

## **The Joint Governance of Emerging and Degrading Technologies: Antimicrobials and Biomedical Innovation**

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For over twenty-five years, public health experts have campaigned to raise awareness of antimicrobial resistance (AMR) and called for concerted action to avert the end of modern medicine. AMR refers to the inevitable decline in efficacy of antimicrobial technologies (antibiotics, antivirals and other anti-infective agents) in the treatment and prevention of infection. Antimicrobials may be seen as ‘degrading’ technologies insofar as their use precipitates their obsolescence (Wright 2010). Drawing on recent frameworks on responsible innovation (Owen et al 2013) and methods for dealing with the ‘complexity-exclusion trap’ in governing emerging technologies (Bernstein, Bennett and Foley 2014), I explore the implications of AMR, and antibiotic resistance in particular, for the governance of innovation in biomedicine. I focus on three neglected aspects of the intimate link between a degrading technology (antibiotics) and technological fields emerging within biomedicine. First, novel biomedical technologies such as stem cell transplantation involve the use of antibiotics. Hence, the implications of resistance to antibiotics for the viability of such interventions need to be considered. Second, the development of novel solutions to the rise of AMR raises questions about the extent to which the lessons of the past have been taken on board. For example, some research reports on new antibiotic drug possibilities claim to offer ways of overcoming the phenomenon of resistance, a claim that needs to be subjected to scrutiny. The potential for antibiotic discovery from the human microbiome is also being reported, but there is little consideration here of how questions of ownership which have emerged around the use of human tissue would be handled in these novel cases. Third, the redefinition of certain chronic conditions as caused by infectious agents in turn raises questions about the creation of new domains for antibiotic treatment and the implications for AMR.