
University of Arizona Program in Research Integrity Education Monthly Newsletter

A Federally Mandated Compliance Education Program

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Featured this month in the Program in Research Integrity Education (P.R.I.E.) newsletter is the third part in a series of three newsletters which highlight the topic of *Digital Imaging Ethics*. The information contained within is authored by Douglas W. Crome, M.S., Manager, Cellular Imaging Core, *Southwest Environmental Health Sciences Center*, the University of Arizona.

We thank Mr. Crome for granting permission to present this information in the P.R.I.E. monthly newsletter.

Digital Imaging: Ethics (Part 3)

By: Douglas W. Crome, M.S. - Manager, Cellular Imaging Core, *Southwest Environmental Health Sciences Center*, University of Arizona, Tucson, Arizona

12. Be careful when changing the size (in pixels) of a digital image.

Changing the size of an image (the number of pixels in X and Y) can introduce resampling artifacts. Decreasing the image size (downsampling) can cause the XY resolution in an image to be greatly reduced. If the size reduction is not by a power of two, the software program has to be "creative" in determining the intensity values of each pixel (guessing). Using a power of two is slightly better, since this is a form of averaging, and while the resolution is still decreased, it is decreased in a more reproducible manner.

Increasing the image size (upsampling) causes the software to interpolate (guessing) to "create" pixels in between the existing pixels. Upsampling an image does not increase the resolution, in fact it may make it more difficult to resolve features because of aliasing artifacts. In either case, users should insert a magnification scale bar prior to resampling (magnification may be nearly impossible to calculate afterwards).

Users should only change the total number of pixels in an image one time to avoid compounding any artifacts that might be created.

Adobe Photoshop tip: If you are only changing the dpi of the image for different output devices (e.g., printers), uncheck the resample image box found at the bottom of the window that appears

when invoking the IMAGE|IMAGE SIZE menu item. By doing this you change the scale of the image (72 dpi, 300 dpi, etc) without changing the number of pixels in the width or height boxes. See:

http://swehsc.pharmacy.arizona.edu/exppath/resources/pdf/Photoshop_Image_Size_dialog_box.pdf

Microscopy Society of America position on Ethical Digital Imaging:

"Ethical digital imaging requires that the original uncompressed image file be stored on archival media (e.g., CD-R) without any image manipulation or processing operation. All parameters of the production and acquisition of this file, as well as any subsequent processing steps, must be documented and reported to ensure reproducibility."

"Generally, acceptable (non-reportable) imaging operations include gamma correction, histogram stretching, and brightness and contrast adjustments. All other operations (such as Unsharp-masking, Gaussian blur, etc.) must be directly identified by the author as part of the experimental methodology. However, for diffraction data or any other image data that is used for subsequent quantification, all imaging operations must be reported."

Microscopy Society of America, resolution adopted at the 2003 summer council meeting - *Microscopy Today* Nov/Dec 2003, p61.

Journal of Cell Biology - Instructions to Authors (2007) -

<http://www.jcb.org/misc/ifora.shtml>

No specific feature within an image may be enhanced, obscured, moved, removed, or introduced. The grouping of images from different parts of the same gel, or from different gels, fields, or exposures must be made explicit by the arrangement of the figure (i.e., using dividing lines) and in the text of the figure legend. If dividing lines are not included, they will be added by our production department, and this may result in production delays. Adjustments of brightness, contrast, or color balance are acceptable if they are applied to the whole image and as long as they

do not obscure, eliminate, or misrepresent any information present in the original, including backgrounds. Without any background information, it is not possible to see exactly how much of the original gel is actually shown. Nonlinear adjustments (e.g., changes to gamma settings) must be disclosed in the figure legend. All digital images in manuscripts accepted for publication will be scrutinized by our production department for any indication of improper manipulation. Questions raised by the production department will be referred to the Editors, who will request the original data from the authors for comparison to the prepared figures. If the original data cannot be produced, the acceptance of the manuscript may be revoked. Cases of deliberate misrepresentation of data will result in revocation of acceptance, and will be reported to the corresponding author's home institution or funding agency.

See also: **NATURE** – Guide for Digital Images - <http://www.nature.com/nature/authors/submissions/images/index.html>

Note - this document (Digital Imaging: Ethics) is an original work of the author (Mr. Cromey). Endorsement by the Microscopy Society of America, The Journal of Cell Biology, or any other persons or institutions cited here should not be implied.

Recommended reading material (scientists)

- **What's in a picture? The temptation of image manipulation** (2004) M. Rossner & K. M. Yamada, *J. Cell Biology* 166(1):11–15.
- **CSI: Cell Biology.** (2005) Pearson, H., *Nature* 434: 952-953.
- **Beautification and fraud.** (2006) Editorial, *Nature Cell Biol.* 8: 101-102.
- **Appreciating data: warts, wrinkles and all.** (2006) Editorial, *Nature Cell Biol.* 8: 203.
- **Not Picture Perfect.** (2006) Editorial, *Nature* 439: 891-892.
- **Don't Pretty up that Picture just yet.** (2006) Couzin, J., *Science* 314: 1866-1868.

Additional reading material (journalism)

- **Phototruth or Photofiction?**, Thomas Wheeler, published by Lawrence Erlbaum Associates, Mahwah, New Jersey, 2002.
- **Photojournalism: An Ethical Approach**, Paul Martin Lester, originally published by Lawrence Erlbaum Associates, Hillsdale, New Jersey, 1991. <<http://commfaculty.fullerton.edu/lester/writings/pjethics.html>> © 1999.
- **Photography in the Age of Falsification**, K. Brower, *Atlantic Monthly*, May 1998.
- **Every Picture can tell a Lie**, D. Shenk, *Wired News*, 1997.

<<http://www.wired.com/news/culture/0,1284,7815,00.html>>

- **Photographs that lie: Welcome to journalism's newest ethical nightmare: digital enhancement**, J.D. Lasica, *Washington Journalism Review*, June 1989. <<http://jdlasica.com/articles/WJR.html>>
- **Ethics in the Age of Digital Photography**, J. Long, *National Press Photographer's Association*, September 1999. http://www.nppa.org/professional_development/self-training_resources/eadp_report/
- **Digital Tampering in the Media, Politics and Law**, Dartmouth University, <http://www.cs.dartmouth.edu/farid/research/digitaltampering/>

References:

- (1) **Seeing the Scientific Image** (parts 1,2,3), John Russ, *Proceedings Royal Microscopy Society* 39(2); 39(3); 39(4) (2004) or available online at: <<http://www.drjohnruss.com/downloads/seeing.pdf>>
- (2) **Ethics and Digital Imaging**, J.M. MacKenzie, M.G. Burke, T. Carvalho & A. Eades. *Microscopy Today* 12:40-41. (2006)
- (3) **Crusade for Publishing Better Light Micrographs – Light Microscopy publication guidelines**, George McNamara, Congressman Julian Dixon Image Core, The Saban Research Institute of Children's Hospital Los Angeles, Los Angeles, CA <<http://home.earthlink.net/~geomcnamara/CrusadeBetterMicrographs.htm>>
- (4) **The 39 Steps: A Cautionary Tale of Quantitative 3-D Fluorescence Microscopy**, James Pawley, *BioTechniques* 28(5):884-887 (2000), or available on-line at: <http://www.zoology.wisc.edu/faculty/Paw/pdfs/The_39_Steps_corrected.pdf>
- (5) **Seeing is believing? A beginners' guide to practical pitfalls in image acquisition**, Allison J. North, *JCB* 172(1): 9-18. (2006)
- (6) **Multicolor imaging: the important question of co-localization**, Anna Smallcombe, *Biotechniques* 30, 1240-1242. (2001).
- (7) **Scientific and Industrial**, Joint Photographic Experts Group, <http://www.jpeg.org/apps/scientific.html>
- (8) **The JCB will let your data shine in RGB**, Mike Rossner and Rob O'Donnell, *Journal of Cell Biology* 164:11-13. (2004)
- (9) **Digital Image Sampling Frequency**, Spring, K.R., Russ, J.C., Parry-Hill, M.J., Fellers, T.J., Zuckerman, L.D. & Davidson, M.W. (2006)

<<http://micro.magnet.fsu.edu/primer/java/digitalimaging/processing/samplefrequency/index.html>>

About the author:

Mr. Cromey is the manager of the Cellular Imaging Core, a service that provides training & technical expertise to SWEHSC investigators interested in using microscopy and scientific imaging in their research. The SWEHSC is funded by the NIEHS, grant # ES06694. The Cellular Imaging Core is also host to **Microscopy & Imaging Resources on the WWW**, located at: <http://swehsc.pharmacy.arizona.edu/exppath/>.

Originally written: SWEHSC Cellular Imaging Core newsletter – Feb 2001

Additional material added in Sept 2004 and April 2006.

This document was revised in May 2007 to more closely agree with an expanded version of these guidelines that were submitted for publication to Science & Engineering Ethics.

Revised: 5/7/2007

Available on the WWW at:

http://swehsc.pharmacy.arizona.edu/exppath/micro/digimage_ethics.html

**UNIVERSITY OF ARIZONA
RESEARCH SUPPORT SERVICES GROUP
(RSSG)**



**Good Laboratory Practices
(GLP)**

**Principles of Good
Research Practice**

- Researchers, lab managers, management and support personnel are all owners of, and accountable for, Good Research Practices
- Individuals must have documented training, education and /or experience to perform the tasks required by their current roles
- Test materials [e.g. compounds, test substances and controls] and reagents must be identified, characterized and stored to ensure that they are suitable for the intended research purpose
- Laboratory equipment that is used to generate research data must be maintained and calibrated

- Computer systems that are used to generate, manage, analyze or maintain data must be validated
- All experimental procedures, observations, data and results must be recorded or referenced in a laboratory notebooks and data books to ensure integrity
- Notebook pages should be signed and dated

**If it is not written down
it did not happen.....**

Contact for information and guidance for good practices...

SpM, RQAP-GLP

Office of the Vice President for Research
621-1469 (p), 621-1429 (f)



News from HIPAA.....

**Office for Civil Rights -
Patient Safety and Quality
Improvement Act of 2005 (PSQIA)**

Enforcement of the Confidentiality
of Patient Safety Work Product

General Information

The Patient Safety and Quality Improvement Act of 2005 (PSQIA) establishes a voluntary reporting system designed to enhance the data available to assess and resolve patient safety and health care quality issues. To encourage the reporting and analysis of medical errors within health care systems, PSQIA provides Federal privilege and confidentiality protections for patient safety work product. Patient safety work product includes patient, provider and reporter identifying information that is collected, created or used for patient safety activities. Civil money penalties (CMPs) may be imposed for knowing or reckless impermissible disclosures of patient safety work product.

OCR has been delegated the authority to enforce the confidentiality protections of the PSQIA. [Click here for more detailed information on the Delegation of Authority](#). Drawing upon its enforcement experience with the Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule, OCR is working in close coordination with the Agency for Healthcare Research and Quality (AHRQ), to develop and operate the PSQIA enforcement program.

OCR's participation constitutes a lead role in fulfilling the Department's mandate to improve patient safety and reduce the incidence of events that adversely affect patient safety.

Activities

OCR's activities will include:

- Administering an enforcement program regarding the confidentiality protections, including conducting investigations, taking compliance actions, and making penalty determinations;
- Developing, for issuance by the Secretary, regulations regarding such compliance and enforcement program;
- Imposing CMPs for confidentiality violations;
- Interpreting standards for enforcement and for guidance to Patient Safety Organizations (PSOs) and providers; and
- Providing technical assistance and public information in the administration of the enforcement program.

More Information

For more information on PSQIA, [see AHRQ's overview](#).

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Institutional Biosafety Committee



Biosafety Levels Explained

Biosafety Level 1: Suitable for work involving well-characterized agents not known to cause disease in healthy adult humans and of minimal potential hazard to laboratory personnel and the environment

- ✚ Examples
 - *Bacillus subtilis*
 - *Bacillus cereulans*
 - *Escherichia coli*, (non-pathogenic strains such as K-12)
 - *Naegleria gruberi*

Biosafety Level 2: Suitable for work involving agents of moderate potential hazard to personnel and the environment; immunization or antibiotic treatment is available in the event of exposure.

- ✚ Examples
 - Measles Virus
 - Hepatitis B Virus
 - *Staphylococcus aureus*
 - *Clostridium perfringens*
 - *Salmonellae*, such as *S. typhi*

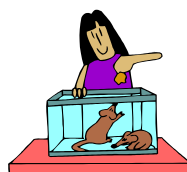
Note: All work involving the use of cultured human and animal cell lines, according to the

University of Arizona's Biosafety Manual must be conducted at Biosafety Level 2.

Biosafety Level 3: Suitable for work involving agents which may cause serious or potentially lethal disease as a result of exposure by the inhalation route with serious potential hazard to personnel and the environment. There are no available vaccines or therapeutic treatments available.

- ✚ Examples:
 - *Mycobacterium tuberculosis*
 - *Coccidioides immitis*
 - *Brucella melitensis*
 - *St. Louis encephalitis virus*
 - HIV-1

University of Arizona – Animal Care



Quality Care for Research Animals

BIOS Vivarium Update

The following are the remaining problems that must be addressed prior to opening the BIOS Vivarium.

Animal Drinking Water: A pressure switch is being installed at the holding tank. The exact location for the switch is being determined. Once this work takes place, work will be needed on the ultrasonic float system. Once this occurs, a commissioning test will be performed; then Edstrom, the company which supplied the system, can be brought back to re-start the system, which will allow us to supply drinking water to the IVC racks.

Air Handling System: A meeting will be held within the next few weeks to complete the changes that are needed to commission the system to work in the IVC's.

Plate Mounted Thermostats: Many thermostats in the facility are not water proof, which is an electrical hazard. The contractor has installed one plate mounted sensor, as a trial, to replace the regular electronic thermostats in wet locations. Once the trial sensor has been tested and found to work successfully, then all the other thermostats can be replaced.

The relocation of the Fire Devices and miscellaneous electrical work is now complete.

Low Voltage Lighting: Three animal holding areas were omitted from being connected to the Low Voltage Lighting System. These rooms have

been wired and now need to be programmed. Once this is complete, the manufacturer will be brought back to train FM and UAC personnel in the operation of the system.

Hot water: The issues with overly hot water are still not resolved. Several potential corrections are being evaluated.

Humidifiers: The water pressure to the humidifiers is still not corrected and several options for correction are being considered.

Shut-off valves on the condensate lines from the Cage and Tunnel washers: a Work request for this project has been submitted.

Once the above have all been completed, then the final walk-through can be scheduled. After the building is turned over to UAC, approximately one month of operational testing and evaluation will be performed by UAC prior to bringing animals into the facility. During this period, the animal facility will be stocked and personnel to be assigned to the facility will be trained to operate the facility equipment.

It is difficult to provide a date for opening, but if all the above facility problems can be addressed in an expeditious manner, we hope to open the facility before the new fiscal year. We will update the research community in the next PRIE newsletter.



Radiation Control



Laws We Use (Summaries)

Laws

Below is a chronological list with brief summaries of the laws EPA uses to protect people and the environment from harmful exposure to radiation.

On this page:

- [1944 - Public Health Service Act](#)
- [1946 - Atomic Energy Act](#)
- [1963 - Clean Air Act](#)
- [1972 - Marine Protection, Research, and Sanctuaries Act; Federal Water Pollution Control Act](#)
- [1974 - Safe Drinking Water Act](#)
- [1976 - Resource Conservation and Recovery Act](#)
- [1978 - Uranium Mill Tailings Radiation Control Act](#)
- [1980 - Low-Level Radioactive Waste Policy Act; Comprehensive Environmental Response, Compensation, and Liability Act](#)
- [1982 - Nuclear Waste Policy Act](#)

- [1987 - Nuclear Waste Policy Amendments Act](#)
- [1988 - Indoor Radon Abatement Act](#)
- [1992 - Waste Isolation Pilot Plant Land Withdrawal Act; Energy Policy Act](#)

Source:

http://www.epa.gov/radiation/laws/laws_sum.html

HUMAN SUBJECTS PROTECTION PROGRAM

≧Highlights≦

Expedited Review*

This article is the first of three articles that focus on expedited review procedures. The Department of Health and Human Services (DHHS) and The Food and Drug Administration (FDA) acknowledge that not all research with humans requires review by a Full Committee. Regulations allow the review of minimal risk research to be conducted by the Institutional Review Board (IRB) Chair or another board member designated by the IRB Chair. This type of review is known as expedited review. The individuals performing this type of review are empowered by the regulations to require modification of a study in order for the study to gain approval. Regulations however, prohibit disapproval of any research reviewed by the expedited procedure and require that “proposed disapprovals” be referred to the Full Committee for review.

Two general categories qualify for expedited review. They include (1) research activities that present no more than minimal risk and are listed in the National Institutes of Health guidance document and (2) minor changes to previously approved research during the period of one year or less for which research is approved. The concept of minor as mentioned above implies that the allowable risk associated with the change is either no more than minimum, or the risk-benefit relationship of the research is not altered in a way that makes it less favorable.

An important component for review of the research by the expedited procedure is that the research meets the criteria for “minimal risk.” The DHHS and FDA regulations define minimal risk as *the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.* According to the Office for Human Research Protections (OHRP), minimal risk

is determined to be relative to the daily life of a normal, healthy person.

As mentioned above, a minor modification of a currently approved protocol can be reviewed by the expedited procedure. Regulations do not specify what constitutes “minimal.” However, common sense dictates that expedited review could be used to approve administrative changes such as routine closure of a study or accrual of a new study population. Other types of changes that constitute minimal risk would include minor clarification of study eligibility and minor corrections to the consent document, changes in recruitment materials, or an alteration of recruitment methods. Any change that includes an intervention that is greater than minimal risk or negatively impacts the risk-benefit relationship of the research should be referred to the Full Committee for review.

Many projects do not require review by the full IRB. The rights, safety, and welfare for minimal risk participants can be protected through the use of the expedited procedure since the same regulatory and ethical standards apply.

*Oki, G. & Zaia, J. (2002). Expedited IRB Review. In R.J. Amdur and E. A. Bankert (Eds.), Institutional Review Board: Management and Function (pp. 114-117) Sudbury, MA: Jones and Bartlett.

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Upcoming Conferences/Workshops

SQA 24th Annual Meeting Program and Registration Now Available

Register now at www.sqa.org/am2008!

The Society of Quality Assurance (SQA) invites all professionals working in Good Laboratory, Good Clinical and Good Manufacturing Practices to attend the 24th SQA Annual Meeting and Training to be held 20-25 April 2008 at the Memphis Cook Convention Center in Memphis, TN, USA.

View the Conference Program AND register on-line at: www.sqa.org/am2008.

General Meeting Info and Opportunities

24th SQA Annual Meeting

20 - 25 April 2008

Memphis Cook Convention Center

Memphis, Tennessee, USA

Who Should Attend

Professionals who effectively promote and advance the principles and knowledge of quality assurance essential to human, animal and environ-

mental health worldwide will not want to miss this Conference.

If you have any questions, please contact SQA Headquarters at sqa@sqa.org or 434-297-4772.

April 4, 2008

<http://www.hhs.gov/ohrp/education/conference.html#upcoming>

OHRP – Research Community Forum

From the Past to the Future: Protecting Research Subjects as Times Change

New Orleans, LA

April 17-19, 2008

[First Biennial ORI Conference on Responsible Conduct of Research \(RCR\) Education, Instruction, and Training](#)

Co-Sponsor: Washington University

St. Louis, MO

April 20-25, 2008

<http://www.sqa.org/am2008/>

24th SQA Annual Meeting and Training

Memphis Cook Convention Center

Memphis, TN

May 13-16, 2008

Fourteenth Annual *Teaching Research Ethics Workshop*

Indiana Memorial Union, Bloomington, Indiana

See [Teaching Research Ethics Overview](#) for the agenda.

For registration and fee information, see:

<http://poynter.indiana.edu/tre/workshop.shtml>

June 8-13, 2008

<http://www-survival.pitt.edu/events/trainer.asp>

14th Annual *Trainer-of-Trainers Conference*

Teaching Survival Skills and Ethics

Silvertree Hotel

Snowmass, Colorado

October 2-3, 2008

Fostering International Research Collaborations

Co-Sponsor: University of Minnesota

Minneapolis, MN

University of Arizona Program in

Research Integrity Education staff:

Ruth K. Daniels, Program Coordinator and Editor

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Program telephone number: (520) 626-6282

Words of Wisdom:

*“And Spring arose on the
garden fair,*

*Like the Spirit of Love felt
everywhere;*

*And each flower and herb on
Earth's dark breast*

*rose from the dreams of its
wintry rest.”*

—— *Percy Bysshe Shelley*