

New metrics for translational research

Translation of a research discovery into clinical practice takes about 17 years and costs billions of dollars.^{1,2} In response, many governments have funded initiatives to increase the efficiency of translational research (eg, the USA's Clinical and Translational Science Award [CTSA] programme³ and the European Union's Innovative Medicine's Initiative). After several years of substantial funding, stakeholders have begun to demand accountability from the institutions in which they have invested so heavily. A clear view of achievements is needed to increase rates of success and provide a framework for corrective action. Although many metrics have been suggested, no consensus has emerged to appraise success of translational research programmes.^{2,4-6} One of the most visible examples is the assessment of the CTSA programme issued by the US Institute of Medicine (IOM).⁷ Their report concluded that the CTSA programme was a worthwhile investment in that it substantially advanced translational research, but made seven broad recommendations to increase its effectiveness. These recommendations included structural changes to the CTSA leadership and consortium, strengthening of child-health research, and ensuring community engagement across all areas of research.⁷

In many respects, the IOM report is a useful model for other assessments of translational research programmes. However, although some common success parameters can be measured across a broad spectrum of translational research programmes, to be most meaningful, metrics need to be context dependent, consider the aims, stage, and national environment of the organisation, and be appropriate for the size and maturity of the organisation itself.

Founded in 2011 by the German Federal Ministry of Education and Research, the German Centre for Lung Research (DZL)^{8,9} is one of six German Centres for Health Research. A key aim of these centres is development of new therapeutic options for major public health issues. Although some translational research programmes focus exclusively on translation of existing basic science findings into clinical practice, the DZL believes that successful translational science can only be achieved by an iterative process including both clinical and basic research. Research metrics put forward by the DZL (panel) therefore include research output and outcome measures, clinical programmes, effects on infrastructure, and networking, training, and outreach.

Academia-driven translational research is perhaps more successful in the development of new therapies than was previously anticipated;¹⁰ however, an assessment technique for measurement of large translational research programmes is needed to justify continued funding. Measurement of the success of translational research programmes with broadly applicable parameters is important, but the specific features of each individual translational research programme need to be taken into account for adequate profiling. Continued discussion within the translational research community of such an approach should help document translational research programme benefits and provide a basis for ensuring their continued success.

We declare no competing interests. We thank Antje Brand, Jörn Bullwinkel, Birgit Teucher, Sylvia Weissmann, and Annegret Zurawski for stimulating discussions.

**Megan Grether, Oliver Eickelberg, Marcus A Mall, Klaus F Rabe, Tobias Welte, Werner Seeger, for the German Center for Lung Research*
megan.grether@ugmlc.de

The German Center for Lung Research, Giessen, Germany (MG); The Comprehensive Pneumology

Panel: German Centre for Lung Research (DZL) translational research metrics

- Output measures include the number and effectiveness of publications in the field, H index of faculty, number of patents filed, third party funding, and evidence of increased collaboration as measured by shared authorship across partners and centres
- Research outcome measures include the number of new experimental models established, targets and biomarkers identified or introduced into clinical studies, and therapies or diagnostic procedures entered into clinical practice
- Clinical programmes include initiation of and participation in clinical studies by the organisation's faculty, and new registries or clinical cohorts
- Development, maintenance, and use of a common infrastructure, which otherwise might not exist, is a key indicator of the value added through creation of a large translational research programme (eg, biomaterial repositories, image databases, and unified data management structures)
- Networking, training, and outreach were emphasised by the US Institute of Medicine as core elements of the Clinical and Translational Science Award programme,⁷ which is in line with the DZL view; these measures include initiation of and participation in national and international research consortia, implementation of programme-wide training, mentoring and clinician-scientist career programmes, workshops and symposia for the scientific community or general public, and web-based educational initiatives

Center, Munich, Germany (OE), Translational Lung Research Center, Heidelberg, Germany (MAM); Airway Research Center North, Grosshansdorf, Germany (KFR); Biomedical Research in Endstage and Obstructive Lung Disease, Hannover, Germany (TW); and Universities of Giessen and Marburg Lung Center, Giessen/Bad Nauheim, Germany (WS)

For more on the **European Union's Innovative Medicine's Initiative** see <http://www.imi.europa.eu/>

- 1 Herper M. The cost of creating a new drug now \$5 billion, pushing big pharma to change. <http://www.forbes.com/sites/matthewherper/2013/08/11/how-the-staggering-cost-of-inventing-new-drugs-is-shaping-the-future-of-medicine/> (accessed March 18, 2014).
- 2 Pozen R, Kline H. Defining success for translational research organizations. *Sci Transl Med* 2011; **3**: 94cm20.
- 3 National Center for Advancing Translational Sciences. Clinical and translational science awards. <http://www.ncats.nih.gov/research/cts/ctsa/ctsa.html> (accessed March 18, 2014).
- 4 Dembe AE, Lynch MS, Gugiu PC, Jackson RD. The translational research impact scale: development, construct validity, and reliability testing. *Eval Health Prof* 2014; **37**: 50-70.
- 5 Papadaki M, Hirsch G. Curing consortium fatigue. *Sci Transl Med* 2013; **5**: 200fs35.
- 6 Terry SF, Leshner AI. Assessing NIH's big idea. *Sci Transl Med* 2013; **5**: 196ed11.



- 7 US Institute of Medicine The CTSA Program at NIH: opportunities for advancing clinical and translational research. Washington, DC: The National Academies Press, 2013.
- 8 Gruber K, Loo J. Profile: German centre breathes new life into lung research. *Lancet* 2012; **38**: 1806.
- 9 Seeger W, Welte T, Eickelberg O, et al. The German centre for lung research—translational research for the prevention, diagnosis and treatment of respiratory diseases. *Pneumologie* 2012; **66**: 464–69.
- 10 Stevens AJ, Jensen JJ, Wyller K, Kilgore PC, Chatterjee S, Rohrbaugh ML. The role of public-sector research in the discovery of drugs and vaccines. *N Engl J Med* 2011; **364**: 535–41.

If you would like to respond to an article published in [The Lancet Respiratory Medicine](#), please submit your correspondence online at: <http://ees.elsevier.com/thelancetrm>



Published Online
July 11, 2014
[http://dx.doi.org/10.1016/S2213-2600\(14\)70112-2](http://dx.doi.org/10.1016/S2213-2600(14)70112-2)

Corrections

Han MK, Zhou Y, Murray S, et al, for the COMET Investigators. Lung microbiome and disease progression in idiopathic pulmonary fibrosis: an analysis of the COMET study. *Lancet Respir Med* 2014; **2**: 548–56. The appendix for this Article has been replaced with one that has a list of the COMET Investigators. This correction has been made to the online version as of July 11, 2014.