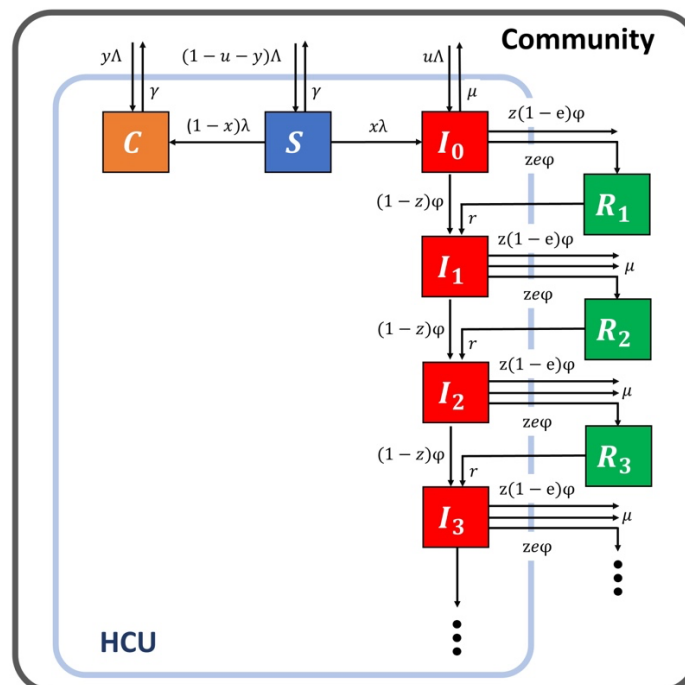


## Modelling of the transmission dynamics of carbapenem-resistant *Klebsiella pneumoniae* in hospitals and design of control strategies

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**Rationale and objective:** Carbapenem-resistant *Klebsiella pneumoniae* (CRKP) has emerged as a major threat to global public health. Epidemiological and infection controls associated with CRKP are challenging because of several potential elements involved in a complicated cycle of transmission. Here, we proposed a comprehensive mathematical model to investigate the transmission dynamics of CRKP, determine factors affecting the prevalence, and evaluate the impact of interventions on transmission.

**Summary:** We found that the admission of colonized patients and use of antibiotics significantly impacted the endemic transmission in health care units. Thus, we introduced the treatment efficacy, defined by combining the treatment duration and probability of successful treatment, to characterize and describe the effects of antibiotic treatment on transmission. We showed that a high antibiotic treatment efficacy results in a significantly reduced likelihood of patient readmission in the health care unit. Additionally, our findings demonstrate that CRKP transmission with different epidemiological characteristics must be controlled using distinct interventions.



**Graphical summary:** Schematic of the kinetic transmission model of carbapenem-resistant *Klebsiella pneumoniae* (CRKP) in a health care unit (HCU).

**Outcome:** The understanding presented herein is valuable to describe the sophisticated mechanism of CRKP transmission and design more effective disease control programs.

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**Related SDGs goal:** 3. Good health and well-being.

**Related publications:**

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