

FROM EXPIRED TO INSPIRED

TRANSFORMING WASTE INTO LEARNING



A team from **London South Bank University** outlines a partnership to repurpose near-expiry molecular diagnostic kits for laboratory sessions.

In biomedical science there is a drive to reduce waste and improve sustainability at both the clinical and educational level. At the end of 2023 the Royal College of Pathology hosted a symposium entitled “How Green is Your Lab?”, which was supported by the NHS England, Greener NHS, the IBMS and the Association for Clinical Biochemistry and Laboratory Medicine.

The NHS has put sustainability at the heart of its long-term plan. In October 2020, the NHS became the world’s first health system to commit to a zero-emissions target and has committed to reaching net zero by 2045 for both the emissions it controls directly and through the goods and services it buys from partners and suppliers. As part of this process, from April 2024, all suppliers intending to tender for a contract or framework administered by NHS England Medicines Value and Access will require, at the point of submission, a valid Evergreen Sustainable Supplier Assessment, as well as a compliant carbon reduction plan.

The need to promote and educate students in sustainability has prompted the Quality Assurance Agency (QAA) for higher education (HE) to revise their benchmarks to include education for sustainable development. These competencies state that “sustainability and sustainable development are key considerations in biomedical science and/or biomedical sciences, as they are vital to managing earth resources to promote the long-term well-being of the planet and all its inhabitants”. It also reflects the fact that sustainability is not only about protecting the environment but also has social and economic concerns.

Education initiatives

Education initiatives for improving sustainability in the teaching laboratories include audit and assessment of laboratory-based sessions for environmental impact and waste reduction. Practically, this has led to strategies for replacing plastics with glassware and improving waste management systems with greater emphasis on recycling. It has also highlighted and instated the use of more environmentally friendly chemicals throughout laboratory practical sessions. In addition, work-integrated learning is increasingly considered an important way to promote graduate employment, with HE providers being encouraged to find novel ways to provide real-work experiences.

Here, we present a case study of good sustainable practice, which is enhancing education and employability skills, alongside promoting environmental, economic and social sustainability by using near-expiry medical diagnostics, which would usually be discarded, for practical training sessions.

The use of near-expiry medical diagnostics in clinical laboratory training

Clinical laboratory skills are vital for undergraduate biomedical science students. However, rising costs and static tuition fees have led to budget cuts across HE, resulting in expensive often disproportionate laboratory training materials for molecular diagnostics, being removed from laboratory sessions.

At London South Bank University (LSBU), we have developed a partnership with altona Diagnostics UK Ltd to repurpose near-expiry molecular diagnostic kits for laboratory sessions in clinical microbiology



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for the PCR-based detection of viruses, bacteria or parasites. The sessions incorporate “ready-to-use” CE-marked *in vitro* diagnostic tests and scenario-based clinical case studies for the development of practical skills. They also reference UK standards in microbial investigation to mimic real-life application and promote critical thinking.

Re-purposing these kits for clinical laboratory training has multiple benefits and feeds into both the university’s core vision on sustainability as well as Altona Diagnostics UK Ltd’s sustainability plan. It also has the added benefit of equipping students with the necessary skills for practice, highlighted by the *IBMS long term workforce plan*.

A summary of the benefits are listed below:

- Saves on the procurement of additional reagents materials and associated waste for teaching purposes.
- Saves on the purchase price of the kit for the institution, allowing for the budget to be spent in other areas of the curriculum to enhance student experience and education. For example, simulation or bioinformatic software.
- Reduces associated waste and costs for waste handling by repurposing materials that would have otherwise been discarded.
- Saves on the procurement of additional reagents materials and associated waste for teaching purposes.
- Promotes student experience and engagement by giving hands-on experience of current diagnostic tests. By using the same tests and the same equipment used by diagnostic laboratories, students gain confidence and real-world context for what they are learning at undergraduate level.
- Enhances student employability, as they gain knowledge and experience of current molecular diagnostics – PCR is a fundamental multi-disciplinary technique in clinical diagnostics. By teaching real-time PCR, students are equipped with knowledge and skills required by employers.
- Promotes inclusivity and social sustainability by the diagnostic company engaging with HE communities and recognising the benefit to people, communities and society as a whole.

Student feedback

Students provided very positive feedback on the practical sessions that integrated PCR kits with scenario-based clinical cases. They particularly valued the interactive nature of these sessions,

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which significantly enhanced their engagement and overall learning experience. The user manuals were praised for being well-written and easy to follow, enabling students to perform the tests independently with confidence.

Additionally, students highlighted the relevance of these investigations to UK standards in microbial investigation, noting how the practical experience aligned with industry expectations. They emphasised the benefit of getting both practical skills and critical thinking abilities, which are essential for their future professional practice. They stated that this hands-on approach not only enriched their current educational experience but that they gained valuable experience in interpreting clinical tests, which boosted their confidence in pursuing roles in biomedical science: “Our lecturer and the use of the kits made the teaching very interesting and relevant.”

“This has increased my confidence in lab skills and gave me more confidence to discuss PCR techniques at interview.”

Final thoughts

It is widely acknowledged that collaboration between educators, the NHS, and suppliers can achieve far greater impact than individual efforts. The above case study is testament to that statement. The repurposing of near-expiry molecular diagnostic kits gives an opportunity to students that they may not get otherwise. Such partnerships benefit both the company and the HE institution. The fostering of these relationships should be encouraged to improve sustainability and give students “real-world” experience they can take into the workforce. ^{BS}

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