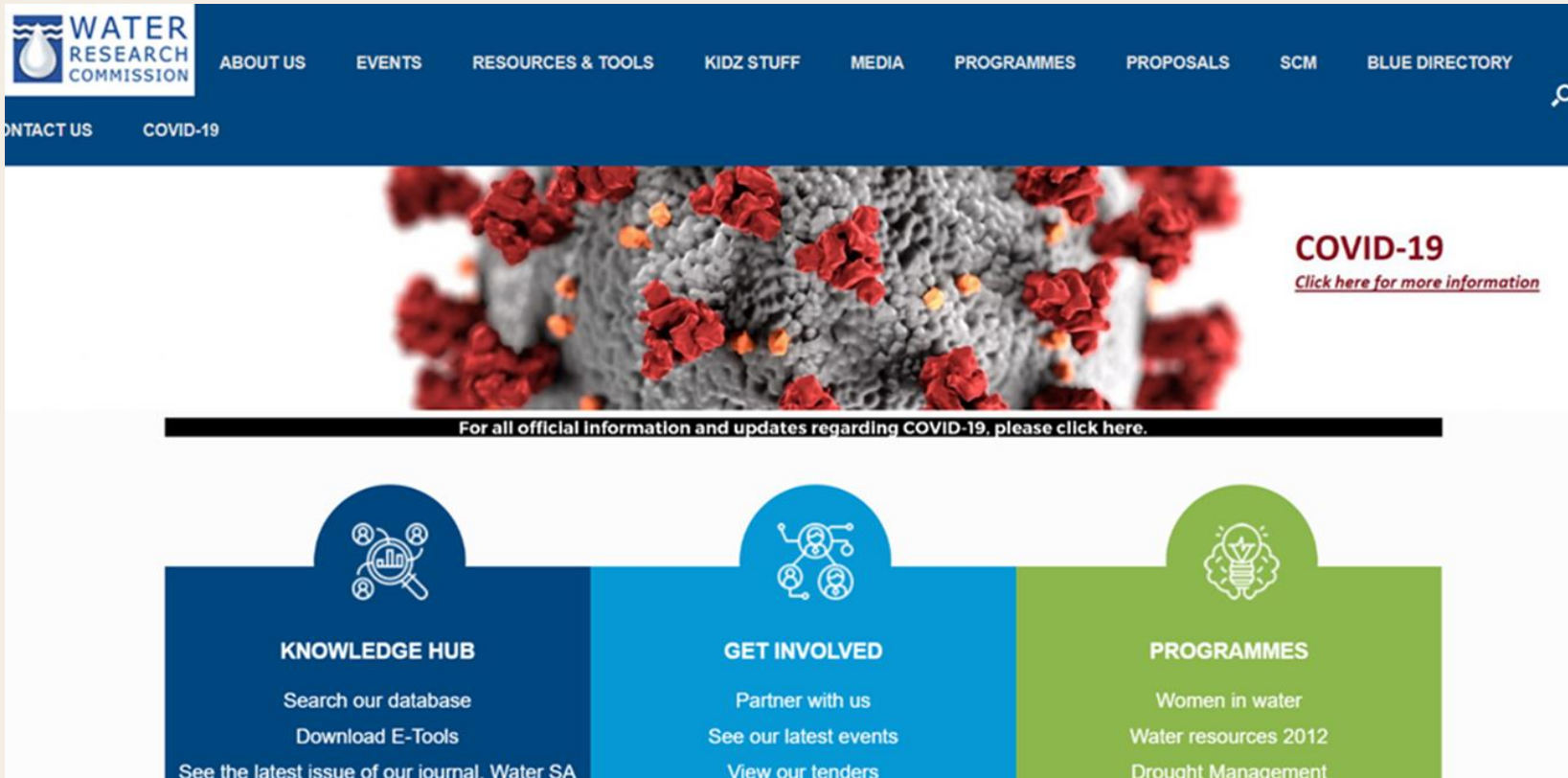
## Applied skills

- Data mining, artificial intelligence, machine learning, database management
- Next generation sequencing
- Pathogen culture capabilities
- Surveillance - One health - transdisciplinary approach among human, animal, plant, and environmental health/joint pathogen detection and human-animal vaccination campaigns
- Laboratory administration – coordinating various levels of a laboratory network to ensure timely response to pandemics.
- Ethics and privacy in relation to data use



# PROMOTING THE UPTAKE OF ESSENTIAL SKILLS IN A PANDEMIC

- Illustrating with clear examples the need of these skills not just for managing the COVID-19 pandemic but for other diseases as well.
  - sewage surveillance/wastewater-based epidemiology as a tool to assist in safeguarding public health from infectious diseases in general and possibly non-communicable diseases
- Continuous education and skilling of those that are already in the workforce or in a particular field.
- Long term – investing in pure science education from primary, secondary... with opportunities for application of science in well resourced laboratories.



WRC reports on various water related research in a multitude of disciplines can be accessed and downloaded from the Knowledge Hub – [www.wrc.org.za](http://www.wrc.org.za).

THANK YOU FOR LISTENING