

Providing animal technicians with the latest news from the NC3Rs

Tech3Rs

Welcome to the latest edition of Tech3Rs. In each issue, we share updates on recent advances in the 3Rs and highlight new resources, research and events.

This newsletter is for animal technicians working in research establishments to help with identifying opportunities to embed the 3Rs in practice and ensure high standards of animal welfare. If you have any ideas for future issues or are working on a 3Rs approach you would like us to feature, please get in touch – we would love to hear from you! You can email us at tech3rs@nc3rs.org.uk.

In this issue we focus on the challenges that technicians face, with a look at compassion fatigue and a Lockdown Champions special feature. We also include post-lockdown return-to-research advice, and an interview with Linda Horan, Manager of the Biomedical Procedures Unit at the University of Strathclyde, about her career so far.



Don't miss the next issue!

Tech3Rs is currently published online only – read all our past issues at www.nc3rs.org.uk/tech3rs.

You can stay up-to-date on the latest issue of Tech3Rs and more via the NC3Rs e-newsletter. Visit www.nc3rs.org.uk/register to subscribe to our monthly updates.



Compassion fatigue: the cost of caring

Discover how this condition affects animal technicians and how you and your colleagues can manage your wellbeing.

For many animal technicians bonding with animals is easy, but breaking those bonds when animals are unwell or an experiment comes to an end is not. Similarly, being exposed to situations where animals are distressed or in pain can take a large emotional toll on those responsible for their welfare.

The emotional and moral stress that arises in these circumstances can result in compassion fatigue, which is often referred to as 'the cost of caring'. Symptoms of compassion fatigue can range from frustration at work to intrusive thoughts and depression. As well as negatively affecting individuals, it also limits the standard of care that staff are able to provide. It is therefore important for the animal research community to recognise compassion fatigue, identify

those at risk and provide strategies and support to alleviate its effects.

Laboratory animal care staff are a new focus of compassion fatigue research. Recent publications give insight into which roles are associated with a higher risk of compassion fatigue¹ and provide suggestions for reducing its effects in the research environment².

The NC3Rs and the North American 3Rs Collaborative (NA3RsC) are hosting a webinar focused on animal technicians and compassion fatigue on **Wednesday 26 August at 3pm (BST)**. Megan LaFollette, 3Rs Fellow at the NA3RsC, will introduce the topic of compassion fatigue and discuss recent research into this condition. You can register by visiting www.nc3rs.org.uk/compassionfatigue.

¹ LaFollette MR *et al.* (2020). Laboratory animal welfare meets human welfare: a cross-sectional study of professional quality of life, including compassion fatigue in laboratory animal personnel. *Frontiers in Veterinary Science* 7: 114.

[doi: 10.3389/fvets.2020.00114](https://doi.org/10.3389/fvets.2020.00114)

² Newsome JT *et al.* (2019). Compassion fatigue, euthanasia stress, and their management in laboratory animal research. *JAALAS* 58(3): 289-292.

[doi: 10.30802/AALAS-JAALAS-18-000092](https://doi.org/10.30802/AALAS-JAALAS-18-000092)

Lockdown champions

In this special edition of our 3Rs champions feature, we're celebrating the work of technicians who have continued to put the 3Rs into practice during the COVID-19 lockdown.



Graham Morrissey, Director of the Biological Services Facility, University of Manchester: *I would like to recognise and thank all the animal technicians at the University of Manchester for adapting so well to the changes we implemented in response to the COVID-19 outbreak. Despite being required to work different shift patterns and additional weekends there have been no complaints – everyone in the team has been a credit to themselves. They are all a fantastic asset to the university.*



Denise Jelfs, Operations Manager, University of Oxford: *During the recent pandemic our team of technicians at Oxford University have all worked tirelessly to maintain a high standard of animal welfare. Managing our breeding colonies in the face of uncertainty has been difficult. Despite this, everyone has still turned up with a smile every day. We have continued with this positive frame of mind and are now able to start welcoming our researchers back into our facilities.*



John Greenman, Professor of Tumour Immunology, University of Hull: *I would like to recognise the professionalism and dedication of our team – Laura, Richard, Megan and Kathryn – at the University of Hull. They have continued tending our animals throughout lockdown and have ensured that many precious experiments did not go unfinished, preventing wastage of animals.*

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Lockdown period has been a challenge for us all – in our personal lives and our work lives. All the technicians involved in caring for our animals have embraced that challenge and continued to maintain our high standards. I would like to say a big thank you to everyone involved in looking after our animals. A first-class job. Well done everyone for your hard work and dedication!”

Alan Hart, Director of Biological Services,
University of Sheffield



Trent Garner, Professor, ZSL Institute of Zoology: *In addition to the novel challenges presented by the pandemic, lockdown coincided with the onset of metamorphosis of hundreds of tadpoles at the Institute of Zoology. Despite these circumstances, the team of Chris, Tresai, Lola and Dada kept the facility functioning and more than a thousand frogs, toads, salamanders and tadpoles happy and healthy. As a result, researchers will not experience any significant delays in resuming animal work that contributes directly to the Institute's research programme to combat global amphibian decline.*

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Despite the daily challenges of living and working through the pandemic, the animal facility staff at the University of Nottingham have conducted their professional duties in an exemplary manner, ensuring that animal welfare has been maintained to the highest standard. Their response to the COVID-19 pandemic has been a fantastic team effort by all involved. This is truly appreciated by the University research community.”

Neil Yates, Director of the Bio-Support Unit, University of Nottingham



Orosia Asby, Director of Biological Services and Standards, Cardiff University: *We would like to pay tribute to the work of all the animal technicians at Cardiff University. Their selfless commitment to ensuring that the key service of animal care could continue has shown a truly fantastic level of dedication to both the animals and their research colleagues.*



Sara Wells, Director of the Mary Lyon Centre, Harwell: *I would like to pay special recognition to the hard work of Maz and Lynn on our necropsy team and Rhys on our phenotyping team. All three have worked tirelessly to ensure that the experiments of colleagues and scientific groups could be completed, despite lockdown. Maz and Lynn have covered hundreds of dissections to avoid mice being wasted and Rhys has worked many extra hours (and weekends), all with a smile on his face – he is an inspiration to all he works with!*



Sally Robinson, Director of Animal Sciences and Technologies, AstraZeneca: *We'd like to thank all our animal technical staff in the UK, Sweden and the USA who have been championing animal care and welfare, supporting our ability to continue to discover and develop new medicines and importantly supporting each other through the COVID-19 pandemic. The pandemic has led to significant changes to how we work with and care for our animals. Reduced staffing, social distancing, increased hygiene and virtual meetings have created a more restrictive working environment and we are very proud that we have maintained high quality animal care and continued working on our global refinement initiatives.*

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Thank you to our amazing and dedicated team of animal technologists, scientists and key workers. Your commitment and passion for animal welfare and science during the current pandemic has been truly inspirational. Your work really does improve the health and lives of people and animals. It has never been more important as we work on finding effective ways to prevent and treat COVID-19.”

Tim Jameson, Animal Welfare and Compliance Officer, Covance

Tech Journeys

We speak to inspirational technicians who have demonstrated a long-term commitment to the 3Rs about their career paths. If you have an inspirational story, or know someone else who does, please get in touch via tech3Rs@nc3rs.org.uk.

This issue we're featuring Linda Horan, who has been active in the animal research community for over 35 years. Linda began her career as a trainee technician and is now Manager of the Biomedical Procedures Unit at the University of Strathclyde. Linda became an NC3Rs Board Member in 2019 and was appointed Chair/Chief Executive Officer of the Institute of Animal Technology (IAT) Council in the same year.

In my early years I was not considered very academic, but I knew that I wanted to work with animals in some capacity. I attended a careers convention and met someone from the University of Liverpool Animal Unit, as it was then known. I applied for a job with them and the rest is history!

I left school at age 16 with just a few O-Levels and started as a trainee technician, and I loved it. I wanted my animals to be as happy and healthy as they could be. I didn't realise then that I was considering one of the 3Rs (refinement) – it just felt right to me and what a good animal technician should be doing. I can remember bringing in toilet rolls and cutting down plastic bottles for something to put into the cages – these were the days before enrichment was the norm!

A voice for animals

As my career has progressed, I have worked on a variety of projects, ranging from cardiovascular research with pigs to a Kennel Club study focused on the Dobermann breed of dog. I enjoy research with larger animals, as it is often closer to the clinical setting.

Whether it has been the usual mice and rats or the more unusual marmosets, baboons, dogs, cats, pigs or sheep, I have always aimed to be the animal's voice. My motto is: laboratory animals

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One of the most important things you can do as a technician is educate yourself. It gives you the power to be able to recognise when something isn't right and the confidence to challenge a situation if it's needed.”



may not have quantity of life, but we can give them quality of life.

My passion for animal welfare and love for my job motivated me to pursue many qualifications in the field of animal technology and science. It also led me to graduate with an honours degree in Applied Biological Sciences at the age of 35. Studying alongside work isn't easy, but hard work does pay off. In my case, the hard work I put into gaining qualifications and connections

within my field helped me to secure my current position as Unit Manager at the University of Strathclyde.

Moving to management

Being the manager of a medium-sized unit is great. My staff are loyal and reliable, and I have a lot of control over how the work is undertaken. My advice to those wishing to run a well-designed unit is to always keep abreast of new developments in animal care and welfare.

Staying up-to-date allows me to ensure we are carrying out best practice – the downside is that I now spend most of my day at a computer! One of the most important things you can do as a technician is educate yourself. It gives you the power to be able to recognise when something isn't right and the confidence to challenge a situation if it's needed.

At an early stage in my career I became involved with the IAT North West Branch. I loved meeting up with other technicians in a secure environment where I knew I could talk openly and without prejudice. Through this, I made great friends that I still have to this day.

Joining the IAT Council

Later in my career, when I moved to Scotland, I helped set up the West of Scotland IAT Branch and applied to be on the IAT Council. My first application wasn't successful, but I tried again the following year and succeeded, initially joining the Congress committee.

Congress gives you the chance to learn about the latest refinements, benchmark where you are, meet other technicians and have some fun; the value of networking cannot be underestimated.

I continued to be involved with the IAT and held the position of Honorary Secretary for five years. I also became involved with the NC3Rs, first joining its 3Rs Impact Working Group and, more recently, becoming a member of the NC3Rs Board.

Over the years I have used my experience and knowledge as an animal technician to contribute to initiatives, panels and working groups focused on improving the welfare of research animals and advancing science. For example, I have been involved in several workshops looking at the clinical signs of animals used in ageing studies and I contributed to the production of the British Pharmacological Society's Curriculum for the Use of Research Animals.

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The value of networking cannot be underestimated.”



Linda has worked with a range of species in research, from mice and rats to larger animals like pigs and dogs, as well as more unusual animals such as Libyan jirds.

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My advice to those wishing to run a well-designed unit is to always keep abreast of new developments in animal care and welfare.”

COVID-19 challenges

Last year I was extremely honoured to become IAT Chair/CEO – what a year to take over as Chair! It has been a real challenge and the ongoing COVID-19 pandemic has created great difficulties for the scientific research community. Projects have been set back by months and, in some cases, even years.

However, the hard work of animal technicians has not gone unnoticed and I believe we will emerge from this situation with a new respect from people who rely on us. We will be valued as the assets we are, and we should all try and build on this, for the benefit of ourselves and the animals in our care.

Visit the IAT website, where you can find further resources to help you develop your career and look after your mental health during and after lockdown: www.iat.org.uk



Linda's love of animals doesn't stop at work: her rescue cat Bart has been keeping her company during lockdown.

3Rs papers of interest

Each issue we summarise recent 3Rs publications, providing links to the full articles for you to discuss with your colleagues (for example, in your next team meeting). This issue we focus on rodent husbandry and procedures.



Makowska JI, Weary DM (2020). A good life for laboratory rodents? *ILAR Journal* ilaa001. doi: [10.1093/ilar/ilaa001](https://doi.org/10.1093/ilar/ilaa001)

- In addition to improving animal welfare and scientific outcomes, providing a higher standard of care for animals used in research can increase job satisfaction and reduce the risk of compassion fatigue for animal technicians.
- The authors of this review state that animal care staff and researchers should aim higher than simply minimising the pain and distress of laboratory rodents, and instead provide them with a "good life".
- A good life is defined as one that allows animals to express a wide range of behaviours, use their abilities and have control over their active engagement with the environment (self-agency).
- The publications and personal communications included in this review provide practical examples of how to maximise the wellbeing of rats and mice through adjustments to their physical and social environments.
- For example, self-agency can be facilitated by providing the animals with the opportunity to segregate clean and dirty areas and choose where they nest, eat and excrete.
- Other relatively easy opportunities to improve welfare include providing access to playpens and increasing cage complexity and usable space by the addition of tunnels and platforms.
- Animal technicians noted that rats that had access to a playpen were "calmer, more confident and interactive" when handled.

Zude BP, Jampachaisri K, Pacharinsak C (2020). Use of flavored tablets of gabapentin and carprofen to attenuate postoperative hypersensitivity in an incisional pain model in rats (*Rattus norvegicus*). *JAALAS* 59(2): 163-169. doi: [10.30802/aalas-jaalas-19-000093](https://doi.org/10.30802/aalas-jaalas-19-000093)

- Administering pain relief by injection can be both time-consuming for staff and stressful for animals due to frequent handling. Some analgesic drugs (e.g. opioids) are subject to legal controls and can have potentially unwanted effects on the immune system.
- To evaluate the efficacy of tablet-based dosing of post-operative analgesia, the researchers measured the consumption of bacon-flavoured analgesic tablets (Bio-Serv) by Sprague-Dawley rats, on the three days before and after they received a surgical incision to the paw.
- They also observed the behavioural responses of rats to mechanical and thermal sensitivity tests, which can be used to quantify the effectiveness of pain relief.
- Rats were given one of five different tablet-based treatments: placebo; placebo + one slow release buprenorphine injection (opioid); gabapentin (non-opioid); carprofen (nonopioid, NSAID); or gabapentin + carprofen combined.
- Mechanical sensitivity tests indicated effective pain relief for the gabapentin group and the carprofen group. However, on the first day post-surgery the gabapentin + carprofen group were not sufficiently relieved of pain, possibly because this group ate a reduced amount of tablet on this day.
- Animals recovering from invasive procedures and anaesthesia can be less motivated to eat, highlighting a limitation of delivering pain relief through the self-administered oral route.
- An additional drawback is that, in the absence of specialised feeding equipment, animals need to be singly-housed in order to properly monitor their drug intake.

Talbot SR et al. (2020). Defining body-weight reduction as a humane endpoint: a critical appraisal. *Laboratory Animals* 54(1): 99-110. doi: [10.1177/0023677219883319](https://doi.org/10.1177/0023677219883319)

- A reduction in bodyweight of 20% or more is frequently used as a humane endpoint criterion for rodents that are used in research studies.
- The authors evaluated the bodyweight loss and clinical scores of mice and rats across a range of disease models, including streptozocin-induced chronic diabetes, dextran sulfate sodium-induced acute colitis, and an intracranial glioma model.
- After induction of chronic diabetes or acute colitis, some animals lost more than 20% of their bodyweight without exhibiting major signs of distress and initial weight loss was followed by weight gain.
- In the cases of these models, strict adherence to the 20% bodyweight loss criterion could lead to unnecessary euthanasia, potentially increasing the number of animals required for the study.
- In contrast, in the rat intracranial glioma model, rapid weight loss of less than 20% was a reliable indicator of further, severe clinical decline that warranted euthanasia.
- The authors recommend a flexible approach to the 20% bodyweight loss criterion, tailored to the specific model or intervention.
- Bodyweight loss should be evaluated alongside other clinical signs, particularly those indicative of distress.

Highlights from the NC3Rs website

We are always updating our website with new resources to help you discover the latest 3Rs advances. Recently we highlighted the need to explore alternatives to fetal calf serum, highlighted a survey on the Rabbit Grimace Scale, and shared first-hand accounts from technicians who have implemented non-aversive mouse handling methods.



A change in (cell) culture

Fetal calf serum (FCS), also known as fetal bovine serum, is a commonly used cell culture supplement obtained from calves during the slaughter of pregnant cows. In a new blog post, Dr Jan van der Valk from the 3Rs-Centre Utrecht Life Sciences outlines why it's time for the cell-culture community to make the change to FCS-free media.

The Centre administers the FCS-Free Database, which details alternative culture media for 260 unique cell types. However, there is more work to be done in developing new defined media and changing (cell) culture.

Read the blog post:

www.nc3rs.org.uk/fcsblogpost

Explore the FCS-Free Database:

www.fcs-free.org



Pain assessment in rabbits: your input wanted

If you are an animal technician or researcher who works with rabbits, your valuable input is required to further develop pain assessment tools for this species. You can contribute to improving the welfare of laboratory rabbits by completing a short online survey from Dr Matt Leach at Newcastle University.

The survey takes around 20 minutes to complete and aims to shed light on current practices in pain assessment and to help evaluate implementation of the Rabbit Grimace Scale and Rabbit Pain Behaviour Scale.

Take the survey:

newcastlehealth.eu.qualtrics.com/jfe/form/SV_d4FzLtA1eftzHq5

Learn more about the housing and husbandry of laboratory rabbits:

www.nc3rs.org.uk/rabbits



Technicians talk non-aversive mouse handling

Prior to lockdown, we visited UK research institutions to speak to animal technicians and NTCOs about how they had moved from tail handling of mice to using cupped hands or handling tunnels.

In a series of short video clips available to view on our website, champions from six different facilities talk about how they have successfully made the change to non-aversive handling methods. The champions highlight the improvements they have seen in the behaviour of their mice and give advice on how others can ensure the transition to non-aversive handling is smooth and efficient.

Watch the videos: www.nc3rs.org.uk/mousehandlingchampions

Spotlight on resuming animal research

Embedding the 3Rs in COVID-19 return to research plans

As research resumes following the COVID-19 lockdown, prioritising the 3Rs is essential for good scientific conduct and sensible contingency planning. The NC3Rs has created a resource to support animal care staff and *in vivo* researchers during the return-to-work transition by highlighting key 3Rs considerations and relevant resources.

The guidance is categorised into four equally important areas, which are outlined below along with examples of the advice in each category:



Considering alternatives to animal use

Example: For studies using tissue from animals killed by humane methods, researchers should collaborate to share the tissue and maximise the research output from each animal.



Prioritising and planning experiments

Example: Whilst access to facilities and staff support is limited, researchers should communicate closely with animal facility managers to carefully prioritise and plan their experiments.



Training and competency

Example: To ensure training records are up-to-date, refresher training and competency assessment should be undertaken by a nominated trainer for all planned procedural techniques required, before starting animal work.



Sourcing and breeding of animals

Example: Breeding strategies should be optimised to ensure efficient breeding of animals and minimal surplus when essential colonies are re-established.



3Rs advice for project licence applicants

A requirement of the project licence application process is to detail how the 3Rs have been considered and applied to the research in question. Our Regional Programme Managers have created a hub on our website to help project licence applicants with this requirement.

The hub has advice and resources relevant for first-time applicants and more experienced project licence holders, as well as members of the Animal Welfare and Ethical Review Body (AWERB). It also contains useful information for those who want to stay up-to-date on the latest advances in the 3Rs, including those resulting from NC3Rs-funded research.

Each of the 3Rs is considered separately and the resources highlighted cover a variety of formats, including training webinars, alternatives databases, best practice guidelines and practical tools for designing experiments and assessing animal welfare.

Read the full resource and share it with your colleagues:
www.nc3rs.org.uk/returntoresearch

Access the hub and download the guidance:
www.nc3rs.org.uk/PPLadvice