

Policy brief:

The urgent need to foster research on infection prevention and control to improve health security

The problem

Effective Infection Prevention and Control (IPC) measures are necessary to control the spread of infections, like COVID-19, as well as minimise everyday healthcare-associated infections. Fewer infections in hospitals result in lower consumption of antibiotics, thereby reducing antibiotic resistance. Yet, despite the critical importance of IPC measures, its research needs are often neglected.

As COVID-19 has demonstrated to the world, the only steps that can be taken to control the spread of a novel virus with pandemic potential are effective Infection Prevention and Control (IPC) measures, like handwashing, social distancing, and even isolation. In non-pandemic times IPC measures are also critical to stop the spread of infections. Every year more than 2.5 million healthcare-associated infections occur in the European Union and European Economic Area, causing millions of extra days of hospital stays.¹ Fewer infections in hospitals result in lower consumption of antibiotics, thereby reducing antibiotic resistance.

Effective IPC measures go well beyond handwashing. Ideally IPC should be designed into any new healthcare facility. For instance, purchases of sinks, showers, or bathtubs in healthcare institutions should include an analysis of the evidence of how easily they can be disinfected. Placement and design of hand sanitisers should be based upon evidence of where healthcare personnel are most likely to use them. Avoidance of ventilator-associated infections should be based on evidence for sterilising both the equipment and insertion site. IPC evidence is crucial, but scarce. When IPC research projects compete for funding against other thematic areas, like breakthrough technologies to combat climate change, big data against social inequities, or potential new cancer treatments, they are often perceived as dull, receiving low innovation marks.

This neglect is apparent in the evidence available. Many IPC guidelines are based upon weak scientific evidence.^{2,3} The research priorities of IPC are often neglected in important international research agendas. Many countries do not identify IPC research as important in hindering the spread of antibiotic resistance.⁴ In this regards, many countries implement a bundle of IPC interventions without knowing which ones are the most cost-effective for their particular context.

The recommendation

With European IPC experts the EU-JAMRAI has developed a list of IPC research priorities. Financing these research priorities is critical to strengthening infection prevention and control.

The lack of IPC research may be due to a global lack of awareness of the most urgent IPC needs and knowledge gaps. To address this issue, the European Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections (EU-JAMRAI) has developed a list of IPC research priorities (overleaf), based upon existing scientific literature and validated by European IPC experts.⁵ The most urgent priorities are in bold text. We urge policymakers, research funders, academics, and industry to adopt and prioritise these research needs. **Investment will have wide-ranging benefits, including lowering the number of hospitalised patients, hindering antibiotic resistance, and strengthening global health preparedness for the next pandemic.**

1. Cassini A, Plachouras D, Eckmanns T, et al. Burden of six healthcare-associated infections on European population health: estimating incidence-based disability-adjusted life years through a population prevalence-based modelling study. *PLoS medicine* 2016; 13(10).

2. Berríos-Torres SI, Umscheid CA, Bratzler DW, et al. Centers for disease control and prevention guideline for the prevention of surgical site infection, 2017. *JAMA surgery* 2017; 152(8): 784-91.

3. O'Grady NP, Alexander M, Burns LA, et al. Guidelines for the prevention of intravascular catheter-related infections. *Clinical infectious diseases* 2011; 52(9): e162-e93.

4. European Union Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections (EU-JAMRAI). Gathering of national research priorities from at least five European countries and gap identification, 2019.

5. Lacotte Y, Årdal C, Ploy M-C. Infection prevention and control research priorities to combat antimicrobial resistance and healthcare-associated infections. (under consideration) 2020.



Patient environment (facilities and staffing)

1. **Insufficient data are available on the impact of infrastructural changes at the facility level on the reduction of infections and resistance. This includes the accessibility to specific equipment, density of hand washing points, availability of single occupancy rooms, and more.**
2. **Research is needed to explore the impact of patient-to-bed ratio on the spread of infections and resistance, including instances of overcrowding. This should include analyses of staff workload, available staffing (including presence of IPC professionals), bed occupancy, and visitor frequency.**
3. **Research is needed to study the interaction between the human and hospital microbiome.**

Behavioural science

4. **Studies are needed to assess the demographic, organizational, economic, sociological, and behavioural factors facilitating success but also the barriers and challenges to implement effective IPC programmes.**
5. **Patients and their families are key elements in the chain of transmission in healthcare facilities. Studies addressing the impact of patient and family-oriented education and communication campaigns (involving patients associations) on the rate of hospital-acquired infections are needed.**

Interventions

6. **There is a need of high-quality studies addressing the effectiveness of hospital-based IPC programmes, including their impact, cost-effectiveness, and ideal composition.**

Guidelines

7. **Many best practice IPC recommendations are based upon weak evidence. For example, the World Health Organization identified, in its Global Guidelines for the Prevention of Surgical Site Infection, 20 recommendations with a “low” quality of evidence. The evidence base supporting IPC guidelines needs to be strengthened.**
8. **Situational analyses in different settings (high, medium or low-incomes countries) but also different healthcare settings (intensive care units, short or long stay, medico-social facilities) are needed to better understand potential adaptations of IPC guidelines.**
9. **A better understanding of the different patient screening strategies is needed for risk management. This includes who should be screened, when (including start and stop of screening), and how movement between healthcare institutions should trigger screening. Research should include both clinical impact and cost-effectiveness.**

Training

10. **Additional tools are needed to evaluate IPC training programmes and implement them.**
11. **New innovative ways of training should be evaluated such as e-learning, simulation, self-directed training modules or mentorship for IPC education. There is a lack of study on the impact of these innovative training tools on the practice change and infection rate in healthcare facilities.**
12. **Minimal standard requirements for the recruitment and training of IPC professionals should be investigated.**

Surveillance and monitoring

13. **Research is needed to assess and validate the reliability of surveillance based on available patient clinical information (syndromic-based surveillance) rather than microbiological data or prescription databases, i.e., data gathered for other primary purposes.**
14. **There is a lack of published standards to monitor IPC practices beyond hand hygiene. Evidence-based standardised audit protocols need to be created addressing, for example, catheter-related bloodstream/urinary tract infections and ventilator-associated pneumonia.**
15. **There are a number of innovative, new methods to monitor compliance to IPC practices, including electronic and infrared approaches. These need to be tested in multiple settings to assess their value for IPC programmes.**

One Health

16. **Research is needed to assess the impact of IPC measures in different operational contexts including small farms, industrial farms, feedlots, slaughterhouses, fish farms, and more. IPC measures may include the density of the animal populations, vaccinations and antibiotic use in animals, as well as the infection control measures of the workers.**