



UCL DIFFICULT DIALOGUES POLICY BRIEFING

Curbing the spread of infectious disease in India

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Introduction

This policy briefing provides a summary of the discussion and policy recommendations which emerged from the Difficult Dialogues panel session on infectious disease. The session explored what actions India can take to effectively tackle emerging infectious diseases and prepare for epidemics, such as the recent dengue fever outbreak, and address endemic infectious diseases, such as tuberculosis. It was agreed that achieving significant progress in this area requires policymakers to act on a number of fronts, as the solutions to these problems are multifaceted and multisectoral. Four interrelated solutions for curbing the spread of infectious disease were identified:

- Making structural changes to India's public health system and equipping the system with greater resources and capacity, especially in regard to epidemic preparedness.
- Increasing routine immunization coverage rates.
- Combatting antimicrobial resistance.
- Improving hygiene and sanitation facilities and infrastructure nationwide.

The panellists for this session were:

- ❖ **Rakesh Aggarwal** – Senior Professor, Sanjay Gandhi Postgraduate Institute of Medical Sciences.
- ❖ **Anne Johnson** – Professor of Infectious Disease, UCL.
- ❖ **Ramanan Laxminarayan** – Director, Centre for Disease Dynamics, Economics and Policy, New Delhi.
- ❖ **Sujatha Rao** – Former Union Secretary, Ministry of Health and Family Welfare.
- ❖ **Sanchita Sharma** (chair) – Health and Science Editor, Hindustan Times.

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The burden of infectious disease in India

Infectious diseases encompass a broad range of illnesses including tuberculosis, HIV, malaria, hospital infections and sepsis that causes deaths in mothers and newborns. The causative microbes may be transmitted to people from both animals and other people. Globally, the burden of infectious disease is decreasing but new infectious diseases continue to emerge or re-emerge. Developed countries have eliminated or significantly reduced the prevalence of many infectious diseases, due to societal advances like improvements in sanitation and medical advances like vaccinations. In India, the burden of infectious disease is gradually decreasing, but much remains to be done.

According to Global Burden of Disease data, three of the top ten causes of death in India are infectious diseases: lower respiratory tract infections (e.g. pneumonia), diarrhoeal diseases and tuberculosis.² Recent years have seen progress in tackling other diseases. Polio was successfully eliminated in 2011, but India continues to be vigilant given continuing transmission of the disease in Pakistan and Afghanistan. Many old and new diseases, however, have not been adequately controlled. Of particular concern is tuberculosis. The WHO estimates that over a quarter of the world's tuberculosis cases are in India, with over 2.8 million new cases in 2015, 480,000 of which resulted in fatality.³ Multi-drug resistant tuberculosis is rising in India and is making treatment both more expensive and more complicated.

The substantial burden of vaccine-preventable disease means that India's infant mortality rate is high. In 2011, the mortality rate for children age five and younger was 66 per 1000 live births, compared to 34 per 1000 live births in the Philippines, a country with roughly the same per capita GDP.⁴ Pneumonia is the leading cause of death for young children in India. The introduction of the pneumococcal conjugate vaccine in 2017 is expected to prevent nearly 100,000 deaths in children under five. Finally, antimicrobial resistance is a major challenge. It is estimated that 57,000 newborns die each year because of sepsis that is not treatable with first line antibiotics.⁵

There has been a shift in the burden of disease from communicable diseases, such as the ones outlined above, to noncommunicable diseases, like cardiovascular diseases and diabetes.⁶ Nonetheless, curbing the spread of infectious diseases remains one of the core challenges

² Institute for Health Metrics and Evaluation, '[India](#)' (2016).

³ World Health Organization, 'Global Tuberculosis Report 2016' (2016), p. 146.

⁴ Ramanan Laxminarayan and Nirmal K Ganguly, '[India's Vaccine Deficit: Why more than half of Indian Children are not fully immunized, and what can—and should—be done](#)' (2011) 30(6) *Health Affairs*.

⁵ Ramanan Laxminarayan et al., '[Access to effective antimicrobials: a worldwide challenge](#)' (2015) *The Lancet*, p. 171.

⁶ Kajori Banerjee and Laxmi Kant Dwivedi, '[The burden of infectious and cardiovascular diseases in India from 2004 to 2014](#)' (2016) 38 *Epidemiology and Health*, p. 1.



facing India's healthcare system. The purpose of this policy briefing is to suggest practical steps which can be taken to help address this challenge.

Reforming India's healthcare system

A major barrier that India faces in controlling and preventing infectious diseases is its weak public healthcare system. Although curbing the spread of infectious disease requires action on multiple fronts, much of this is underpinned and necessitated by a functioning, well-organised, accountable and adequately-resourced healthcare system.

Three major problems with the healthcare system that impact disease control can be identified. These are:

- A lack of coordination between relevant departments, agencies and bodies.
- Inadequate systems of surveillance, monitoring and data-gathering.
- Insufficient financial resources for tackling infectious disease (and healthcare more generally).

Insufficient coordination of departments working in silos is prevalent throughout India's healthcare system. Our panel argued that this is particularly problematic for disease control. There needs to be increased coordination between the federal and state governments, government departments and agencies, and the public and private healthcare sectors. This is because each disease is highly complex and can only be addressed through concerted action in multiple domains (e.g. health, education and environment) at the local, regional and national level.

Furthermore, scholars argue that the vertical model of disease control (i.e. central government programmes for eliminating specific diseases) has limited value.⁷ Although success has been achieved in eliminating and controlling specific diseases, such as polio, a more integrated and holistic approach is required.

Integration and coordination is crucial for surveillance. It is extremely difficult to prevent, detect and control infectious diseases without comprehensive surveillance systems and accurate, real time data on the prevalence and incidence of these diseases. Coordination is key because data needs to be gathered throughout the country, from both the public and private healthcare sectors. Without reliable data, health authorities cannot understand the extent of the problem or how best to respond, meaning diseases continue to spread.

⁷ T Jacob John et al., '[Continuing challenge of infectious diseases in India](#)' (2011) *The Lancet*, p. 252.



Policy decisions need to be informed by reliable evidence and data. Indeed, much of the success in controlling HIV/AIDS and eliminating polio can be attributed to sophisticated surveillance systems. Although the Integrated Disease Surveillance Programme has achieved some success, significant improvements need to be made as critical data-gaps remain, even with major diseases such as malaria and tuberculosis. (One study found that official estimates of tuberculosis may be far too low due to a lack of surveillance of the private healthcare system).⁸

Our panel also agreed that the system for preventing and controlling infectious diseases is significantly underfunded. Taking tuberculosis alone, in 2015 the gap in required funding was 527 million USD, equivalent to financial shortfall of 66%.⁹ Without increased funding, it is not possible to implement policies and programmes—like enhanced surveillance systems—which are necessary for curbing the spread of infectious diseases. Despite the government's new ambitious plans towards the elimination of several infectious diseases (visceral leishmaniasis and filariasis in 2017, leprosy by 2018, measles by 2020 and tuberculosis by 2025) India currently spends an extremely small fraction of its GDP on health compared with most other countries, and only a proportion of that overall health expenditure is allocated towards tackling infectious diseases.

Policy recommendation: *The government needs to significantly enhance systems for surveillance and monitoring of infectious diseases, to ensure that decisions and strategies are based on accurate, real time data.*

Epidemic preparedness

Advanced systems of epidemic preparedness form a crucial pillar of the overall system for preventing and controlling infectious disease. Again, coordination, surveillance and financial resources are key. Anne Johnson argued that the 2014 Ebola outbreak in West Africa could have been halted much more rapidly had better systems of epidemic preparedness been in place. Ineffective surveillance systems, coupled with weak rapid response systems, made it much harder for authorities to control the outbreak. Because of its weak epidemic preparedness systems, India is vulnerable to emerging diseases and epidemics such as dengue fever. In the

⁸ Nimalan Arinaminpathy et al., '[The number of privately treated tuberculosis cases in India: an estimation from drug sales data](#)' (2016) *The Lancet Infectious Diseases*, p. 1255.

⁹ Ranjith Babu et al., '[Resource Optimisation for Tuberculosis Elimination in India](#)' (2016) 51(19) *Economic and Political Weekly*.



2015 outbreak over 100,000 cases were reported. India's weak epidemic preparedness systems are also illustrated by the late announcement on Zika, which occurred six months after the first cases were noted.

It is crucial that policymakers act to ensure that India's epidemic preparedness infrastructure is fit for purpose. This includes continued participation in international initiatives, such as CEPI (Coalition for Epidemic Preparedness Innovations), strengthening links between departments and agencies (e.g. food safety and animal health authorities), improving surveillance systems to ensure that outbreaks are detected early, and making sure that effective systems of rapid response are in place. This, in part, requires comprehensive networks of both laboratories and community health workers. Anne Johnson emphasised that the rapid isolation of infected individuals and engagement with local communities was vital for controlling the spread of Ebola.

Policy recommendation: *It is vital that policymakers improve India's systems of epidemic preparedness and rapid response, to ensure that disease outbreaks can be detected and controlled.*

Policy recommendation: *Through initiatives like CEPI, India should work with international partners to participate in the global effort to lead in epidemic preparedness.*

Increasing routine immunization coverage rates

Increasing rates of vaccination coverage is one of the key reasons for the significant decrease of the global burden of infectious disease in recent decades. Ramanan Laxminarayan emphasised the crucial role that vaccinations play in preventing infectious diseases, noting that no single medical advance has saved more lives. Laxminarayan also lamented the low rates of vaccination coverage in India and simultaneously highlighted the substantial body of evidence which shows that higher rates of vaccination coverage result in much lower infant mortality rates. Increasing routine immunization coverage rates must therefore be a key part of the strategy for reducing India's infectious disease burden.

Relative to both international and regional standards, India has extremely low rates of routine immunization coverage. Fewer than 44% of India's young children receive the full schedule of vaccinations and the country is home to roughly one third of the world's unimmunized children.¹⁰ In neighbouring Nepal, 80% of children are fully immunized by age one. Although immunization coverage rates have gradually increased over the years, they remain unacceptably low. This

¹⁰ Ramanan Laxminarayan and Nirmal K Ganguly, '[India's Vaccine Deficit: Why more than half of Indian Children are not fully immunized, and what can—and should—be done](#)' (2011) 30(6) *Health Affairs*.



explains why hundreds of thousands of children continue to die from vaccine-preventable diseases, like pneumonia and measles, each year.

There are many reasons¹¹ why India has low rates of immunization coverage: a high birth rate, extreme geographical diversity, a lack of funding, a large mobile/migrant population and a lack of public awareness, to name but a few. More can be done to increase these rates and there are examples of success to draw from. The campaigns to eradicate polio and smallpox, as well as the high levels of interstate variation in coverage rates, shows that higher coverage rates are possible.

Sujatha Rao argued that managing public perceptions of vaccines is a crucial way in which coverage can be increased. Education and raising public awareness about the importance and safety of vaccines is key. Rao noted that the government will not succeed if it seeks to impose vaccines on people; cultural changes fostered by education is the only solution.

Improvements to the healthcare system, such as those outlined above, are crucial for increasing routine immunization coverage rates. Vaccinations are one of the most cost-effective public health interventions. As such, it makes sense for the government to spend more than the current 2.1% of the national health budget on routine immunization.¹² As vaccinations are so cost-effective, and play such a vital role in reducing infant mortality, our panel agreed that increasing routine immunization coverage rates is a key way in which India can prevent and control infectious disease.

Policy recommendation: *To significantly increase routine immunization coverage rates, the government needs to invest in delivery points, community health workers and other trained personnel across the country.*

Combatting antimicrobial resistance

The panel identified combatting antimicrobial resistance as another key way in which India can curb the spread of infectious disease. Resistance to antibiotics is a major public health problem, largely because the emergence and growth of antibiotic resistant bacteria makes it much more challenging to prevent and control the spread of infections which could normally be effectively treated using antibiotics.

¹¹ Vipin M Vashishtha and P Kumar, '[50 years of immunization in India: Progress and future](#)' (2013) 50(1) *Indian Pediatrics*.

¹² Ramanan Laxminarayan and Nirmal K Ganguly, '[India's Vaccine Deficit: Why more than half of Indian Children are not fully immunized, and what can—and should—be done](#)' (2011) 30(6) *Health Affairs*.



Ramanan Laxminarayan described India as a global epicentre of antimicrobial resistance, highlighting the country's extremely high resistance rates. Although data on the scale of the problem is scarce, it is estimated that 57,000 neonatal deaths are attributable to sepsis caused by antimicrobial resistance each year.¹³ Furthermore, resistance to drugs for treating tuberculosis has become endemic, meaning that antimicrobial resistance undermines efforts to combat India's tuberculosis crisis.

The primary driver of antimicrobial resistance is (inappropriate) antibiotic use: the more antibiotics are used, the more resistant bacteria become. Various factors explain why antibiotic use is increasing in India.¹⁴ The high burden of infectious disease means that many individuals require antibiotics for treatment, with economic growth and rising incomes enabling more and more people to access antibiotics. Furthermore, a lack of regulation and government oversight means that it is very easy for people to purchase cheap antibiotics. Often, antibiotics are used in situations for which they have limited value. This lack of regulation and ease of access is especially problematic in the animal farming sector, which has seen a marked increase in antibiotic use.

Curtailling the inappropriate use of antibiotics is a crucial route through which the spread of infectious disease can be controlled. The high burden of disease creates a vicious circle wherein more antibiotics are used because of the high rates of infection. These high usage levels mean that more bacteria become resistant, which in turn makes it harder to treat and control diseases, which means that rates of infection (and demand for antibiotics) increases.

The panel suggested various measures policymakers could implement to decrease the use of antibiotics in India. Laxminarayan explained that if routine immunization coverage rates were higher, demand for antibiotics would decrease because the burden of infectious disease would be lower. Sujatha Rao proposed that there should be a better system for regulating the production and sale of drugs, so that it is not so easy to access antibiotics, especially for unnecessary use. Such a system would require enhanced monitoring and surveillance of antibiotic use across the country, requiring coordination between the federal and state governments, and enhanced oversight of the private healthcare sector. This could only be done by equipping regulatory bodies with greater powers and resources.

¹³ Ramanan Laxminarayan et al., '[Access to effective antimicrobials: a worldwide challenge](#)' (2015) *The Lancet*, p. 171.

¹⁴ Ramanan Laxminarayan and Ranjit R Chaudhury, '[Antibiotic Resistance in India: Drivers and Opportunities for Action](#)' (2016) *PLOS Medicine* 13(3).

Crucially, as with vaccines, education and public awareness initiatives are needed to foster cultural and behavioural change. There is a need to educate the public on the dangers of unnecessarily using antibiotics.

Policy recommendation: *The government should educate every child on the dangers of inappropriate and unnecessary antibiotic use, in the same way that all children are taught about the dangers of smoking and drinking alcohol.*

Improving hygiene and sanitation nationwide

Rakesh Aggarwal emphasised that improvements to hygiene and sanitation facilities and infrastructure, as well as personal behaviour, must be part of the strategy for curbing the spread of infectious disease. He noted that major global reductions in infectious disease rates occurred before vaccines and other modern developments in medicine and pharmacy. This, he argued, was due to improvements in hygiene and sanitation.

India's problems in this area are well documented. 67% of rural households and 13% of urban households defecate in the open.¹⁵ According to World Bank data, only 40% of the population has access to 'improved sanitation facilities'.¹⁶ Although this represents a marked increase from 17% in 1990, it remains one of the country's leading public health issues. Many infectious diseases are strongly linked to poor hygiene and sanitation, including diarrhoeal diseases, India's fifth biggest cause of death.

These are countless reasons why poor hygiene and sanitation is a major public health risk. Contaminated food and water, linked to substandard hygiene and sanitation infrastructure, makes it much easier for viruses and bacteria to spread. In many cases, proximity to animals, coupled with a lack of basic hygiene requirements, is also an issue. In overpopulated areas infectious diseases find the right conditions to spread extremely quickly. Unfortunately, there are many parts of India characterised by a dangerous mix of the conditions which facilitate the rapid spread of diseases: overcrowding and overpopulation, poor personal hygiene, proximity to animals, and substandard sanitation and sewage facilities.

Rakesh Aggarwal argued that policymakers cannot just focus on technological solutions like vaccines. 'Low technology' solutions, such as water supply networks, sewage systems, toilets and other sanitation facilities, food supply chains, and the ways in which humans come into contact with one another, as well as animals, all need to be considered. Again, education and

¹⁵ Ministry of Home Affairs, '[2011 Census Data](#)' (2011).

¹⁶ World Bank Data, '[Improved sanitation facilities \(% of population with access\)](#)' (2015).



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behaviour change must be part of the solution, especially with regards to food and water cleanliness and personal hygiene.

Policy recommendation: *The government should invest in 'low technology' solutions, including hygiene and sanitation facilities, as a matter of priority.*

Conclusion

This policy briefing has argued that infectious disease can only be controlled by taking coordinated action in multiple interrelated domains, such as education, health and industry. This means that government agencies, the federal and state governments, and the public and private healthcare sector need to work together in an integrated way to tackle the problem. Although each disease is unique, the four issues raised in this paper—a subpar healthcare system, low routine immunization coverage rates, antimicrobial resistance, and a lack of infrastructure for hygiene and sanitation—need to be addressed as strategic priorities if India is to make progress in detecting, preventing and controlling the spread of infectious disease.



Difficult Dialogues is an annual forum examining issues of contemporary relevance in South Asia. It fosters crucial interaction between a diverse array of stakeholders from academia, law, public policy, politics, business, international relations, the media, young leadership and civic society. In the 2017 edition, which took place at The International Centre Goa, 10-12 February, Difficult Dialogues partnered with University College London (UCL) to explore the challenges India faces in creating conditions for good health and access to healthcare for all citizens.

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