Revolution-ZERO

More effective, more economic, more sustainable

GIG CYMRU NHS WALES

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Public Health Wales

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Welsh Government

Addressing Single-use Plastic and Waste in Public Health Wales' Microbiology Labs

Revolution-ZERO

April 2024

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1. Executive Summary

1.1 Summary

This project, commissioned by Public Health Wales (PHW), required an evaluation and recommendation of actions to reduce emissions associated with single-use laboratory consumables in PHW laboratories, with a focus on the microbiology service area. The primary objective was to review the single-use plastic, high waste items and personal protective equipment used in the laboratories and research suitable sustainable alternatives and calculate the emissions and cost savings and impacts of all the materials reviewed. Secondary to this objective was to identify materials that could not be switched due to the nature of the work stream, along with their emission and cost impact.

The work involved direct engagement with service, management and procurement teams, backed up by secondary research on life cycle analyses (LCA) and existing literature. Estimates of waste generation were produced using best available data. With a focus on long-term change, this report proposes a number of solutions for PHW to implement including further work to improve understanding of the true environmental impact of laboratories across the service. These recommendations, along with the Annexes, form the basis of an actionable roadmap for PHW.

1.2 Background

PHW comprises 14 microbiology service sites offering a fully integrated service in both cities and rural areas. PHW is one of the 11 organisations that makes up NHS Wales and works to improve health and well-being and reduce inequalities. Globally, laboratories produced 5.5 million tonnes of plastic waste in 2014.[1] PHW can play a significant role in reducing waste and carbon impact from its operations.

1.3 Methods

We used multiple methods to gather data on laboratory consumables and potential solutions. Direct engagement with laboratory, management and procurement staff, and interviews with emerging solution providers were the most successful methods. Online workshops also gave valuable insights from people working across PHW, and helped establish potential barriers to solutions, and ways to overcome them.

Secondary research involved a literature review of current solutions to reduce laboratory waste, and analysis of procurement data using existing LCA data. Analysis of procurement data is challenging due to the data types recorded. Despite this, the analysis did validate other sources of information, helping predict where efforts could have the most impact.

This project was funded by Welsh Government's Health and Social Care Climate Emergency National Programme.

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The project was supported by WRAP (Waste Resources Action Programme) and Eunomia.

wrap Cymru

1. Urbina et al., 2015, 'Labs should cut plastic waste too', Nature.

1.4 Results

The results are summarised as follows:

1. Primary analysis of the Carbon, Waste and Cost impacts of single-use plastic and paper products from annual procurement data. The four highest carbon impact items are presented below.

Highest Emissions Impact Items

Product	Quantity	CO_2e (tonnes)	Waste (tonnes) (Product only)	Cost Impacts
Agar plates (Petri dishes)	1,942,773	189	30	£493,144
Microbank vials	24,720	99	16	£24,056
Sodium hydroxide bottles	13,500	54	9	£19,725
Pipettes	3,478,392	44	9	£36,449

2 Secondary analysis outputs informed by Literature Review, Stakeholder and Supplier Engagement to assess actions to decrease waste and/or emissions.

Proposed Actions/Switches And Savings - CO_2e Impact Rank Order

Material/ Product	Actions	CO_2e (tonnes) Savings	Waste Savings (est.%)	Status/ Comment
Single-use Plastics (16 top by procurement)	Mechanical recycling and remanufacture	232	>90% estimated	Potential Supplier (LabCycle) solution 2024
Plastics	Manufacture utilising renewable energy	105	0	Material and product manufacturers need to action
Plastics	Local manufacture and transport	30	0	Need to leverage and incentivise local industry
Paper	Reduce paper use by 25%	8	25% (if not recycled)	Achievable according to stakeholders
Disposable Masks	Reusable Type IIR masks to displace disposables	4	80% (due to loss during use)	Higher cost implications
Paper	Change to recycled paper	3	0	Currently prohibitively expensive
Paper	Switch to lighter weight paper	2	5% (if not recycled)	Switch from 90gsm to 80gsm
Disposable Jars	Use Bio-bins to store bench waste reducing jar use by 10%	1.6	10%	Achievable according to stakeholders

We found that impactful actions can be taken to reduce emissions for all products shown in the table.

3 A simple excel spreadsheet tool has been developed to provide potential emission and cost data associated with switching specific laboratory items.

4 Evaluation of the willingness to change within the NHS Wales Microbiology Community found most stakeholders were eager for both more information sharing and changing microbiology practices away from single-use plastic if suitable safe and effective alternatives could be found.

Proposed Actions/Switches And Savings - CO_2e Impact Rank Order

Material/ Product	Actions	CO_2e (tonnes) Savings	Waste Savings (est.%)	Status/ Comment
Single-use Plastics	Enhance packaging practices saving 50% of estimated 2% packaging weight.	1.5	1	Change procurement requirements
Specimen Bags	Reuse pathology specimen bags	0.8	10	Achievable according to stakeholders
Petri Dishes	Redesign system, product and practices for reuse	Unknown	Unknown	Potential very high impact and previously has been achieved
Loops	Redesign system, product and practices for reuse	Unknown	Unknown	Potential very high impact and previously has been achieved
Pipette Tip Rack	Reuse pipette tip racks	Unknown	Unknown	Readily achieved

1.5 Discussion

The key outputs of this project were:

1. The primary and secondary analyses and associated recommendations.

2. Four case study based recommendations for real world short and long term solutions.

a. **Evaluate, Urinalysis:** An audit of common work streams to calculate weight and material of all items used

b. **Reduce, Packaging:** Changes to procurement guidelines where a range of quantities and types of packaging are specified

c. **Reuse, Masks:** Consider use of reusable Type IIR masks to displace disposables

d. **Recycle, Pipette Tips:** Take back schemes and opportunity for remanufacture

3. Two system wide interventions co-developed with laboratory, management and procurement stakeholders.

a. Identifying new ways of working to encourage engagement with staff, including:

i. Assignment of sustainability champions within laboratory teams

ii. Implementation of structured education and behavioural change programmes

b. Increased digitisation of systems to:

i. Improve communication

ii. Reduce or eliminate paper based reporting

iii. Decrease unnecessary interventions/tests

4. Strategies for change and suggestions for an initial rollout plan.

1.6 Recommended Strategies

We identified the following strategies (short to long term) as below.

Plastic Waste And Emissions

- Disseminate results and prioritise highest carbon impact items
- Actively chase, champion and fund reuse initiatives
- Evaluate real world impact through in laboratory intervention auditing (e.g. urinalysis)

Paper Waste

- Reduce Use
- Switch all 90gsm to 80gsm
- Source lower cost recycled alternatives

Leverage Willingness For Change

- Appoint a National Coordinator – waste/environment, business case/funding, communications, digital, creative (1 FTE)
- Regional Champions (>0.2 FTE) – co-ordinate, network, unify, events, research, education
- Local Champions (>0.1 FTE) – evaluation/audit, project leadership, inclusivity
- Formalised delivery focused national working group

The Power Of Procurement

- Set up formal working group with procurement and laboratories
- New rules for procurement – pack sizes, product information, accessible impact, transparency and accountability (validated)

1.6 Recommended Strategies

The Power Of Digital

- Bring in central coordination/responsibility
- Audit and leverage existing initiatives
- Cross checks/education/communications: Reduce – Reduce – Reduce
- Utilise for social initiatives (see below)

The Power Of Social

- Audit communication channels
- Create a unified portal/identity – make it cross platform: internal and social media
- Educate, communicate, encourage (case studies/best practice), compete (leader boards, awards)

The Power Of Trialling

- Make changes in smaller laboratories before rolling out across the board
- Prioritise laboratories with highest impact vs effort; greatest access to procurement data or greatest engagement of staff

2. Background

Following the Welsh Government's climate emergency declaration in 2019,[2] the Welsh public sector has committed to reaching net zero targets by 2030.[3] NHS Wales is the largest source of emissions in the Welsh public sector, responsible for around 1 million tonnes of CO_2 equivalent emissions a year,[4] and has a responsibility to respond to the impact climate change has on health and well-being.

In partnership with Public Health Wales' Microbiology Project Group, we reviewed single-use plastic, waste items and personal protective equipment (PPE) used in the laboratories. Revolution-ZERO gathered input from teams and stakeholders in WRAP Cymru (WRAP), Eunomia, NHS Wales Shared Services Partnership (NWSSP) and Swansea Bay University Health Board.

The Well-being of Future Generations (Wales) Act (2015),[5] which highlights the importance of long-term social, economic and environmental sustainability and the Healthier Wales Foundation Economy Programme have both influenced our recommendations,[6] which should benefit PHW staff, the public and the environment.

3. Methods (Annex A)

To identify potential carbon reduction actions and changes, we collated and reviewed multiple sources of information including procurement data and input from clinical, managerial and administrative staff in PHW laboratories. The following methods were used:

- **Procurement data**
  - WRAP (Waste and Resources Action Programme) and Eunomia analysis of procurement data for quantities and spend
  - Revolution-ZERO analysis and Life Cycle Assessment (LCA)
- **Lived experience data**
  - Analysis of existing ideas in laboratories
  - Google Forms survey on staff attitudes towards sustainability
  - Solutions workshop
  - LCA of items as quantified in the workshop
  - Barriers workshop
- **Literature review**
  - Best practice around assessing and addressing single-use plastics in international laboratories
- **Supplier engagement with existing and emerging suppliers**

Further detail is included as annexes to this report and key references are in the footnotes.

Throughout this work, CO_2e is used to describe Carbon Dioxide equivalent, the standard unit used to compare emissions from various greenhouse gases on the basis of their global warming potential.

2. https://www.gov.wales/welsh-government-makes-climate-emergency-declara-tion
3. 'Welsh Public Sector Net Zero: Emissions update and recommendations', Aether, 2022
4. https://www.gov.wales/24m-projects-reduce-nhs-wales-emissions
5. https://www.futuregenerations.wales/about-us/future-generations-act/
6. https://www.gov.wales/healthier-wales-foundation-economy-programme

4. Results

The results from this work have been split into four parts: life cycle assessment; lived experience data; literature review; and supplier data.

4.1 Life Cycle Assessment (LCA)

4.1.1 WRAP And Eunomia Data (Annex G)

WRAP and Eunomia created a database using annual PHW procurement data, which identified the top 16 single-use plastic products by quantity and spend. Here, they are ranked by quantity.

WRAP And Eunomia Analysis Of Top 16 Products By Quantity

Product	Quantity	Spend	Product	Quantity	Spend
1. Agar	1,786,665	£439,524	9. Aerobic Plastic Bottle	68,050	£171,486
2. Buffer	1,540,203	£2,536,528	10. Boric Acid Urine Tube	67,950	£8,757
3. Specimen	567,013	£192,640	11. Anaerobic Plastic Bottle	67,450	£169,974
4. Closures	412,807	£38,601	12. Stool Preparation Solution	64,800	£960
5. Test Tubes	382,70	£138,288	13. Gastro Panel	64,560	£639,144
6. Transfer Pipettes	212,626	£7,054	14. SARS-COV-2, FLU A/B	62,281	£7,902,524
7. Loops	204,632	£7,695	15. Cell culture consumables	55,200	£2,346
8. Pipette Tips	175,516	£562,137	16. Storage Jars	48,896	£5,927

4.1.2 Procurement Plastic, Paper And Workshop Master Table (Annex I)

LCA analysis using best available data after adjusting amounts above on the basis of further analysis (such as more items per packet than reported above) was carried out. Hence the figures are higher in the table below. The top 16 single-use plastic products were ranked in order of carbon impact (CO_2e).

Analysis Of Product By Carbon Impact (CO_2e)

Product	Quantity	Total CO_2e (Kg)	Product	Quantity	Total CO_2e (Kg)
1. Agar (contained in Petri Dish)	1,942,773	140,468	9. Petri Dish	60,970	4,408
2. Microbank Vials	24,720	73,170	10. Anaerobic Plastic Bottle	74,100	2,305
3. Sodium Hydroxide Container	13,500	39,960	11. Aerobic Plastic Bottle	73,950	2,300
4. Pipette Tips	3,478,392	30,304	12. Polypropylene Container	37,000	1,934
5. Boric Acid Urine Tube	67,950	24,698	13. Storage Jar	4,104	1,355
6. Test Tubes	525,000	16,029	14. Loops	224,635	1,061
7. Disposable Jars	23,930	12,023	15. Charcoal Swab	17,875	764
8. Specimen Bags	567,013	8,649	16. Stain Container	2,263	379

On average, the LCA showed a potential **75% reduction** in emissions when implementing four scenarios:

1. Manufacture from renewable energy can result in a 50% reduction in emissions compared to utilised fossil fuel derived energy sources;[7]
2. Manufacturing locally could reduce the carbon impact from transporting from Eastern Europe or the Far East (by truck or ship respectively) by 80%;
3. Mechanical recycling has the ability to reverse the emissions impact of waste disposal to a positive if fed back into remanufacture of salvaged materials by 1 kg CO_2e per kg;[8]
4. Enhanced packaging practices were estimated to save 50% in packaging related emissions through removing unnecessary packaging of products.

Procurement data was used to calculate quantity, weight and CO_2e emissions associated with paper usage, with the results shown below:

Analysis Of Paper Emissions

Paper Type	Quantity	CO_2e Per Sheet (Kg)	Sheets/kg	Total CO_2e (Kg)
Virgin 80gsm	2,952,000	0.0061	200	18,007
Virgin 90gsm	2,595,000	0.0069	177	17,905
Recycled 80gsm	26,000	0.0052	200	135

The LCA Demonstrated:

- 13% reduction in emissions (2,000 kg) and weight (1,687 kg) from switching all 90gsm paper to 80gsm paper. (23 more sheets per kg);
- 17% reduction in emissions from switching all paper to recycled paper;
- The highest savings from a 25% reduction across paper use. 25% was considered readily achievable at the solutions workshop and in follow-up.

Analysis Of Estimation Activity

Product	Procurement Data	Estimated Quantity	Estimated CO_2e (kg)
Bags/Packaging	NA	21,900,000	334,071
Pipettes	NA	21,900,000	278,393
Loop	204,632	29,200,000	187,093
Petri Dish	60,960	1,460,000	142,004
Gloves (nitrile)	NA	3,650,000	73,000
Test Tubes	525,000	1,168,000	51,360
Masks	NA	365,000	6,496

7. https://www.nature.com/articles/s41558-019-0459-z
8. https://tinyurl.com/b62fy6y2

4.2 Lived Experience Data

4.2.1 Existing Ideas (Annex B)

Existing ideas from staff were compiled and are presented as 'Resource Solutions' and 'Waste Solutions' in the table below.

Resource Solutions	Waste Solutions
• Source items with recycled content	• Recycling plastic agar plates
• Reducing number of agar plates	• Recycling glass bijoux bottles
• Reducing packaging	• Recycling cardboard and non-confidential paper waste
• 'Dead-end' printer for laboratory reports	• Improving non-clinical waste streams (paper towels in black bag rather than orange)
• Turning off large equipment when not in use and running laboratory freezers more sustainably[9]	• Using Bio-bins to store bench waste
• Reusing pathology specimen bags	
• Reusable metal loops	

4.2.2 Google Forms Survey (Annex C)

A survey on single-use consumables and wider environmental issues was shared with laboratory staff. Only 23% of staff reported having a good working knowledge of their workplace sustainability goals. A total of 93% agreed that they want to decrease single-use plastic use to help the environment. Key suggestions are outlined below.

Suggestions From Google Forms Staff Survey
• Reduction of sample bags, virgin plastic and unnecessary energy use
• Recycling items that haven't been used, non contaminated plastics like pipette tip boxes and other sterile waste
• Introduce recycling bins within laboratories (avoid recyclable items going to general waste)
• Education and inter-laboratory competitions to encourage waste reduction
• Consider the risks around reusable items such as contamination, hazards around glass and staff time

4.2.3 In-person Solutions Workshop (Annex D)

A workshop was held with staff from the Swansea Microbiology laboratory. Two potential 'whole system' solutions to reduce single-use waste were identified.

Solution A: Cultural Shift	Solution B: Digitisation
• Dedicated champions and groups	• Reduce duplicate testing
• Initiatives to bring environmental and financial savings	• Reduce paper waste
• Strengthen connections between institutions	• Generate cost savings, environmental benefits and save staff time

4.2.4 Online Barriers Workshop (Annex E)

A second workshop was held to discuss potential barriers to solutions and ways to overcome them. Key points are outlined below.

Barriers To Solution Implementation	Overcoming Barriers
Lack of staff time to drive and implement meaningful change	Introduce dedicated sustainability leads and working groups
Silo working preventing sustainability being written into change management	Audit communication channels and unify
Poor waste and emissions data	Request from manufacturers and assess in individual laboratories
Inability to switch off laboratory report printing	Implement digital systems with report requesting
Health & safety guidelines restricting the use of glass	Investigate potential for using glass in the long-term
Many samples are not tracked end to end	Implement digital systems and tracking
Recycling of single-use reagent bottles is time consuming and increases risk of exposure to harmful chemicals	Use machines to carry out rinsing and sorting

9. www.freezerchallenge.org

4.3 Literature Review

4.3.1 Literature Review - Best practice for assessing and addressing single-use plastics (Annex F)

A literature review on global use of laboratory consumables, found three ways of assessing the amount and type of waste produced.

1. Workstream audit: record the weight, volume, material and waste type for all items used in a specific workstream. Include packaging and all items that enter the laboratory waste streams. Multiply these figures for the number of times that workstream is used in a year to calculate waste produced from this workstream.
2. Waste audit: store all waste produced by a laboratory for a week. Record the weight, volume, material and waste type. Multiply these figures to find the yearly waste.
3. Procurement data: Request that suppliers give weight and material data for the components of products in their laboratories. Change the way that procurement data is recorded to allow for inclusion of this information.

Although these methods would be valuable in supporting a comparison for future reduction, each has potential shortcomings. These include the time and staff resource for laboratories and suppliers, storage space required for holding waste and risk of contamination when storing waste.

Secondly, a literature review on ways to lower carbon emissions from laboratory consumables found a number of good practice solutions:

- Consolidate purchases and choose products with less packaging
- Reuse pipette and test tube racks or choose cardboard versions that can be recycled
- Recycle items that cannot be switched through supplier take back schemes
- Better education for staff on the correct application of waste management guidance

4.4 Supplier Data

4.4.1 Existing Supplier Engagement (Annex J)

WRAP and Eunomia will be carrying out engagement with existing suppliers through NWSSP leads to ascertain their willingness to switch to lower emission products, services and systems. This piece of work will be completed separately.

4.4.2 Emerging Supplier Engagement (Annex K)

Revolution-ZERO engaged with emerging solution providers who have identified ways to reduce emissions associated with water, waste, carbon and energy in laboratory settings.

Engagement With Emerging Suppliers

- Recycling schemes (LabCycle, Automedi, Circular 11 and ReNew ELP)
- Resource management of laboratory consumables (Warp It)
- Embedding change (SusQI)
- Take back schemes (Terracycle)
- Sustainable laboratory programmes (My Green Lab, UCL LEAF Programme)
- Switching from single-use plastic to cardboard alternatives (Bio-bin, Appleton)
- Reusing pipette tips (Grenova)
- Single-use glove recycling (Kimberly Clark Professional)
- Running laboratory freezers sustainably (Freezer Challenge)

5. Discussion

A number of factors influence both the effectiveness of calculating carbon emissions in the laboratory environment, and the likely success of reduction activities;

1. Impact vs Effort - prioritising actions to maximise impact in a busy environment;

2. Issues with procurement data;

3. Equivalents - using equivalents to help communicate savings;

4. Case Studies - using case studies to communicate.

5.1 Impact / Effort

We have highlighted a range of solutions that can be implemented immediately and others that require a longer timescale for implementation.

Immediate Actions

- Use plastic containers or Bio-bins as collection boxes for bench waste
- Segregate domestic waste streams (paper towels in black bag rather than orange)
- Reduce paper use (target manual printing of laboratory reports)
- Order refillable pipette tip racks (Starlab)
- Switch to reusable masks
- Reuse specimen bags
- Set up more recycling bins in the laboratories (away from hazardous waste bins to avoid contamination) and provide digital and poster copies of recycling instructions
- Recycle consumables, such as Petri dishes, that go out of date or are damaged rather than putting in hazardous waste streams
- Recycle pipette tip boxes, cardboard and non-confidential paper waste
- Send used laboratory gloves to recycling schemes identified in supplier engagement
- Train staff to support education about sustainability/reducing emissions
- Trial running freezers at a lower temperature through the My Green Lab Freezer Challenge

Long Term Actions

- Single-use plastic items to reusable plastics
- Replace single-use plastic loops with reusable metal loops that are sterilised
- Switch to products with a higher recycled content
- Recycle potentially contaminated waste by rinsing in machines
- Use reusable Petri dishes and mix agar when required
- Use renewable energy sources
- Work with IPC teams to reduce the number of sample bags
- Establish sustainability teams
- Sign up to the sustainable labs scheme and achieve relevant standard
- Secure funding to take key recommendations forward

Further evaluation work could plot solutions into an impact/effort matrix. This would allow teams to prioritise for highest impact (CO_2e)/lowest effort (cost/time). This would require more accurate calculations of procurement data including cost and additional time estimations.

5.2 Issues With Procurement Data (Annex H)

When using procurement data, discrepancies between the recorded quantity and real quantity can be an order of magnitude out. An item recorded as 10 purchased may actually contain multiples up to thousands. Revolution-ZERO highlighted this issue by researching the actual product quantities in a number of cases. An example is given in the table below.

Limited access to data and its inconsistency, makes this a time consuming exercise and is a clear barrier to using procurement data to quantify quantities and, therefore, emissions. This work highlights the significance of improving procurement records and utilising other methods of assessing waste.

Exercise To Highlight Issues With Item Quantities In Procurement Data

Pipette tips from Thistle Scientific Ltd	Procurement data qty	WRAP & Eunomia qty	Estimated Revolution-ZERO qty
CLV-FT-1000-L-R-S I1000ML, FILTER TIPS, LOW RETENTION, RACKED, STERILE, CASE	60	50,000	300,000
CLV-FT-1000-R-S I 1000ML, FILTER TIPS, RACKED, STERILE, CASE QUOTE 93786	10	50	50,000
1250UL LRS THISTLE TIPS	10	0	9,600
Total qty	**80**	**50,050**	**359,600**
Total cost	**£27,945**	**£6,345**	**£27,945**

This work demonstrates the value in carrying out in-house audits of common workstreams to calculate exact weight and material of all items used.

10. Berners-Lee, M 2010, How Bad Are Bananas?

11. https://www.nice.org.uk/news/article/nice-encourages-use-of-greener-asthma-inhalers

5.3 Communication Equivalents

To support understanding of the impact of emissions and better communication, the CO_2e of laboratory consumables in the master table in Annex I can be compared to the figures below.

Analysis Of Estimation Activity

Activity	CO_2e
Hour of using an average-efficient laptop	10 g[10]
Laundry load washed at 40C, tumble dried	2 kg
Dry powder inhaler (estimated 200 doses)	4 kg[11]
5-watt low energy bulb for one year	15 kg
London to Glasgow and back (train)	64 kg
Using a smartphone (a year's typical usage of 195 minutes a day)	69 kg
Metered dose inhaler (estimated 200 doses)	100 kg
London to Glasgow and back (small efficient petrol car)	237 kg
Insulating a loft (outlay for a detached house)	400 kg
Hip replacement or knee surgery	1 tonne
Heart bypass operation	2.3 tonnes
A new build house (three-bedroom terrace, bricks and mortar)	32 tonnes
Installation of a 100-kW wind turbine (saves 2619 tonnes after 20 years)	134 tonnes

5.4 Case Studies (Annex L)

As part of the final report, Revolution-ZERO introduced four case studies on reducing single-use plastic. These were written up as shareable reports and included in Annex L.

1. Evaluate, Urinalysis: An audit of a common workstream to calculate exact weight and material of all items used.

2. Reduce, Packaging: Changes to procurement guidelines where a range of quantities and types of packaging are specified.

3. Reuse, Masks: Consider use of reusable Type IIR masks to displace disposables.

4. Recycle, Pipette Tips: Take back schemes and opportunity for remanufacture.

5.5 Solutions Workshop

During the solutions workshop, laboratory staff were asked to estimate the quantity of items used based on their personal use. The product names are those used by laboratory staff while the LCA analysis uses procurement terminology. The staff estimates provide a useful reality check of the procurement data and suggest the product quantities derived from the procurement data are likely to underestimate real use.

6. Recommended Strategies

We found that a reduction in emissions from single-use laboratory consumables is possible across the board. Significant challenges exist when using current procurement data as a reference for calculating emissions and prioritising action. Engagement in the topic was good, but communication around potential solutions or savings could be improved.

Multiple solutions have been introduced and we recommend further work to prioritise these. The overarching themes of potential action can be categorised as follows:

Plastic Waste And Emissions

- Disseminate results and prioritise highest carbon impact items
- Actively chase, champion and fund reuse initiatives
- Evaluate real world impact through in laboratory intervention auditing (e.g. urinalysis)

Paper Waste

- Reduce Use
- Switch all 90gsm to 80gsm
- Source lower cost recycled alternatives – ideally local

Leverage Willingness For Change

- Appoint a National Coordinator – waste/environment, business case/funding, communications, digital, creative (1 FTE)
- Regional Champions (>0.2 FTE) – co-ordinate, network, unify, events, research, education
- Local Champions (>0.1 FTE) – evaluation/audit, project leadership, inclusivity
- Formalised delivery focused national working group

The Power Of Procurement

- Set up formal working group with procurement and laboratories
- New rules for procurement – pack sizes, product information, accessible impact, transparency and accountability (validated)

The Power Of Digital

- Bring in central coordination/responsibility
- Audit and leverage existing initiatives
- Cross checks/education/communications: Reduce – Reduce – Reduce
- Utilise for social initiatives (see below)

The Power Of Social

- Audit communication channels
- Create a unified portal/identity – make it cross platform: internal and social media
- Educate, communicate, encourage (case studies/best practice), compete (leader boards, awards)

The Power Of Trialling

- Make changes in smaller laboratories before rolling out across the board
- Prioritise laboratories with highest impact vs effort; greatest access to procurement data or greatest engagement of staff

6.1 Revolution-ZERO Recommends

Revolution-ZERO recommends commencing work with these immediate actions:

Immediate Actions

- Disseminate results
  - This is not just about microbiology: Potential to be a blueprint for the entire NHS and other sectors
- Sign up to sustainable laboratory programmes[12]
  - My Green Lab, UCL LEAF Programme[13]
- Set up a formalised delivery focused national working group
- Appoint a National Coordinator who will play a key and performance-based role
  - Budget, advertise and recruit as soon as possible
  - Business Case and Access Funding to drive the change
  - Work with and encourage internal culture and local business initiatives
- Implement recycling solutions for all possible waste types
- Start requesting tender changes and source consumables from local suppliers where possible

Recommendations for this project also include a further source of funding to support sustainable development and change.

Further Source Of Funding

- Innovate UK Resource Efficiency for Manufacturing and Materials (REforMM)[14]

While this project focused on PHW laboratories, solutions were found that can be replicated across the wider healthcare sector. There are also opportunities for long-term planning within the Welsh public sector with further analysis of resources used in workstreams and changes to procurement guidelines and standards.

The most significant conclusion from this work was the need for continued support for laboratory staff. Here, appointing sustainability leads will mean more human resource, clear messaging and increase in skills and capabilities of the workforce through education and training. Overall, maximum reductions in emissions will require connecting multiple solutions, systems and efforts, with streamlining in one area increasing the available resource to focus on another.

12. https://www.mygreenlab.org/
13. https://www.ucl.ac.uk/sustainable/leaf-laboratory-efficiency-assessment-framework
14. https://iuk.ktn-uk.org/programme/manufacturing-materials-reformm/

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Canolfan Gydweithredol Sefydliad Iechyd y Byd ar Fuddsoddi ar gyfer Iechyd a Llesiant

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