



# ENVIRONMENTAL SUSTAINABILITY IN PHARMACY EDUCATION

Mapped to General Pharmaceutical Council (GPhC) Learning  
Outcomes for initial education and training of pharmacists



Endorsed by Pharmacy Schools Council UK  
June 2023

By Sustainability in Pharmacy Education (SPE) Group

Mapping the General Pharmaceutical Council (GPhC) Learning Outcomes for the initial education and training of pharmacists indicating where environmental sustainability could be addressed:

| Learning Outcome   | Suggestions for incorporating environmental sustainability   |
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| 1. Demonstrate empathy and keep the person at the centre of their approach to care at all times                                      | <p>Recognise that the Climate and Ecological Emergency (CEE) will impact all patients and that by addressing this we provide care to all – individually, nationally and globally.</p> <p>Include a consultation where a patient has concerns about the impact of climate change through continuing, stopping or starting a new medicine.</p>   |
| 2. Work in partnership with people to support and empower them in shared decision-making about their health and wellbeing            | <p>Encourage students and trainees to discuss the key issues of climate change and health when relevant to shared-decision making.<sup>1</sup></p>   |
| 3. Demonstrate effective communication at all times and adapt their approach and communication style to meet the needs of the person | <p>Confirm that students and trainees can effectively communicate the key issues of climate change and health.<sup>1</sup></p> <p>In a conversation with a health professional, adapt their message around sustainable healthcare to meet the knowledge level of the professional. Link to LO 4.</p>   |
| 4. Understand the variety of settings and adapt their communication accordingly  | <p>Recognise that the CEE may cause anxiety in patients or other healthcare professionals, and be able to adjust communications with respect to the psychological concerns the individuals may have.</p> <p>Recognise that CEE may not be a priority for patients and adapt communication appropriately.</p> <p>Be able to communicate sustainable healthcare values to patients with compassion and without judgement.</p>  |
| 5. Proactively support people to make safe and effective use of their medicines and devices  | <p>Discuss environmental sustainability in aspects of clinical care e.g. NICE clinical decision aid<sup>2</sup> on inhalers when teaching about respiratory care.</p> <p>Recognise that medicines optimisation is also an important environmental sustainability tool that complements patient care. It reduces overprescribing, improves patient wellbeing, and reduces the likelihood of ADRs.</p> <p>Discuss the proper disposal of medicines to reduce environmental pollution and the impact on biodiversity. Link to LO25.</p> |

<sup>1</sup> Lee H ryeon, Pagano I, Borth A, Campbell E, Hubbert B, Kotcher J, et al. Health professional's willingness to advocate for strengthening global commitments to the Paris climate agreement: Findings from a multi-nation survey. The Journal of Climate Change and Health. 2021 May;2:100016

<sup>2</sup> NICE. Asthma inhalers and climate change [Internet]. [cited 2023 Mar 31]. Available from: <https://www.nice.org.uk/guidance/ng80/resources/inhalers-for-asthma-patient-decision-aid-pdf-6727144573>

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| <p>6. Treat people as equals, with dignity and respect, and meet their own legal responsibilities under equality and human rights legislation, while respecting diversity and cultural differences</p> | <p>Respect alternative views on CEE, whilst meeting professional responsibilities.<sup>3</sup></p>  |
| <p>7. Obtain informed consent before providing care and pharmacy services</p>  | <p>Discuss lower carbon alternative treatments with patients or carers and avoid 'blanket-switching' of therapies.</p>  |
| <p>8. Assess and respond to the person's particular health risks, taking account of individuals' protected characteristics and background</p>  | <p>Discuss how the social determinants of health such as wealth and ethnicity are linked to their access to green space, polluted air, which are in turn related to the CEE.</p> <p>Understand the importance of taking an environmental history or exposure history.</p> |
| <p>9. Take responsibility for ensuring that personal values and beliefs do not compromise person-centred care</p>  | <p>Recognise that the level of climate anxiety is variable and others views may differ from yours.<sup>4</sup></p>  |
| <p>10. Demonstrate effective consultation skills, and in partnership with the person, decide the most appropriate course of action</p>   | <p>Enable students to see that health prevention and medicines optimisation is the most environmentally sustainable way forward and most beneficial for the patient.</p> <p>Include climate impact in discussion about health choices.</p>                                |
| <p>11. Take into consideration factors that affect people's behaviours in relation to health and wellbeing</p>   | <p>See LOs 8 and 9.</p> <p>Also opportunities/advice for safe disposal of medicines and packaging.</p>  |
| <p>12. Take an all-inclusive approach to ensure the most appropriate course of action based on clinical, legal and</p>   | <p>Recognise the legal frameworks associated with environmental sustainability –</p> <ul style="list-style-type: none"> <li>• Health and Care Act 2022<sup>5</sup></li> <li>• UK Climate Change Act<sup>6</sup></li> <li>• the Paris Agreement<sup>7</sup></li> </ul>     |

<sup>3</sup> Starting the Conversation – Five Tips on How to Talk to Climate Deniers in Your Family [Internet]. The Climate Reality Project. 2021 [cited 2023 Mar 31]. Available from: <https://www.climateRealityProject.org/blog/starting-conversation-five-tips-how-talk-climate-deniers-your-family>

<sup>4</sup> Naik A. What is 'Climate Anxiety', and what can you do about it? [Internet]. Mental Health UK. 2021 [cited 2023 Mar 31]. Available from: <https://mentalhealth-uk.org/blog/what-is-climate-anxiety-and-what-can-you-do-about-it/>

<sup>5</sup> Health and Care Act 2022 [Internet]. Queen's Printer of Acts of Parliament; [cited 2023 Feb 17]. Available from: <https://www.legislation.gov.uk/ukpga/2022/31/section/9/enacted>

<sup>6</sup> Climate Change Act 2008 [Internet]. [cited 2023 Mar 31]. Available from: <https://www.legislation.gov.uk/ukpga/2008/27/contents>

<sup>7</sup> The Paris Agreement | UNFCCC [Internet]. [cited 2023 Mar 31]. Available from: <https://unfccc.int/process-and-meetings/the-paris-agreement>

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| professional considerations  | <ul style="list-style-type: none"> <li>UNFCCC and NDCs<sup>8</sup></li> </ul> <p>Include climate impact in discussion about health choices.</p>   |
| 13. Recognise the psychological, physiological and physical impact of prescribing decisions on people  | <p>Recognise how to bring the CEE into the consultation without making the person feel guilty for seeking healthcare, helping them to take proactive steps to prevent ill-health.</p> <p>Recognise and accommodate that patients will give varying priority to CEE.</p>   |
| 14. Work collaboratively and effectively with other members of the multi-disciplinary team to ensure high-quality, person-centred care, including continuity of care | <p>Link to those providing public health advice related to the CEE to prevent illness, such as local councils, water provision, clean air.</p> <p>Work effectively with others to reduce service impact on CEE, for example, via use of transport, packaging etc.</p> <p>Promote good practice in terms of continuity of care between primary/secondary/tertiary care and the need for good collaborative working to ensure formularies are aligned to reduce waste and select environmentally sustainable choices.</p> |
| 15. Demonstrate the values, attitudes and behaviours expected of a pharmacy professional at all times  | <p>Discuss the commitment to a net-zero NHS from England<sup>9</sup>, Wales<sup>10</sup> and Scotland<sup>11</sup> as part of being a pharmacy professional and the values, attitudes and behaviours that would demonstrate this.</p> <p>This could include discussion of personal values and how they may not align with government aims. Emphasise that good climate care is good health care.</p>  |
| 16. Apply professional judgement in all circumstances, taking legal and ethical reasoning into account   | <p>Climate impact should be considered as an part of the ethical reasoning in making a professional judgement.</p>  |
| 17. Recognise and work within the limits of their knowledge and skills, and get support and refer to others when they need to  |   |
| 18. Take responsibility for all aspects of pharmacy services, and make sure that the care  | <p>Discuss services such as inhaler recycling<sup>12</sup> and blister pack recycling schemes which link to the pharmacy essential service 'disposal of unwanted medicines'.</p>  |

<sup>8</sup> United Nations Framework Convention on Climate Change [Internet]. [cited 2023 Mar 31]. Available from: <https://unfccc.int/>

<sup>9</sup> Greener NHS. Delivering a 'Net Zero' National Health Service [Internet]. [cited 2022 Oct 27]. Available from: <https://www.england.nhs.uk/greenernhs/publication/delivering-a-net-zero-national-health-service/>

<sup>10</sup> NHS Wales decarbonisation strategic delivery plan [Internet]. GOV.WALES. 2021 [cited 2023 Mar 31]. Available from: <https://www.gov.wales/nhs-wales-decarbonisation-strategic-delivery-plan>

<sup>11</sup> NHS Scotland climate emergency and sustainability strategy: 2022-2026 [Internet]. [cited 2023 Mar 31]. Available from: <http://www.gov.scot/publications/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026/>

<sup>12</sup> Murphy A, Howlett D, Gowson A, Lewis H. Understanding the feasibility and environmental effectiveness of a pilot postal inhaler recovery and recycling scheme. *npj Prim Care Respir Med.* 2023 Jan 21;33(1):5

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| and services provided are safe and accurate  | Demonstrate an understanding of types of waste generated by the healthcare system, where it is produced, the pollutants generated and waste management in a healthcare setting, including waste hierarchy. (Link to LO 25)   |
| 19. Take responsibility for all aspects of health and safety and take actions when necessary   | Understand how waste is managed in the healthcare setting and identify opportunities to manage waste that would reduce environmental impact.   |
| 20. Act openly and honestly when things go wrong and raise concerns even when it is not easy to do so  |  |
| 21. Apply the science behind pharmacy in all activities  | Cover the science behind climate change <sup>13</sup> and the concept of carbon literacy <sup>14</sup> when discussing environmental sustainability.   |
| 22. Demonstrate how the science behind pharmacy is applied in the discovery, design, development and safety testing of medicines and devices   | <p>In the initial introduction to practical work discuss and work within Green Chemistry principles<sup>15</sup>.</p> <p>Consider how the carbon footprint of pharmaceuticals is increasingly being considered in the development of new medicines<sup>16</sup>.</p> <p>Discuss the ecological impact of medicines and how we want 'benign by design' drugs that don't harm the fragile ecological systems that we rely on for good health<sup>17</sup>.</p> |
| 23. Recognise the technologies that are behind developing advanced therapeutic medicinal products and precision medicines, including the formulation, supply and quality assurance of these therapeutic agents | <p>Discuss more environmentally sustainable ways of drug discovery, development and manufacture that will making pharmaceuticals that will cut waste and energy usage<sup>18</sup>.</p> <p>Also see LO 25.</p>   |

<sup>13</sup> The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels - The Lancet [Internet]. [cited 2022 Oct 30]. Available from: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(22\)01540-9/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)01540-9/fulltext)

<sup>14</sup> The Carbon Literacy Project. Relevant climate change learning for everyone. [Internet]. [cited 2023 Mar 31]. Available from: <https://carbonliteracy.com/>

<sup>15</sup> Matharu AS, Lokesh K. Green Chemistry Principles and Global Drivers for Sustainability – An Introduction. 2019 Jun 6 [cited 2023 Mar 31]; Available from: <https://books.rsc.org/books/edited-volume/1891/chapter/2479850/Green-Chemistry-Principles-and-Global-Drivers-for>

<sup>16</sup> Richie C. Environmental sustainability and the carbon emissions of pharmaceuticals. J Med Ethics. 2021 Apr 14;medethics-2020-106842

<sup>17</sup> Leder C, Rastogi T, Kümmerer K. Putting benign by design into practice-novel concepts for green and sustainable pharmacy: Designing green drug derivatives by non-targeted synthesis and screening for biodegradability. Sustainable Chemistry and Pharmacy. 2015 Dec;2:31–6

<sup>18</sup> Wynendaele E, Furman C, Wielgomas B, Larsson P, Hak E, Block T, et al. Sustainability in drug discovery. Medicine in Drug Discovery. 2021 Dec;12:100107

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| <p>24. Keep abreast of new technologies and use data and digital technologies to improve clinical outcomes and patient safety, keeping to information governance principles</p> | <p>Use of IT pharmacy systems to reduce paper waste and new innovative strategies to reduce carbon in healthcare e.g. nitrous oxide 'cracking' technology<sup>19</sup></p>   |
| <p>25. Apply pharmaceutical principles to the safe and effective formulation, preparation, packaging and disposal of medicines and products</p>                                 | <p>Consider the environment in all steps of the medicines process<sup>20</sup>.</p> <p>Discuss the ecological impact of medicines and how we want 'benign by design' drugs that don't harm the fragile ecological systems that we rely on for good health<sup>14</sup>.</p> <p>Discuss services such as inhaler recycling and blister pack recycling schemes which link to the pharmacy essential service 'disposal of unwanted medicines'</p> <p>Introduce the Management and disposal of health care waste<sup>21</sup>.</p> |
| <p>26. Consider the quality, safety and risks associated with medicines and products and take appropriate action when producing, supplying and prescribing them</p>             | <p>Talk about the environmental risk that medicines have e.g. anaesthetic gases<sup>22</sup> and disposal of medicines into wastewater<sup>23</sup>.</p> <p>Be able to balance the CEE impact versus patient choice and concordance in relation to medicine-taking behaviours.</p>   |
| <p>27. Take responsibility for the legal, safe and efficient supply, prescribing and administration of medicines and devices</p>  | <p>Discuss the carbon footprint and other aspects of environmentally sustainable medicines use as part of the consideration of efficiency.</p>   |
| <p>28. Demonstrate effective diagnostic skills, including physical examination, to decide the most appropriate course of action for the person</p>                              | <p>Recognise the links between climate change and mental health, e.g. impact on quality of life and ability to cope with freak weather events leading to anxiety and depression, anxiety, sleep disorders and suicidal ideation in relation to the changing world<sup>11</sup>.</p> <p>Understand environmental and patient harm through defensive medical practice (over-investigation and over-treatment).</p>   |

<sup>19</sup> Pinder A, Fang L, Fieldhouse A, Goddard A, Lovett R, Khan-Perez J, et al. Implementing nitrous oxide cracking technology in the labour ward to reduce occupational exposure and environmental emissions: a quality improvement study \*. *Anaesthesia*. 2022 Nov;77(11):1228–36

<sup>20</sup> Thomber K, Adshead F, Balayannis A, Brazier R, Brown R, Comber S, et al. First, do no harm: time for a systems approach to address the problem of health-care-derived pharmaceutical pollution. *The Lancet Planetary Health*. 2022 Dec;6(12):e935–7

<sup>21</sup> NHS England. (HTM 07-01) Management and disposal of healthcare waste [Internet]. [cited 2023 Mar 31]. Available from: <https://www.england.nhs.uk/publication/management-and-disposal-of-healthcare-waste-htm-07-01/>

<sup>22</sup> Charlesworth M, Swinton F. Anaesthetic gases, climate change, and sustainable practice. *The Lancet Planetary Health*. 2017 Sep;1(6):e216–7

<sup>23</sup> Niemi L, Taggart M, Boyd K, Zhang Z, Gaffney PPJ, Pflieger S, et al. Assessing hospital impact on pharmaceutical levels in a rural 'source-to-sink' water system. *Science of The Total Environment*. 2020 Oct;737:139618

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|  | Ability to take an environmental history or exposure history for diagnosis and management of presented symptoms.   |
| 29. Apply the principles of clinical therapeutics, pharmacology and genomics to make effective use of medicines for people, including in their prescribing practice                                | <p>Include aspects of the health impact of climate change into all therapeutic topics:</p> <ul style="list-style-type: none"> <li>• Climate change and communicable diseases<sup>24</sup></li> <li>• Climate change and respiratory health<sup>25</sup></li> <li>• Cardiovascular risks of climate change<sup>26</sup></li> </ul> <p>Achieving this LO, through optimising therapy for patients and reducing waste, will not only improve health but also lower the ecological impact through the effective use of medicines.</p>                      |
| 30. Appraise the evidence base and apply clinical reasoning and professional judgement to make safe and logical decisions which minimise risk and optimise outcomes for the person                 | <p>Recognise current limitations of estimated carbon footprint indicators.</p> <p>Understand how to interpret information on public health issues such as air and water pollution to inform decisions in improving health outcomes.</p>  |
| 31. Critically evaluate and use national guidelines and clinical evidence to support safe, rational and cost-effective procurement for the use, and prescribing of medicines, devices and services | <p>Introduce how environmental factors are being increasingly incorporated into guidance and how environmentally sustainable usage of medicines is a key element of medicines optimisation in the national overprescribing report: <i>Good for you, good for us, good for everybody: a plan to reduce overprescribing to make patient care better and safer, support the NHS, and reduce carbon emissions</i><sup>27</sup></p> <p>Be able to balance CEE impact versus other factors in drug choice (cost, safety, effectiveness, patient choice).</p> |
| 32. Accurately perform calculations  | Use examples of calculating the carbon footprint of healthcare and medicines during the learning process.  |
| 33. Effectively promote healthy lifestyles using evidence-based techniques   | Discuss how climate change is affecting health <sup>11</sup> and the evidence to support a reduction in greenhouse gases to improve health. For example, a plant based diet and exercise advice, consistent with an environmentally sustainable lifestyle, are important in the management of acute coronary syndrome (ACS). The EAT-Lancet Commission <sup>28</sup> provides a useful brief for healthcare professionals.   |

<sup>24</sup> Murray KA, Escobar LE, Lowe R, Rocklöv J, Semenza JC, Watts N. Tracking infectious diseases in a warming world. *BMJ*. 2020 Nov 13;m3086

<sup>25</sup> Joshi M, Goraya H, Joshi A, Bartter T. Climate change and respiratory diseases: a 2020 perspective. *Current Opinion in Pulmonary Medicine*. 2020 Mar;26(2):119–27

<sup>26</sup> Peters A, Schneider A. Cardiovascular risks of climate change. *Nat Rev Cardiol*. 2021 Jan;18(1):1–2

<sup>27</sup> Department of Health and Social Care. National overprescribing review report [Internet]. 2021 [cited 2023 Mar 31]. Available from: <https://www.gov.uk/government/publications/national-overprescribing-review-report>

<sup>28</sup> Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, et al. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*. 2019 Feb 2;393(10170):447–92

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|   | Be able to integrate equity, diversity and inclusivity principles with CEE impact on health (inequitable impact of climate change on health and environmentally sustainable behaviours).   |
| 34. Apply the principles of effective monitoring and management to improve health outcomes  | <p>Include monitoring of public health issues such as air and water pollution as a way to improve health outcomes<sup>29</sup>.</p> <p>Be able to review prescribing data to promote waste reduction.</p> <p>Demonstrate ability to reduce prescribing impact on environmental sustainability by avoiding overprescribing, reducing waste through regular reviews, deprescribing, dose and device optimisation.</p>  |
| 35. Anticipate and recognise adverse drug reactions, and recognise the need to apply the principles of pharmacovigilance  | Understand that application of pharmacogenomics to tailor treatments to individuals has the ability to reduce unnecessary prescribing and subsequent medications required to manage ADRs.  |
| 36. Apply relevant legislation and ethical decision-making related to prescribing, including remote prescribing   |  |
| 37. Prescribe effectively within the relevant systems and frameworks for medicines use  | <p>Raise awareness of prescribing sustainably as outlined in the Competency Framework for all prescribers<sup>30</sup>.</p> <p>Include Social Prescribing as an option (usually lower climate impact).</p>   |
| 38. Understand clinical governance in relation to prescribing, while also considering that the prescriber may be in a position to supply the prescribed medicines to people | One of the competence statements for all prescribers under the Governance domain <sup>31</sup> is: <i>9.7. Considers the impact of prescribing on sustainability, as well as methods of reducing the carbon footprint and environmental impact of any medicine</i> , with the following note: Methods of reducing a medicine's carbon footprint and environmental impact include proper disposal of medicine/device/equipment waste, recycling schemes, avoiding overprescribing and waste through regular reviews, deprescribing, dose and device optimisation. |
| 39. Take responsibility for people's health records, including the legality, appropriateness, accuracy, security and  | Ensure drug labels with patient details on are peeled off cardboard boxes and pharmacy bags before discarding them into general or recycling waste bins.   |

<sup>29</sup> Department of Health and Social Care. Chief Medical Officer's annual report 2022: air pollution [Internet]. [cited 2023 Feb 23]. Available from: <https://www.gov.uk/government/publications/chief-medical-officers-annual-report-2022-air-pollution>

<sup>30</sup> Royal Pharmaceutical Society. Frameworks [Internet]. [cited 2023 Mar 31]. Available from: <https://www.rpharms.com/resources/frameworks/prescribin%20g-competency-framework/competency-framework#improve>

<sup>31</sup> Royal Pharmaceutical Society. A Competency Framework for all Prescribers [Internet]. 2021 [cited 2023 Mar 31]. Available from: <https://www.rpharms.com/resources/frameworks/prescribing-competency-framework/competency-framework>



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| confidentiality of personal data  |  |
| 40. Understand and implement relevant safeguarding procedures, including local and national guidance in relation to each person                                 |  |
| 41. Effectively make use of local and national health and social care policies to improve health outcomes and public health, and to address health inequalities | <p>Discuss the policies in place to achieve a Net Zero NHS and other local policy documents.</p> <p>Discuss how environmental sustainability is incorporated into NICE guidelines<sup>32</sup>.</p> <p>Discuss how environmental sustainability is also part of the new Pharmacy Quality Scheme for community pharmacy<sup>33</sup>.</p> <p>Discuss the FIP call to action '<i>Mobilising pharmacists across our communities to mitigate the impact of air pollution on health</i>'.<sup>34</sup></p> <p>Consider the environment as a determinant of health; discussing how environmental decline and climate breakdown are exacerbating existing social inequalities in health and in healthcare<sup>35</sup>.</p> |
| 42. Proactively participate in the promotion and protection of public health in their practice  | <p>Understand local and national health and social care policies and impact of CEE to promote healthy lifestyles and public health. Including, but not limited: promotion of active lifestyle, plant-based diet, social prescribing, healthy weight.</p> <p>The ecosystem and natural environment such as water and air quality, and access to green space should be included as part of the teaching of the model of the determinants of health<sup>36</sup>.</p> <p>Recognise and act upon equity, diversity and inclusivity issues that impact on health promotion activities.</p>  |
| 43. Identify misuse of medicines and implement effective strategies to deal with this   | Impacts of substance misuse to the environment <sup>37</sup> .   |

<sup>32</sup> NICE. Sustainability [Internet]. [cited 2023 Mar 31]. Available from: <https://www.nice.org.uk/about/who-we-are/sustainability>

<sup>33</sup> PSNC Briefing 024/21: Reducing the climate change impact of inhalers: environmentally safe disposal [Internet]. PSNC Website. [cited 2023 Mar 31]. Available from: <https://psnc.org.uk/briefings/psnc-briefing-024-21-reducing-the-climate-change-impact-of-inhalers-environmentally-safe-disposal/>

<sup>34</sup> FIP Air Pollution Programme - International Pharmaceutical Federation [Internet]. [cited 2023 Mar 31]. Available from: <https://events.fip.org/programme/air-pollution/>

<sup>35</sup> Paavola J. Health impacts of climate change and health and social inequalities in the UK. *Environ Health*. 2017 Nov;16(S1):113

<sup>36</sup> Hartig T, Mitchell R, De Vries S, Frumkin H. Nature and Health. <https://doi.org/101146/annurev-publhealth-032013-182443>. 2014 Mar 18;35:207–28

<sup>37</sup> Pharmaceutical Journal. Substance use and the environment: time for pharmacy to step up. [Internet]. 2022 [cited 2023 Mar 31]; Available from: <https://pharmaceutical-journal.com/article/opinion/substance-use-and-the-environment-time-for-pharmacy-to-step-up>

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| <p>44. Respond appropriately to medical emergencies, including the provision of first aid</p>  | <p>Emphasise the need to respond to emergency situations caused by climate change such as extreme heat and flooding, wildfire burns.</p> <p>Describe the impact of emergency situations on medicines supply and the role of the pharmacist in their management.</p> <p>Be able to use scientific principles to advise on medicines use during extreme climate change situations.</p>   |
| <p>45. Demonstrate effective leadership and management skills as part of the multi-disciplinary team</p>                                 | <p>Encourage students and trainees to identify the environmental sustainability teams in their workplace and get involved in activities that would contribute to leadership and management skills.</p> <p>Consider starting a SUSQI project<sup>38</sup>.</p>  |
| <p>46. Make use of the skills and knowledge of other members of the multi-disciplinary team to manage resources and priorities</p>       | <p>Work collaboratively with faculty from other courses within the universities who have expertise in planetary health and related subjects to provide research opportunities as part of the MPharm.</p> <p>Be able to describe the impact of collaboration with other MDT members in promoting sustainable medicines practice, collaborate effectively with the appropriate people to ensure environmental sustainability is considered in the provision of high-quality and person-centred care.</p> |
| <p>47. Develop, lead and apply effective strategies to improve the quality of care and safe use of medicines</p>                         | <p>Talk about the strategies for managing medicine use during heatwaves<sup>39</sup> and related heatwave plans<sup>40</sup>.</p>  |
| <p>48. Actively take part in the management of risks and consider the impacts on people</p>  | <p>As for LO 47.</p> <p>Able to balance the risks of patient choice and concordance with CEE impact of medicines use.</p>  |
| <p>49. Use tools and techniques to avoid medication errors associated with prescribing, supply and administration</p>                    | <p>Safe prescribing in General Practice is underpinned by safe repeat and acute prescribing systems. These need to be set up to ensure regular medication review to ensure medication is still required, condition appropriately managed and monitored etc. Links in to deprescribing and reducing waste and encouraging patients to only order what they need.</p>  |
| <p>50. Take appropriate actions to respond to complaints, incidents or errors in a timely manner and to prevent them happening again</p> |  |

<sup>38</sup> <https://www.susqi.org/>

<sup>39</sup> The Lancet. Health professionals: be prepared for heatwaves. The Lancet. 2015 Jul;386(9990):219

<sup>40</sup> Department of Health and Social Care & NHS England. Supporting vulnerable people before and during a heatwave: for health and social care professionals [Internet]. [cited 2022 Dec 1]. Available from: <https://www.gov.uk/government/publications/heatwave-plan-for-england/supporting-vulnerable-people-before-and-during-a-heatwave-for-health-and-social-care-professionals>

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| <p>51. Recognise when and how their performance or that of others could put people at risk and take appropriate actions</p>                                     | <p>Understand the unique contribution that pharmacists can make to promote social transformation and planetary health to avert the ecosystem crisis.</p>                                       |
| <p>52. Demonstrate resilience and flexibility, and apply effective strategies to manage multiple priorities, uncertainty, complexity and change</p>             | <p>Keeping up to date with latest climate-health related policies or updates.</p>  |
| <p>53. Reflect upon, identify, and proactively address their learning needs</p>   | <p>Recognise your own learning needs in relation to sustainable healthcare and CEE.</p>  |
| <p>54. Support the learning and development of others, including through mentoring</p>  | <p>Promote sustainable healthcare through teaching of others.</p>  |
| <p>55. Take part in research activities, audit, service evaluation and quality improvement, and demonstrate how these are used to improve care and services</p> | <p>Be able to review the environmental impact of one's own practice.<br/>Complete a research project, audit, or service improvement with impact statement on environmental sustainability.</p> |

Updated & published January 2023 by Sustainability in Pharmacy Education (SPE) Group

<https://www.pharmacydeclares.co.uk/education>


## Case Studies of how environmental sustainability has been implemented in existing MPharm curriculum:

| Pharmacy School  | University of Manchester   |
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| <b>MPharm Year implemented</b>   | 1 <sup>st</sup> year Lecture and Summative Coursework  |
| <b>What environmental sustainability content was implemented?</b>        | <p>Green Chemistry lecture, which introducing ES coursework where all students were requested to prepare a poster which linked healthcare and ES.</p> <p>178 poster were prepared by 1<sup>st</sup> yr students, titles included:</p> <ul style="list-style-type: none"> <li>• Don't sleep on the environmental impact of anaesthetic gas!</li> <li>• Contribution of pharmacy to SDGs.</li> <li>• Safe disposal of medicines.</li> <li>• Environmental Sustainability: NHS and PPE</li> <li>• Environmental impact of menstrual products.</li> <li>• CFCs and global warming.</li> <li>• New drugs and deforestation.</li> <li>• Delivering a net zero NHS.</li> <li>• Proper needle disposal: A shared responsibility for protecting our communities.</li> <li>• Green chemistry and synthesis of esomeprazole.</li> <li>• Green chemistry and synthesis of lansoprazole.</li> <li>• Steps to sustainability in pharmacy.</li> <li>• Contribution of pharmacy to the UN goal: Life below water.</li> </ul> |
| <b>Which SDGs does this meet?</b>  | All posters linked to at least one of the following SDGs: SDG3, SDG6, SDG8, SDG12, SDG13, SDG14, SDG15, SDG17  |
| <b>Which health system does this impact on?</b>                          | Includes drug discovery, respiratory, net zero NHS (policy), medicine disposal, women's health.  |
| <b>Feedback from pharmacy students if any</b>                            | Informal feedback is that the students enjoyed preparing posters, showing excellent creative   |
| <b>What could be done better? Suggestions for future by module leads</b> | Likely to restrict the range of topics for future academic years. This will make marking easier/more consistent and also allow a recycling of topics on a 4-year cycle.  |

| Pharmacy School  | University of Sunderland   |
|--|--|
| <b>MPharm Year implemented</b>   | <p>All years MPharm + OSPAP- reusable sharps bins in clinical skills lessons and OSCE's.</p> <p>All years MPharm and OSPAP- reusable scrubs for placement and OSCE, and removal or single use plastic aprons.</p> <p>Reduced use of gloves and increase emphasis on hand hygiene where relevant.</p> <p>2<sup>nd</sup> year therapeutics lectures and seminars</p> <p>2<sup>nd</sup> year rapid review topic- topics on environmental sustainability introduced</p> <p>3<sup>rd</sup> year research project- encourage research and topics on environmental sustainability</p> <p>4<sup>th</sup> year therapeutics lectures and seminars</p> |
| <b>What environmental sustainability content was implemented?</b>        | <ul style="list-style-type: none"> <li>- Environmental impact of inhalers (2<sup>nd</sup> year/ when prescribing and deprescribing 4<sup>th</sup> year)</li> <li>- Environmental impact of polypharmacy, prescribing and deprescribing (4<sup>th</sup> year)</li> </ul>  |
| <b>Which SDGs does this meet?</b>  | LO 2, 3, 5, 13, 21, 22, 23, 25, 41   |
| <b>Which health system does this impact on?</b>                          | Respiratory, polypharmacy, global policy   |
| <b>Feedback from pharmacy students if any</b>                            | Positive feedback from students.   |
| <b>What could be done better? Suggestions for future by module leads</b> | Application to each therapeutic and scientific area of curriculum  |

### Case Studies of how environmental sustainability has been implemented in existing MPharm curriculum:

| Pharmacy School   | UCL School of Pharmacy  |   |  |   |  |
|---|---|---|--|---|--|
| MPharm Year implemented   | Year 1  | Year 1  | Year 3 options   | Year 4  | Various years  |
| What environmental sustainability content was implemented?        | Sustainability in community pharmacy: waste, expired drugs, stock control, is sustainability taken into consideration when prescribing, etc | Climate Change impact on health. Assigned Reading: Lancet Commission on Climate Change<br><a href="https://www.thelancet.com/article/S0140-6736(21)01787-6/fulltext#">https://www.thelancet.com/article/S0140-6736(21)01787-6/fulltext#</a> | Various examples in several of the options – QI and leadership, plant-based medicines, global health.<br><br>In 2022 the module-spanning coursework was on the impact of climate change on the topics studied in the two options | Climate Change & link to outbreaks of infectious diseases | Deprescribing, Antimicrobial Stewardship.<br><br>Ethical Debates- students debate sending out of date medicines to 3rd world countries |
| Which SDGs does this meet?  | 3 and 13  | 3 and 13  | 3, 12 and 13   | 3, 6 and 13   | 3 and 13   |
| Which health system does this impact on?                          | All   | All   | All  | Global policy, infections                                 | All  |
| Feedback from pharmacy students if any                            |   |   |  |   |  |
| What could be done better? Suggestions for future by module leads | Plans to increase environmental sustainability across the whole MPharm from October 2023  |   |  |   |  |

| Pharmacy School  | Swansea School of Pharmacy  |
|--|---|
| MPharm Year implemented                                    | Year 2  |
| What environmental sustainability content was implemented? | <p data-bbox="629 355 1809 405">Week 1: Overview of the Coursework and To Do List</p> <p data-bbox="629 448 792 485">Overview</p> <p data-bbox="629 517 2047 569">As part of the summative assessments for the PMP202 module, you are required to complete a piece of coursework that will contribute towards 20% of your final module mark.</p> <p data-bbox="629 595 2074 679">The coursework comprises of two components of equal weighting (50% each), both of which must be completed. The components are a 10-minute group poster presentation and a 1000-word reflective essay. You will be split into groups to complete the group poster presentation, while the reflective essay should be completed individually.</p> <p data-bbox="629 705 2011 758">Following the group presentation, you will also need to complete a peer assessment survey comprising grading and constructive critique/feedback on the contribution of other group members.</p>  |

## To-Do List

In order to successfully complete Week 1, please do the following:

1. Review the documents provided on Canvas.
2. Attend Week 1 workshop
3. Complete Student Agreement Form
4. Participate in the discussion
5. Plan ahead for Week 2 poster development





# Week 1: Sustainability in Pharmacy Presentation

## *"Sustainability and its application in pharmaceutical science and pharmacy practice"*

Sustainability is set to play a significant role in the future of healthcare, therefore it is essential for pharmacy students and trainees to understand the impact of climate change on the health of individual patients and the population. Thus, implementing proper interventions to tackle the problems associated with climate change.

To start: This Student Agreement Form must be completed prior to the commencement of the coursework. Click [here](#) to access the form.



## Learning outcomes

By the end of this coursework you should be able to:

1. Understand the science behind global warming and communicate the threat to health
2. Understand the urgency and scale of the issues and how to act to address them in professional life and clinical practice
3. Understand the importance of "sustainable healthcare" and its implications in pharmacy practice
4. Develop team-working and conflict-resolution skills

**NB: The audio of the live presentation was not captured due to technical issues. If you have any question please do not hesitate to contact Dr. Juman Dujaili.**

[Sustainability in Pharmacy - Updated Slides.pdf](#) ↓

[Sustainability in Pharmacy Coursework Week 1 Presentation - Student Copy -1.pptx](#) ↓

[PMP202 Sustainability Coursework- Student Proforma.docx](#) ↓

[PMP202 Coursework Poster Template and Guidelines.pdf](#) ↓

[Year 2 Groups TB2 230125.xlsx](#) ↓

## Week 1: Coursework Supplementary Resources



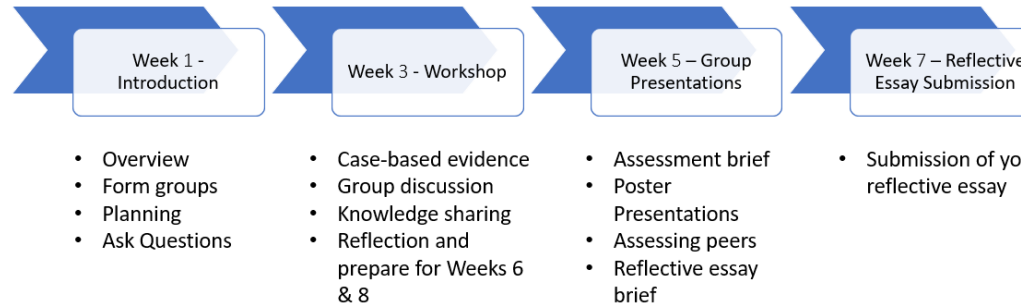
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### Additional materials and resources

The following material is additional content and resources, which you might want to take a look at if you would like to dive deeper into the learning materials to further your learning. They expand on the topic and may help consolidate your learning, by introducing additional layers of complexity and a more comprehensive understanding of the learning materials.

1. [FIP Sustainability in Pharmacy](#) ↗
  2. [The Journal of Climate Change and Health Manuscript.pdf](#) ↓
  3. [Climate anxiety](#) ↗
  4. [Pharmaceutical Chemistry Benign by Design.pdf](#) ↓
  5. [Pharmaceutical Chemistry Sustainability in Drug Discovery.pdf](#) ↓
  6. [Pharmaceutical Chemistry Biotransformations in Drug Synthesis - A Green and Powerful.pdf](#) ↓
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# Timeline



PMP202 Coursework Introduction to students

## Overview

| Group Presentation   | Reflective Essay   |
|--|--|
| <ul style="list-style-type: none"> <li>• 50%</li> <li>• 1 Poster and 10 Minutes</li> <li>• 2 Minutes Q&amp;A</li> <li>• Everyone in each group must make a significant contribution</li> <li>• Instructor Assessment</li> <li>• Peer Assessment</li> </ul> | <ul style="list-style-type: none"> <li>• 50%</li> <li>• 1000 Words</li> <li>• Each person must complete <b>individually</b></li> <li>• Only instructor-assessed</li> </ul> |

## Poster Presentation Specifications

- Complete using Microsoft PowerPoint
- Only allowed 1 slide & 10 minutes Presentation
  - Title, group intro and their contributions
  - Background
  - Discussion of sustainability in pharmacy considering a product/service integrating six learning themes
  - Summary and Keynote
  - References
- Can include animation provided the group created it
- Every member must contribute and master the presentation, but presenter(s) is for the group to decide
- Dress code: Professional
- Grading rubric available in the coursework booklet

## Reflective Essay Specifications

- 1000 words  $\pm$  10%
- **Core Science (700 words - 70%):** How does science underpin practice? Links between ISUs and what you have learnt during coursework, links to 6 themes of course
- **New Knowledge and Skills (200 words – 20%):** What knowledge / skills did you gain or refine? Which skills would you like to refine further? Any aspect of the task which was particularly beneficial to your learning?
- **Working in a Group (100 words – 10%):** Your contribution to design and delivery? How the group worked together – well? conflict resolution? Strengths? How did you respond to peer feedback? Agree / disagree? Learn something about yourself? Changes for future?

|   |   |
|---|---|
| <b>Learning Outcomes</b>                        | <p>By the end of this coursework, students should be able to:</p> <ul style="list-style-type: none"> <li>• Describe the science behind global warning and communicate the threat to health</li> <li>• Appreciate the urgency and scale of the issues and how to act to address them in professional life and clinical practice</li> <li>• Describe the importance of “sustainable healthcare” and its implications in pharmacy practice</li> <li>• Develop team-working and conflict-resolution skills</li> </ul> |
| <b>Which health system does this impact on?</b> | <p>All systems</p>  |