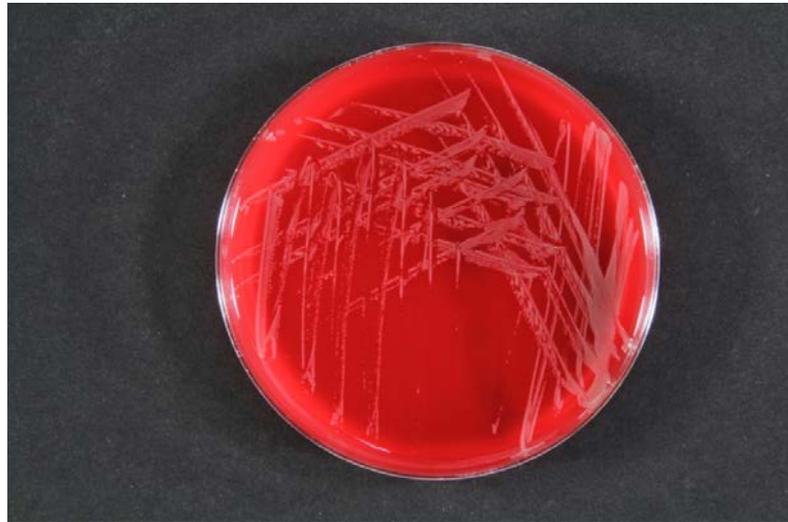


# ***Burkholderia* incident in Belgian hospitals**



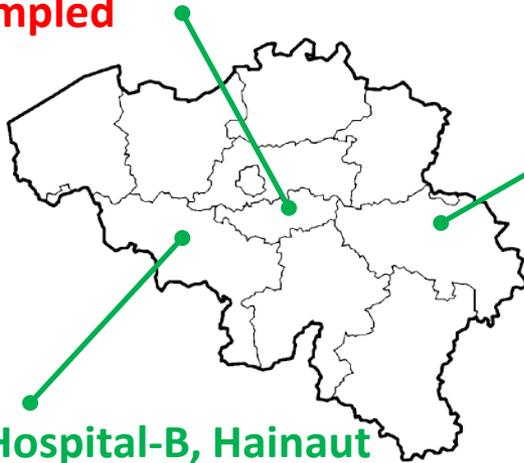
***Béatrice Jans, Denis Piérard, Annelies De Bel, Els Vrindts, Boudewijn Catry, Peter Vandamme***

# The incident

## 2/2/2014: Hospital-C, Walloon Brabant

- 2 patients infected with *B. cepacia* (endo-tracheal aspirate),
- hospitalized in IC-ward,
- 1 strain available for analysis by NRC

**Soap not sampled**



## 6/12/2013: Hospital-B, Hainaut

- 2 patients infected with *B. cepacia* (urine, bronchial aspirate),
- hospitalized in IC-ward,
- 1 strain available for analysis by NRC

***B. cepacia* confirmed in the same liquid soap**

## End of November 2013: Hospital-A, Liège

- 30/09/2013 - 2/12/2013
- **14 patients** infected/colonized with *Burkholderia cepacia*
- hospitalized in several intensive care wards
- **43 *B. cepacia* positive samples:**
  - 26 respiratory (9 patients),
  - 8 blood cultures (3 patients),
  - 9 urinary (4 patients)
- 7 strains available for analysis by the National Reference Center (NRC)

*Microbiology lab. & Hospital Hygiene team:*  
outbreak investigation: case listing, review of the literature, environmental sampling...

***Burkholderia cepacia* confirmed  
in liquid soap**

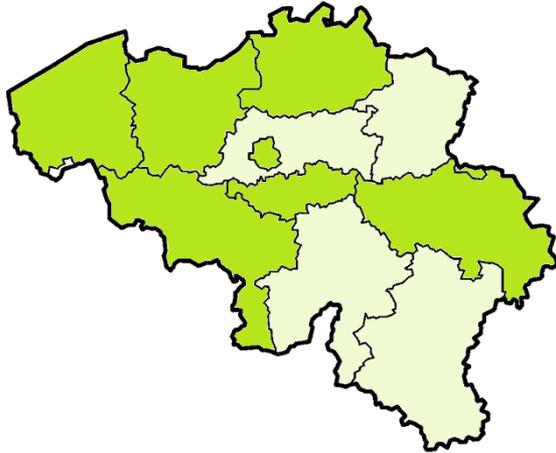
# The liquid soap

*Dermalex® hospital derma lotion (batch no. 713-0909)*

- *surface-active components, no disinfectants*
- *for hand hygiene of healthcare workers and for corporal hygiene of patients*



**Since August 27, 2013, the contaminated batch was delivered in 37 hospital sites (10.945 beds) in Belgium.**



**Flanders region:** 13 hospitals (3.485 beds)

**Brussels region:** 13 hospitals (3.378 beds)  
including 2 expertise units for  
cystic fibrosis (CF)

**Walloon region:** 11 hospitals (4.082 beds)

■ contaminated soap not delivered in the province

- The company was informed about the incident (3/12/2013)
- An independent laboratory analyzed the batch and confirmed **the presence of *Burkholderia cepacia*** (5/12/2013)
- The company recalled the soap (6/12/2013)

# Burkholderia



**Family** Burkholderiaceae

**Genus** *Burkholderia*: Gram-negative, aerobic, non-fermenting, motile bacillus, colonize a large variety of ecological niches (water, soil, fruits, vegetables)

**Species** many different *Burkholderia* species,

- some species are able to break down toxic compounds, pesticides, herbicides and polychlorinated biphenyls (PCBs),...
- some are **pathogenic** for:

Plants: *B. cepacia* = onions (onion rot), garlic, tobacco,



Animals: *B. mallei* = glanders in horses, donkeys,..



Humans: *B. pseudomallei* = melioidosis or Whitmore's disease  
(endemic in Southeast Asia & Northern Australia)

*B. mallei* & *B. pseudomallei*: potential biological warfare agents (level-3)

- *Burkholderia cepacia complex (Bcc)* = group of 18 species: *B. cepacia*, *B. cenocepacia*, *B. lata*, *B. multivorans*, *B. pseudomultivorans*, *B. contaminans*, *B. diffusa*, *B. dolosa*, ...

# *Burkholderia cepacia*



- Formerly: *Pseudomonas cepacia*
- Cause rarely infections in the healthy host
- **Opportunistic pathogen:** hospitalized patients, weakened immune system, chronic pulmonary diseases (respiratory & urinary infections, bacteraemia, arthritis, peritonitis,...)
- Major **nosocomial pathogen:**  
life-threatening among patients with cystic fibrosis, chronic granulomatous disease, sickle cell anaemia.  
Contamination among CF-patients can lead to severe '**Cepacia syndrome**'  
= fatal necrotizing pneumonia and septicemia among CF-patients.  
Belgian CF-Register, 2011: annual prevalence of Bcc among CF-patients = 3.6%
- High **intrinsic multi-resistance**, infections difficult to treat, formation of biofilms
- **Identification on species level** difficult in the routine microbiology laboratory
- *Burkholderia* can **survive (long time) and multiply in aqueous hospital environments**, transmission from contaminated liquids and surfaces, colonized staff (hands) and person-to-person spread.

# Epidemiological & microbiological investigation

(16/12/2013)



Universitair  
Ziekenhuis  
Brussel



## Aims:

- 1- register all *Burkholderia spp* isolated in acute care hospitals > 27/8/2013
- 2- estimate the incidence of *Burkholderia* among hospitalized, non-CF patients in exposed and in non-exposed hospitals.

## Case definition:

### Confirmed case:

- hospitalized patient colonized/infected with ***B. cepacia*, MLST-type ST848** (confirmed by the NRC) isolated from clinical/screening sample > 27/8/2013

### Probable/possible case:

- hospitalized patient colonized/infected with ***Burkholderia spp.*** from clinical/screening samples > 27/8/2013

**Conditions:** no (known) antecedents of previous *Burkholderia* carriage/infection strain not available for identification/confirmation by NRC current or previous hospitalization in an exposed hospital.

# Epidemiological & microbiological investigation

(16/12/2013)



## Methods:

- Hospital questionnaire: calculation of Bcc incidence in exposed/non-exposed hospitals
- Patient questionnaire: for each patient with *Burkholderia* positive clinical or screening sample > 27/8
- Hospitals with cases (> 27/8) sent the available strains to the NRC for analysis:
  - culture on agar plate, MALDI-TOF mass spectrometry,
  - randomly amplified polymorphic DNA typing (RAPD-typing) of Bcc strains,
  - multilocus sequence typing analysis (MLST-typing)

# Results

**General hospitals in Belgium (n=106):**

Hospital sites: 195  
Hospital beds: 52.599

**No participation:**  
59 hospital sites  
(n=14.379 beds)  
59 non-exposed sites

**Participation:**  
**136** hospital sites  
(n=38.220 beds)

**=70% of all Belgian  
hospital sites**

**Incidence of  
*Burkholderia*\*:**  
**0.19 cases/10.000 HD**

**Exposed hospital sites:**  
**37** sites (n=10.945 beds)

**Non-exposed hospital sites:**  
**99** sites (n=27.275 beds)

**incidence:**  
**0.08/10.000 HD**

***Burkholderia spp* isolated**  
14/37 hospital sites (38%)  
**31 patients**  
(11 strains available, clin. samples)

***Burkholderia spp* isolated**  
35/99 hospital sites (35%)  
**29 patients**  
(11 strains available, clin. samples)

***Burkholderia cepacia*  
with confirmed link  
(MLST-type ST848):**  
**8 patients**

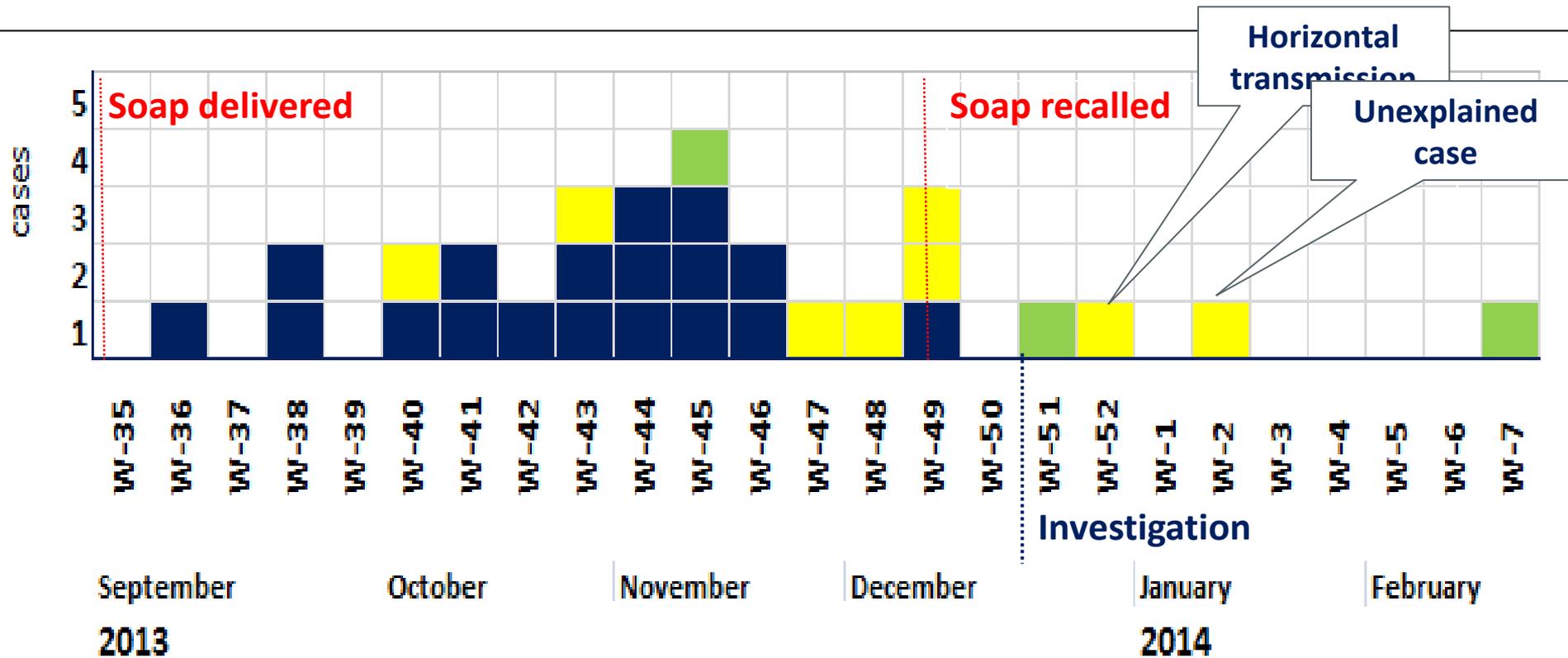
- Hospital A, B, C
- All ICU-patients,
- 3 patients died

**Not-related:**  
**Other species, MLST-type:**  
**3 patients:**  
*B. cepacia*, ST840  
*B. cenocepacia* IIIb, ST854  
*B. cenocepacia* IIIb, ST864

**Not related:**  
**Other species, MLST-type: 11 patients:**  
*B. cenocepacia* IIIa, ST32 (n=1)  
*B. cenocepacia* IIIa, ST217 (n=2)  
*B. contaminans*, ST482 (n=1)  
*B. multivorans* (n=6) ST25, ST615, ST742,  
ST749, ST751, ST819  
*B. gladioli* (n=1)

**\* Incidence: CF patients excluded**

# Epidemic curve for non-cystic fibrosis patients with clinical *Burkholderia* samples in exposed hospitals (> 27/08/2013)



- B. cepacia*, ST848
- Burkholderia*, other species and MLST-type
- Burkholderia* strain not available for analysis



A Review of Reported Recalls Involving Microbiological Control 2004-2011 with Emphasis on FDA Considerations of “Objectionable Organisms”

Sutton, S. and Jimenez, L. (<http://www.americanpharmaceuticalreview.com/Featured-Articles/>)

*B. cepacia* alone is cited in **34%** of the non-sterile recalls from the years 2004-2011.

**batch no. 713-0909:**

- ‘Intrinsic contamination’ in the conservation tank preceding conditioning.
- Applied methods for identification of *Burkholderia* were inappropriate (ISO 21149, cosmetics)  
Cosmetics should not contain pathogens, some products need additional tests.
- The first conditioned products of the batch showed no contamination, the majority of the remaining batch was contaminated (prolonged time allowing bacterial growth).

# Conclusions



- 70% of all Belgian hospital sites participated (including all exposed hospitals).
- A comparable % of exposed and non-exposed hospital sites had *Burkholderia* cases during the critical period (> August 27),
- The incidence of *Burkholderia* cases was higher in exposed hospitals compared to non-exposed hospitals: 0.19 cases/10.000 HD versus 0.08 cases/10.000 HD.
- Because of the long delay (15 weeks) between delivery and recall of the contaminated soap, only few *Burkholderia* strains were available for analysis by the NRC:
  - 11 strains from exposed hospitals: among them 8 with the same *Burkholderia* species and MLST-type as the contaminated soap = *Burkholderia cepacia*, ST848,
  - 11 strains from non-exposed hospitals: all with a different *Burkholderia* spp. and MLST-type than the contaminated soap.

# Conclusions



- At least 3 exposed hospitals had to deal with *Burkholderia cepacia* attributable to the use of the contaminated soap.
- This is probably an underestimation (lack of strains available for NRC confirmation).
- In exposed hospitals, among 29 non-CF patients with *Burkholderia* isolated > August 27:
  - 8 cases were **confirmed cases**:  
same species and MLST-type as contaminated soap,
  - 18 cases were possibly related (but sample no longer available),
  - 3 cases were not related (other species, MLST-type).
- No data available on storage and use of the contaminated soap in the exposed hospitals.

# Acknowledgements



**The National Reference Centers for *Burkholderia cepacia* complex**

- Microbiology laboratory, VUB, University hospital, Brussels and associated partner,
- Microbiology laboratory Faculty of Sciences, University of Ghent



**Inspection of consumer products: cosmetics,**  
Federal Public Service Health, Food Chain Safety and Environment, Brussels



**Dienst Toezicht Volksgezondheid,**  
Vlaams Agentschap Zorg en Gezondheid, Vlaanderen



**Cellule de surveillance des maladies Infectieuses,**  
Fédération Wallonie-Bruxelles



**Service d'Inspection d'hygiène de la Commission Communautaire Commune de Bruxelles-Capitale**



**IC-teams** Centre Hospitalier Universitaire du Sart-Tilman (Liège),  
Centre Hospitalier Universitaire de Charleroi (site Hôpital Civil),  
Clinique Saint-Pierre (Ottignies).

**The hospital hygiene teams and microbiologists from all participating hospitals in Belgium**