

## **Seminar part: R&D and public policy in the pharmaceutical sector – Topics and literature**

Presentation: 10-15 Minutes (depends on number of presentations). Additional: One / two page handout with summary of main results (per topic). Language of presentations: English. Starting with a \* must be taken by one seminar group before non-star papers can be chosen.

### **Covid-19 in connection with innovations**

1. \*Wouters, Olivier J., Kenneth C. Shadlen, Maximilian Salcher-Konrad, Andrew J. Pollard, Heidi J. Larson, Yot Teerawattananon, and Mark Jit. "Challenges in ensuring global access to COVID-19 vaccines: production, affordability, allocation, and deployment." *The Lancet* (2021).
2. \*Towse, Adrian, Kalipso Chalkidou, Isobel Firth, Hannah Kettler, and Rachel Silverman. "How Should the World Pay for a Coronavirus Disease (COVID-19) Vaccine?." *Value in Health* (2021).

### **Drug Development Process**

3. \*Scherer, F.M. Pharmaceutical Innovation. In Handbook of the Economics of Innovation, eds Hall, B.H, and N. Rosenberg, Elsevier, Amsterdam, 2010 [Especially pages 541-545]

### **General overview of R&D and innovation the pharmaceutical industry:**

#### **Facts and Figures – How it works**

4. \*Swinney, David C., Anthony, Jason: How were new medicines discovered?. *Nature Reviews Drug Discovery*, Volume 10, Issue 7 (July 2011), pp. 507-519, <http://www.nature.com/nrd/journal/v10/n7/full/nrd3480.html>
5. \*Munos, Bernard: Lessons from 60 years of pharmaceutical innovation. *Nature Reviews Drug Discovery*, Volume 8, Issue 12 (December 2009), pp. 959-968, <http://www.nature.com/nrd/journal/v8/n12/full/nrd2961.html>

### **Innovation in the pharmaceutical sector and its determinants**

6. Daron Acemoglu and Joshua Linn, Market Size in Innovation: Theory and Evidence from the Pharmaceutical Industry, *Quarterly Journal of Economics*, 119(3), August 2004: pp. 1049–1090.
7. Andrew A. Toole, The impact of public basic research on industrial innovation: Evidence from the pharmaceutical industry, *Research Policy*, Volume 41, Issue 1, February 2012, Pages 1-12, (<http://www.sciencedirect.com/science/article/pii/S004873331100117X>)
8. \*Dubois, P., De Mouzon, O., Scott-Morton, F. and Seabright, P., 2015. Market size and pharmaceutical innovation. *The RAND Journal of Economics*, 46(4), pp.844-871.

### **Cost estimates and the determinants of costs**

9. \*DiMasi, J.A., Hansen, R.W. and Grabowski, H.G., 2003. The price of innovation: new estimates of drug development costs. *Journal of health economics*, 22(2), pp.151-185.
10. Morgan, S., Grootendorst, P., Lexchin, J., Cunningham, C., & Greyson, D. (2011). The cost of drug development: a systematic review. *Health policy*, 100(1), 4-17.

11. \*Light, D.W. and Warburton, R., 2011. Demythologizing the high costs of pharmaceutical research. *BioSocieties*, 6(1), pp.34-50.
12. \*DiMasi, J.A., Grabowski, H.G. and Hansen, R.W., 2016. Innovation in the pharmaceutical industry: new estimates of R&D costs. *Journal of health economics*, 47, pp.20-33.

### Public funding of health related research (USA)

13. Lichtenberg, Frank R. "Public Policy and Innovation in the U.S. Pharmaceutical Industry," in Douglas Holtz-Eakin and Harvey S. Rosen, eds., Public policy and the economics of entrepreneurship. Cambridge, MA: MIT Press, 2004, pp. 83-113.
14. Toole, A.A. (2003): Does Public Scientific Research Complement Private Investment in Research and Development in the Pharmaceutical Industry? *Journal of Law and Economics* , Vol. 50, No. 1 (February 2007), pp. 81-104.  
<http://www.jstor.org/stable/10.1086/508314>
15. DiMasi, J.A. and Chakravarthy, R., 2016. Competitive development in pharmacologic classes: Market entry and the timing of development. *Clinical Pharmacology & Therapeutics*, 100(6), pp.754-760.

### R&D productivity in the pharmaceutical industry

16. \*Pammolli, Fabio., Magazzini, Laura, Riccaboni, Massimo: The productivity crisis in pharmaceutical R&D? *Nature Reviews Drug Discovery*, Volume 10, Issue 6 (June 2011), pp. 428-438, <http://www.nature.com/nrd/journal/v10/n6/full/nrd3405.html>
17. \*Paul, S., Mytelka, D., Dunwiddie, C., Persinger, Ch., Munos, B., Lindborg, S., Schacht, A.: How to improve R&D productivity: the pharmaceutical industry's grand challenge. *Nature Reviews Drug Discovery*, Volume 9, Issue 3 (March 2010), pp. 203-214, <http://www.nature.com/nrd/journal/v9/n3/full/nrd3078.html>

### Biosimilars and innovation

18. Mark R. Trusheim, Murray L. Aitken, Ernst R. Berndt, Characterizing Markets for Biopharmaceutical Innovations: Do Biologics Differ from Small Molecules? *Forum for Health Economics & Policy*, Volume 13, Issue 1 2010 Article 4.  
[http://www.imshealth.com/ims/Global/Content/Insights/Featured%20Topics/Portfolio%20Strategy/Forum\\_for\\_Health\\_Eco.pdf](http://www.imshealth.com/ims/Global/Content/Insights/Featured%20Topics/Portfolio%20Strategy/Forum_for_Health_Eco.pdf)
19. Grabowski H, Long G, Mortimer R. Implementation of the biosimilar pathway: economic and policy issues. *Seton Hall Law Rev.* 2011;41(2):511-57.  
<http://erepository.law.shu.edu/cgi/viewcontent.cgi?article=1381&context=shlr>
20. Henry Grabowski, Follow-on biologics: data exclusivity and the balance between innovation and competition. *Nature Reviews Drug Discovery* 7, 479-488 (June 2008), <http://www.nature.com/nrd/journal/v7/n6/pdf/nrd2532.pdf>

### Further Topics

21. Wang, L., Plump, A. and Ringel, M., 2015. Racing to define pharmaceutical R&D external innovation models. *Drug discovery today*, 20(3), pp.361-370.

**Suggestions for further topics are welcome!**