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New methods, requirements have changed data sharing among life science researchers

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Measures instituted in recent years to encourage the sharing of scientific information appear to have reduced the overall level of withholding of data and materials among academic life science researchers. In their follow up to an earlier study that documented the extent of data withholding in 2000, a multi-institutional research team describes the results of a 2013 survey of investigators at top research institutions. Their report has been published online in *Academic Medicine*.

"Our study showed a dramatic change in the ways scientists share information and materials since the first study," says Darren Zinner, PhD, of the Heller School for Social Policy and Management, Brandeis University, lead and corresponding author of the paper. "The good news is that we are seeing more exchanges of information, making it easier for new research to build on existing findings. But we also found that, since most of these exchanges are happening through third parties - online journal supplements or data repositories - we are witnessing fewer person-to-person collaborations among scientists."

The authors note that open disclosure of study methods and results is essential to scientific progress, and many funding organizations require open sharing of research data and materials. But the fact that career advancement in science usually depends on the quality and quantity of published papers and on being the first to publish novel information establishes competing incentives for secrecy. The 2000 study, led by investigators at the Mongan Institute for Health Policy at Massachusetts General Hospital (MGH) and published in the Jan. 23, 2002, issue of

JAMA, found that 10 percent of responding scientists had requests for additional information related to published papers denied, and 12 percent admitted denying requests from other investigators.

Since that study's publication, new policies designed to encourage and sometimes require data sharing have been put into place. The National Institutes of Health (NIH) requires that all grant applications include data sharing plans and that the data and materials be made available to other researchers. Most major journals require study authors to include detailed online data and methodology supplements; third-party repositories for data and biomaterials have been established, and online forums and other technologies have been created to further increase communication. The current study was designed to examine whether and how these policies have affected data sharing and withholding among academic life science researchers.

The methodology of the current study was essentially unchanged from that of the 2000 study, with surveys sent to life science researchers at the 100 U.S. universities that receive the most NIH funding. As in the previous study, special emphasis was placed on researchers in genetics, a field that is generating massive amounts of data and for which many repositories were specifically established. The only change to the survey was the addition of three questions specifically asking about the effects on sharing of journal policies regarding online supplements and third-party repositories. The surveys were mailed between January and June of 2013.

Out of 3,000 surveyed investigators, 1,165 responded, compared with 1,849 in 2000. The percentage of respondents who reported making or receiving requests during the preceding three years, the percentage who indicated that had denied a request, and the percentage of requests that had been denied was essentially unchanged. But there was an overall drop in the total numbers of person-to-person requests made or received.

Whereas the 2000 survey indicated that respondents whose research was supported by industry funding or who were involved in commercial activities, such as licensing patents on their discoveries, were significantly more likely to keep their findings secret, the 2013 survey found that those with industry support were no more likely to withhold data than those without such funding. Request denial continued to be more common among respondents engaged in commercial activities.

Responses to the questions about new requirements and methods for data sharing indicated that 44 percent had been required by journals to submit detailed data and method supplements and 25 percent were required to place data or biomaterials within third-party repositories. Almost 30 percent of respondents had submitted requests to repositories in the preceding three years - among those, 11 percent experienced at least one denial, 24 percent experienced a significant delay and 6 percent believed the response they received was 'misleading or inaccurate.' But almost 40 percent of respondents and 62 percent of geneticists indicated that repositories had helped their research.

The total number of requests made both to other investigators and to repositories increased significantly, particularly among geneticists. Similar percentages of respondents to both surveys reported being 'scooped' by another researcher who had beaten them to publication or that sharing data had compromised the ability of a junior member of their team to publish. Respondents to the 2013 survey were significantly less likely to report that sharing with other researchers resulted in new collaborations, and they were less likely to believe that sharing was helpful towards innovation.

The authors indicate that the increased availability of data and materials from third parties may explain the overall decline in person-to-person data requests. Total requests made to all sources averaged 8.4 per respondent in 2000 and increased to an average of 15 per respondent,

only 6.6 of which were to other scientists, in 2013. Although the percentage of requests that respondents denied was unchanged, the overall number of requests that were honored increased significantly when the new sharing methods were included.

"A primary finding is that we've seen a change in the way information, data and materials are shared in the scientific community," says Eric Campbell, PhD, of the Mongan Institute for Health Policy at MGH, senior author of the current study and lead author of the 2002 report. "Scientists used to be the gatekeepers of their data, and increasingly that responsibility has transitioned to third-party repositories. The key question now is what impacts - both positive and negative - does this shift have on individual scientists, research groups, scientific fields and science as a whole."

More information: Darren E. Zinner et al. The Changing Nature of Scientific Sharing and Withholding in Academic Life Sciences Research, *Academic Medicine* (2015). DOI: 10.1097/ACM.0000000000001028

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