Question 1: ***Why is it important to keep highly detailed records of laboratory and clinical research data and analyses – which should have been electronic at the NIH since June 2024?***

Detailed research records allow scientists to understand how experiments were conducted and to replicate them accurately. Maintaining excellent research records is essential not only for experimental reproducibility but also for assisting new group members in completing projects that rely on data initially gathered by former group members who have since moved on to the next stage of their careers. Good record keeping may help defend against false allegations of potential research misconduct or provide evidence to support one's claim to warrant authorship in an authorship conflict resolution process. For a more detailed discussion on the requirements and advantages of good record keeping please refer to the "Scientific record keeping" chapter of the Guidelines and Policies for the Conduct of Research document.

Question 2: ***Should the postdoc be the first author or a co-author on the new version of the paper?***

Because the postdoc had written the original version of the manuscript, based on NIH General Guidelines for Authorship Contributions, drafting the manuscript warrants first authorship. However, if the manuscript no longer contains any original data from the postdoc and if the postbac had rewritten the manuscript so substantially that in essence, an entirely new manuscript had been drafted, then the PI may consider the manuscript to be a new paper. If that were the PI's decision, it would be likely to be a contentious decision, as the postdoc had presumably conceptualized many of the experiments and therefore merited authorship with original ideas, planning, developing protocols and reagents, and other intellectual contributions to the project. The postbac could deserve first authorship if the postbac's contribution surpassed that of the postdoc's. Alternatively, the postdoc and the postbac could be co-first authors on the manuscript based on the extent of their contribution and the authorship guidelines. All co-authors must take responsibility for the full manuscript and agree to its submission, which can be a challenge if there are fundamental disagreements about authorship.

Question 3: ***Could the postdoc's low quality of recordkeeping lead to suspicions of research misconduct? How should the PI respond in this case?***

The low quality of the postdoc's recordkeeping is unlikely to directly lead to suspicions of research misconduct, unless it appeared that the experiments performed by the postdoc could not actually have been conducted as reported. However, when faced with suspicious data, the PI is more likely to be reassured of the quality of the results and integrity of the experimentalist when the work has been responsibly documented. On the other hand, if the PI confirmed the presence of "suspicious duplications within a key image," a consultation with the NIH Agency Intramural Research Integrity Officer (AIRIO) would be warranted.

Question 4: ***What could each person have done differently to prevent the problems that occurred in this case?***

The PI could have kept a closer eye on the recordkeeping in the research group and asked a different group member, perhaps a staff member, to repeat the experiments. The PI should also have consulted appropriate resources regarding authorship and provided transparent updates to the postdoc about the status of the manuscript, including any authorship changes. The postdoc should have kept better research records, in a single, agreed-upon location, and asked questions if unsure about best practices; the postdoc should also have considered the importance of avoiding potential misconduct in the preparation of manuscript figures. The PI and the postdoc should have reviewed the postdoc's records before departure. This is particularly important since most journals currently require the authors to submit the underlying raw data, including an exhaustive methods and materials section in the supplemental information section. This is especially relevant in the context of the recent policies on open science and data sharing. The postbac could express concerns to the PI about the pressure of replicating these experiments and consider asking if there is another, more appropriate group member to perform the replication efforts.

The postdoc could have asked to take a copy of all data relevant to the manuscript before leaving, in case questions came up before submission or during revisions. In that case, the postdoc would have needed to complete an NIH Form 3000 at least 45 days before departure.

Please refer to the NIH IRP Authorship Conflict Resolution policy for more information about authorship and conflict resolution.