

# XII CONGRESO ARGENTINO DE ESTERILIZACIÓN Y DESINFECCIÓN HOSPITALARIA *BUENOS AIRES 2025*

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Goldcenter Eventos  
Int. Cantilo e Int. Güiraldes s/n C1128  
Ciudad Autónoma de Buenos Aires

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Evento libre de humo y tabaco.

# Las Unidades de Terapia Intensiva y su Control Ambiental Dra Laura Friedman

Control de Infecciones  
(Higiene del Entorno del Paciente)

microbes from human origin



**International space station**

isolation from Earth and surrounding environment  
weekly cleaning, bi-weekly disinfection  
isolation from Earth, microgravity, radiation  
constant microclimates, nutrient availability  
low gravity research, new frontiers

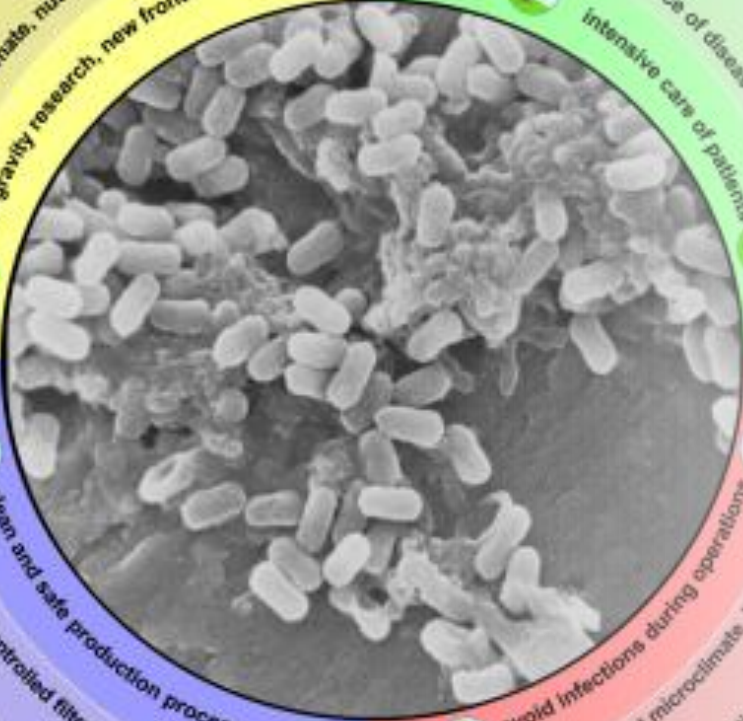
maintenance and preventive measures

environmental characteristics

purpose for confinement

**Intensive care units**

objective monitoring and interventions on specific cleaning procedures  
with efficient disinfectants, protective clothing  
frequent cleaning, broad-spectrum antibiotics, limited access  
presence of diseased occupants  
intensive care of patients



**Cleanrooms**

higher pressure, electrostatics, controlled filtered air flows + microclimate  
HEPA and ULPA filters, cleanroom garment, architecture, low emitting materials  
higher pressure, e.g. cleaning with 70% IPA, alkaline reagents, UV-light,  $\gamma$ -irradiation, vapor-phase  $H_2O_2$

avoid infections during operations  
air filtration, constant microclimates, higher pressure

**operating rooms**

higher pressure, protective clothing, regular cleaning procedures  
with e.g. formaldehyde fumigation, bacillocid and UV-light

microbes from environmental sources



Las Unidades de  
Terapia Intensiva y los  
Quirófanos son  
Ambientes  
Confinados y  
Ecosistemas  
Antropogénicos

# El Microbioma de las UTIs

- Origen antropogénico
- Incluye Microorganismos patógenos
- Multiresistentes a antimicrobianos
- Bacterias Hongos Virus
- Características adicionales  
Formación de biofilms, Resistencia a desecación y condiciones ambientales



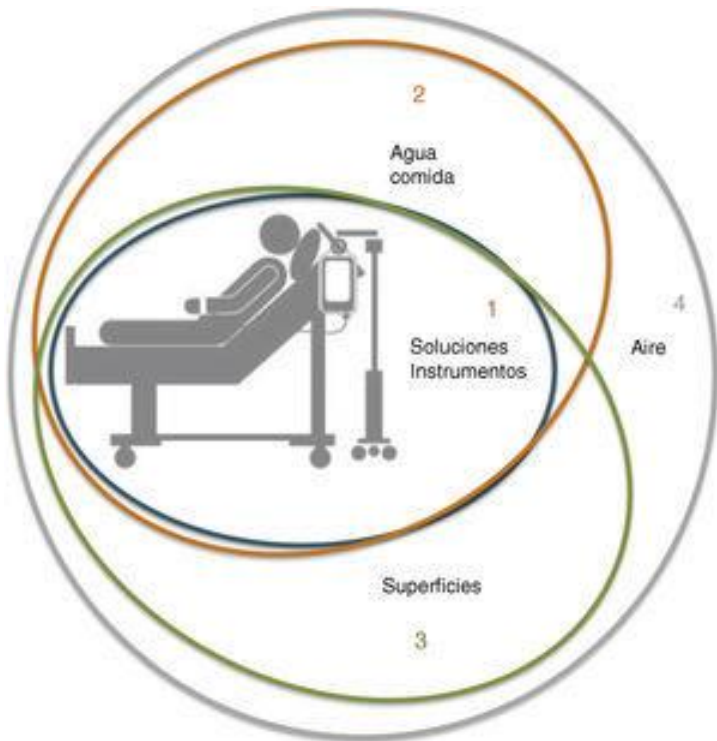
# Algunos Ejemplos

- *Acinetobacter baumannii*  
asociado a superficie
  - *Pseudomonas aeruginosa*  
ambientes húmedos y  
desinfectantes
  - *Klebsiella pneumoniae*  
ambientes húmedos
- 
- Diversos  
microorganismos  
contaminación de  
medicamentos
  - Diversos  
microorganismos  
contaminación de aire y  
sistemas de ventilación
  - Diversos  
microorganismos  
productos médicos

# ¿Dónde podemos cortar las cadenas de transmisión?



# El Retorno de los Fomites



*Clinical Infectious Diseases*

INVITED ARTICLE

HEALTHCARE EPIDEMIOLOGY: Robert A. Weinstein, Section Editor



## The Role of Patient Care Items as a Fomite in Healthcare-Associated Outbreaks and Infection Prevention

Hajime Kanamori,<sup>1,2</sup> William A. Rutala,<sup>1,2</sup> and David J. Weber<sup>1,2</sup>

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Patient-care items can serve as a source or reservoir for healthcare-associated pathogens in hospitals. We reviewed healthcare-associated outbreaks from medical equipment and provide infection prevention recommendations. Multiple healthcare-associated outbreaks via a contaminated patient-care item were identified, including infections with multidrug-resistant organisms. The type of patient care items implicated as a fomite causing healthcare-associated infections (HAIs) has changed over time. Patient populations at risk were most commonly critically ill patients in adult and neonatal intensive care units. Most fomite related healthcare-associated outbreaks were due to inappropriate disinfection practices. Repeated healthcare-associated outbreaks via medical equipment highlight the need for infectious disease professionals to understand that fomites/medical devices may be a source of HAIs. The introduction of new and more complex medical devices will likely increase the risk that such devices serve as a source of HAIs. Assuring appropriate cleaning and disinfection or sterilization of medical equipment is necessary to prevent future fomite-associated outbreaks.

**Keywords.** medical equipment; patient care items; fomite; healthcare-associated infections; outbreaks.



# Una Pregunta Compleja: Monitorear el Ambiente de las UTIs o el entorno de los pacientes?

- Monitoreo reactivo o en respuesta a un brote
- Estudios de Microbioma



# Algunas Definiciones

Concepto	Definición	Alcance	Duración	Ejemplo
<b>Brote</b>	Aumento súbito de casos en un área y tiempo determinados	Local o limitado	Corto	Intoxicación alimentaria en una escuela
<b>Pseudobrote</b>	Apariencia de brote sin incremento real de casos	Variable	Depende de la detección y corrección	Contaminación
<b>Epidemia</b>	Casos por encima de lo esperado en población/área/tiempo	Regional, nacional o internacional	Prolongada	Epidemia de gripe

# Pasos de Investigación de un Brote

## Box 1

### Outbreak investigation

1. Verify the diagnosis and notify laboratory
2. Determine if this is an outbreak (baseline rates, assess changes in definition and changes in population)
3. Generate an epidemic curve and a line list (describe potential cases person, place, and time)
4. Perform a literature review to guide risk factor assessment
5. Develop a case definition
6. Find cases
7. "Shoe leather epidemiology" talk to staff, evaluate facility structure,
8. Implement appropriate infection-prevention interventions
9. Communicate with hospital leadership, and public relations department and risk department as indicated; involve public health authorities
10. Generate hypothesis and review cases for common epidemiologic links
11. Test the hypothesis (case-controlled evaluation)
12. Perform additional environmental or personnel screening as indicated
13. Evaluate impact of intervention



# Estudio de un Caso

Herramientas de estudio

Una pregunta: Los brotes son clonales ?



## Recuperación de Microorganismos del Complejo *A. baumannii-calcoaceticus* (ABC) ambientales



Se tomaron un total de 67 de las superficies ambientales de alto contacto cercanas al entorno de las camas y del equipamiento médico próximo en dos unidades de UTI, durante los meses de noviembre de los años 2017 .

# Identificación y genotipificación de aislamientos de *A. baumannii* y ensayo de resistencia a antibióticos

## A Identificación bioquímica

- Complejo ABC identificado mediante pruebas API 20 NE.
- Todos los aislamientos: Oxidasa negativa y Catalasa positiva.

## B Identificación a nivel molecular

- Espectrometría de masa, MALDI TOF: equipo Microflex III instrument (Bruker Daltonik, Bremen, Germany) y el software MALDI Biotyper.
- Scores mayores a 2.

## C Resistencia a Carbapenemes

- Ensayos según normas CLSI.
- 33 aislamientos de *A. baumannii* resistentes a carbapenemes.

## D Genotipificación por Rep-PCR

- Técnica basada en PCR con cebadores (Rep1 y Rep2).
- Separación en gel de agarosa (1%), teñido con bromuro de etidio, visualización UV.
- Análisis manual de imágenes: perfiles clasificados por similitud.

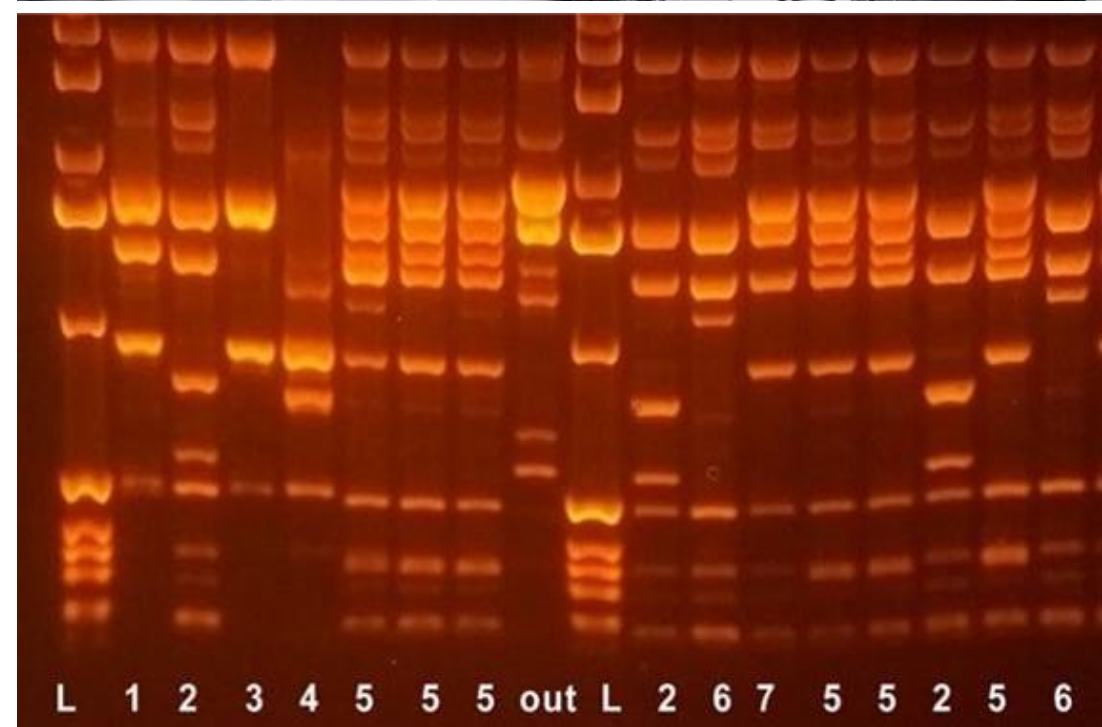
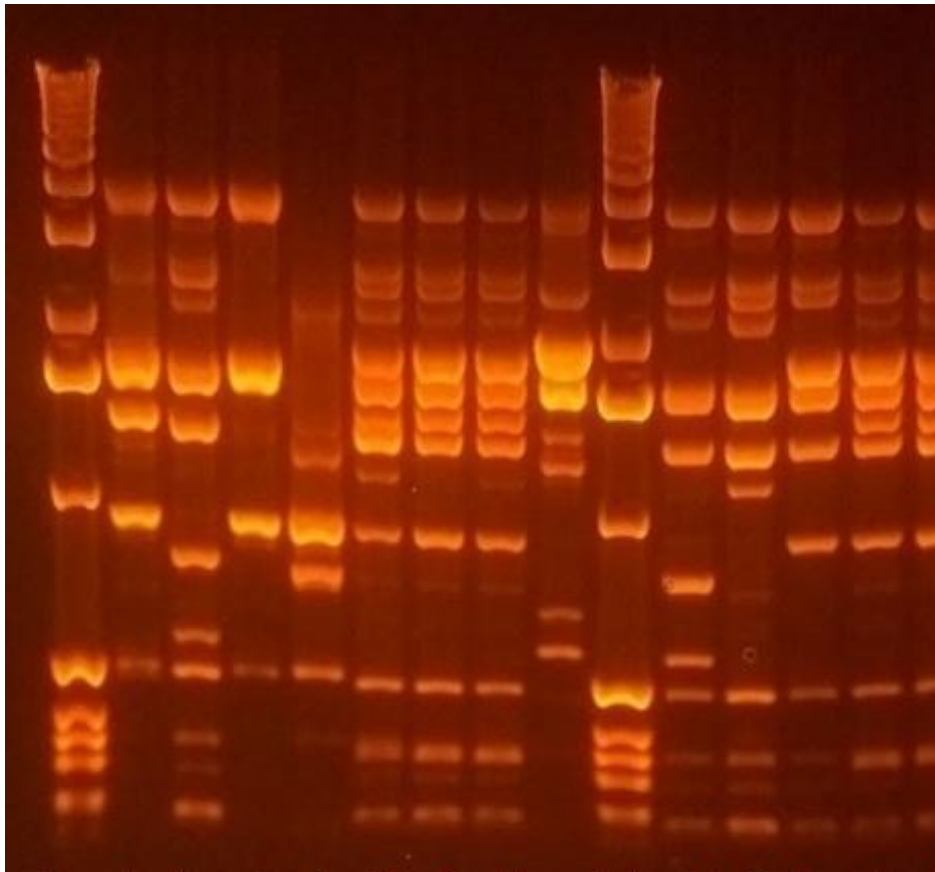


Imagen representativa Rep-PCR *A. baumannii*



Ref. Calle 1 y 10 marcadores de PM 1 kB. Calle 2 aislamiento 11, calle 3 aislamiento 141, calle 4 aislamiento 150, calle 5 aislamiento 310 A, calle 6, 7,8 aislamientos 411,42C, 421, calle 9 outgroup: Ab 33, aislamiento clínico de colección, calle 11 aislamiento 18B, calle 12 aislamiento 250, calle 13 aislamiento 230, calle 14, 15, 17 aislamiento 380, 389 399 respectivamente, calle 16 aislamiento 142 calle 18 aislamiento 220

7 perfiles de los 23 aislamientos de *A. baumannii* más los 3 aislamientos clínicos. Las frecuencias de cada uno de los genotipos fueron:

	Tipos (REP-PCR)						
	1	2	3	4	5	6	7
Aislamientos Ambientales	2	3	1	1	11	4	1
Aislamientos Clínicos	0	1	0	0	2	0	0

Análisis de los resultados del perfil genotípico de la imagen de las muestras.



# Evidencias de Brotes policlonales

Nuevos estudios incorporan herramientas moleculares y secuenciación de genoma completo y han demostrado la coexistencia de varios clones en un aparente brote

## SYNOPSIS

### Polyclonal *Burkholderia cepacia* Complex Outbreak in Peritoneal Dialysis Patients Caused by Contaminated Aqueous Chlorhexidine

Y C.Y. Wong,<sup>1</sup> Shuk-Ching Wong, Jonathan H.K. Chen, Rosana W.S. Poon, L.L. Hung, Kelvin H.Y. Chiu, Simon Y.C. So, Wing Shan Leung, Tak Mao Chan, and Y.H. Yap, Vivien W.M. Chuang, Kwok-Yung Yuen,<sup>2</sup> Vincent C.C. Cheng<sup>2</sup>

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### Horizontal Gene Transfer in a Polyclonal Outbreak of Carbapenem-Resistant *Acinetobacter baumannii*<sup>†</sup>

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In the last few years, phenotypically carbapenem resistant *Acinetobacter* strains have been identified throughout the world, including in many of the hospitals and intensive care units (ICUs) of Australia. Genotyping of Australian ICU outbreak-associated isolates by pulsed-field gel electrophoresis of whole genomic DNA indicated that different strains were cocirculating within one hospital. The carbapenem-resistant phenotype of these and other Australian isolates was found to be due to carbapenem-hydrolyzing activity associated with the presence of the *Mcr*<sub>CTXA23</sub> gene. In all resistant strains examined, the *Mcr*<sub>CTXA23</sub> gene was adjacent to the insertion sequence ISAbal in a structure that has been found in *Acinetobacter baumannii* strains of a similar phenotype from around the world; *Mcr*<sub>CTXA81</sub>-like genes were also found in all *A. baumannii* strains but were not consistently associated with ISAbal, which is believed to provide the promoter required for expression of linked antibiotic resistance genes. Most isolates were also found to contain additional antibiotic resistance genes within the cassette arrays of class I integrons. The same cassette arrays, in addition to the ISAbal-*Mcr*<sub>CTXA23</sub> structure, were found within unrelated strains, but no common plasmid carrying these accessory gene/elements could be identified. It therefore appears that antibiotic resistance genes are readily exchanged between cocirculating strains in epidemics of phenotypically indistinguishable organisms. Epidemiology investigation of major outbreaks should include whole-genome typing as well as analysis of potential transmissible resistance genes and their vehicles.

toilets and drainage systems as a reservoir for a polyclonal outbreak of clinical infections caused by multidrug-resistant *Klebsiella oxytoca* species

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OBJECTIVE

SUMMARY

For 2024  
December

Antimicrobial  
infection

**Background:** Nosocomial outbreaks with multidrug-resistant bacteria with a reservoir in hospital toilets and drainage systems have been increasingly reported. **Aim:** To investigate an increase in bacteraemia with extended-spectrum β-lactamase (ESBL)-producing *Klebsiella oxytoca* at our hospital in 2021; the epidemiology of the outbreak suggested an environmental source.

**Methods:** Available clinical *K. oxytoca* isolates from patient with infection or carriage from 2019 to 2022 were collected. Clinical information was gathered from patients and sampled sinks, shower drains, and toilet water. Short- and long-read whole-genome sequencing (WGS) was performed on patient and environmental isolates to determine phylogenetic relationships, antibiotic resistance genes/mutations, and plasmid profiles.

**Results:** WGS revealed four clusters and a polyclonal population consisting of ESBL-producing *K. oxytoca* and *Klebsiella michiganensis*. All clusters contained both clinical and environmental isolates. The environmental sampling revealed widespread contamination of the outbreak ward, and plasmid analyses indicated possible transmission of plasmids between species and clones. Most environmental findings in the outbreak ward were from toilet water, and enhanced cleaning of bathrooms and toilets was introduced. Following year, a decrease in outbreak strains in systemic infections was observed.

**Conclusion:** This investigation uncovered a polyclonal outbreak of multidrug-resistant *K. oxytoca* and *K. michiganensis* and unveiled a persistent reservoir of outbreak



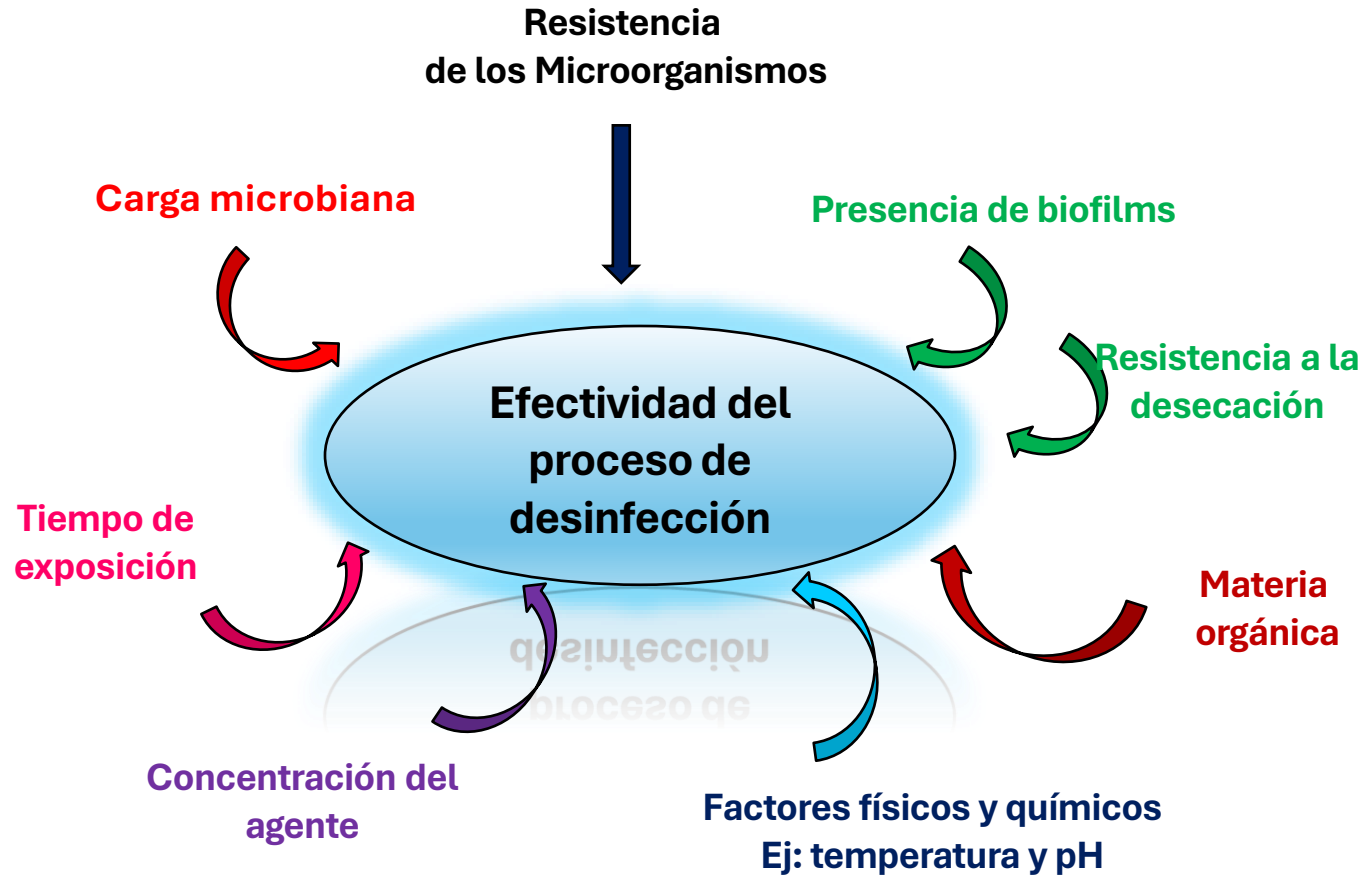
# Estrategias de Prevención

Control de Infecciones

Lavado de manos

Desinfección de superficies

Monitoreo ambiental



Factores que afectan el proceso de desinfección

# Ejes para un programa de desinfección





Muchas gracias por su  
atención