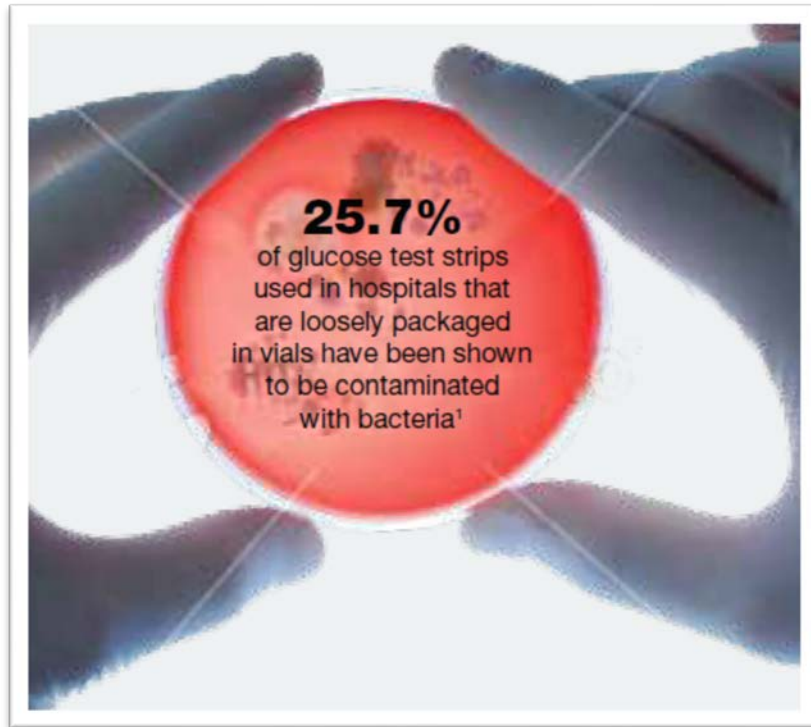


Bacterial contamination of glucose test strips: not to be neglected



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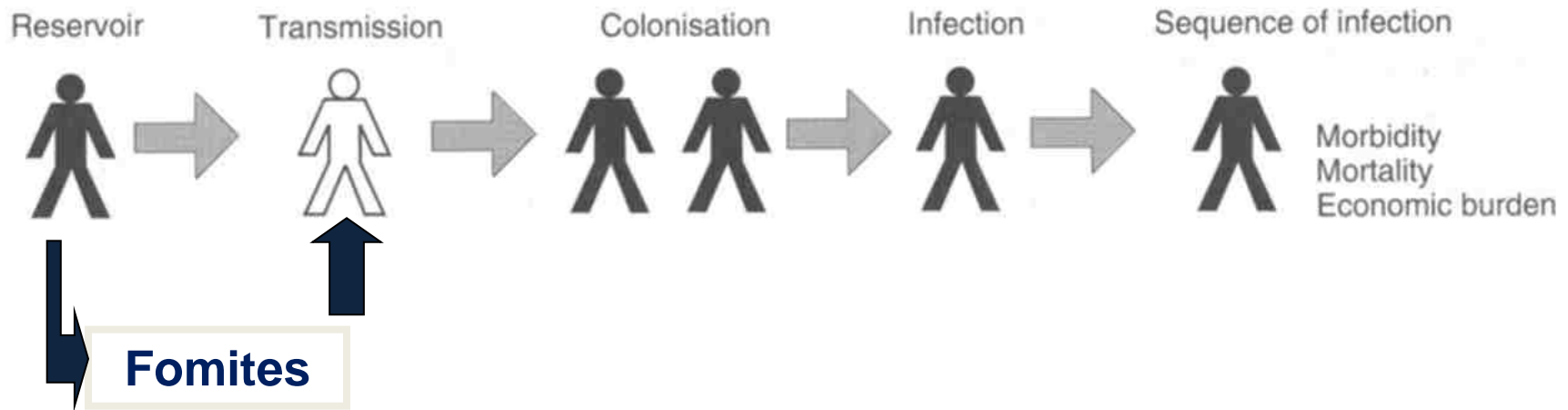
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Bacterial contamination of glucose test strips: does it exist?

- January 2010: A link nurse alerted the Infection Control team of new recommendations to use a different brand of glucose test strips packaged in vials of fifty units instead of unitarian packaging
- I went to my computer, took my “holy” Mayhall’s book, which is a very famous encyclopedia about infection control, and looked for the information about contamination of glucose test strips... *nothing*.
- I searched Pub Med using the keywords “glucose – strips – bacteria”.....*nothing*
- *Well, a hard day had begun!*

How could glucose test strips contribute to infection transmission?



- If shared between patients, strips / vials of strips could act as secondary reservoir

Details of our study

○ Objective

- Does packaging glucose test strips in vials increase the risk of contamination?

○ Methodology:

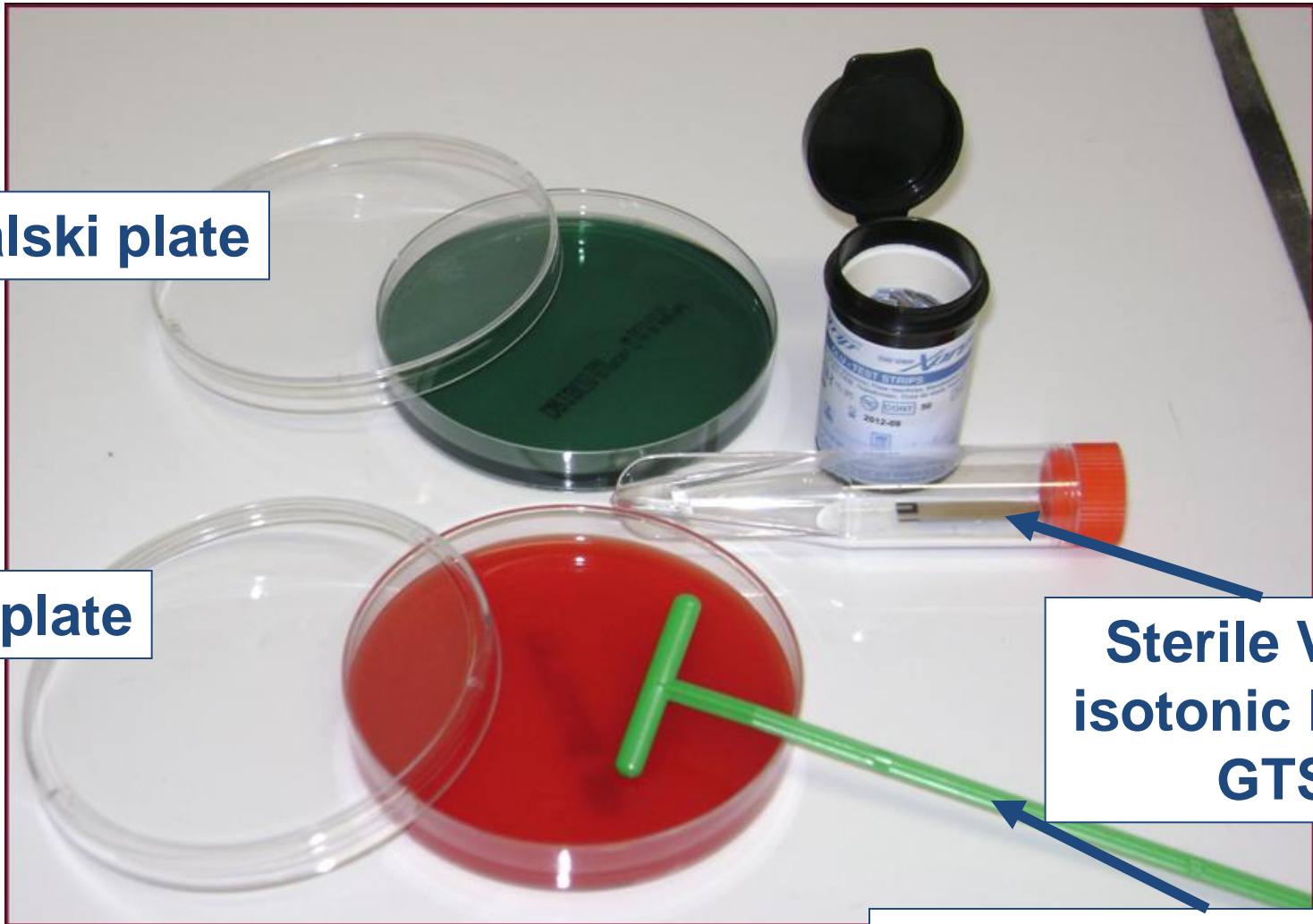
- Study carried out in 4 hospital wards: **surgical** and **neonatal intensive care units**, **hepato-gastroenterology**, **geriatric**
- Both vials shared between patients, and single patient use vials were assessed
- Vials were handled only by medical personnel following normal hospital procedures
- Every week for 6 weeks one strip was aseptically removed from open vials, cultured for 24-48h at 37°C to assess the viable bacteria

Single patient use vials



Vials shared between patients





Drigalski plate

ANC plate

Sterile Vial + isotonic NaCl + GTS

Sterile rake to streak the plate

Results

- During the study period 148 strips were collected and cultured:
 - 36 from Surgical Intensive Care Unit (SICU),
 - 78 from Neonatal Intensive Care Unit (NICU),
 - 20 from Hepato-Gastroenterology Ward (HGW),
 - 14 from Geriatric Ward (MGW).
- **25.7% yielded a positive culture (38/148)**, consisting in most cases of cutaneous flora (24.3% vs 1.4% for intestinal flora).
 - No Multi Drug Resistant bacterium was identified.
- The bacterial load varied from **10 to 280 Unit Forming Colonies per Strip** (average value: 27 UFC)

Results

Type of Ward	Number of positive culture (%)	Number of positive cultures with skin flora* (%)	Number of positive cultures with enteric flora** (%)	Range of bacterial load for positive strip (UFC/strip)	Mean bacterial load per positive strip (UFC/strip)
SICU	6/36 (16.6%)	5/36 (13.9%)	1/36 (2.7%)	10-20	13
NICU	21/78 (26.9%)	21/78 (26.9%)	0	10-50	15
HGW	6/20 (30%)	5/20 (25%)	1/20 (5%)	20-280	69
MGW	5/14 (35.7%)	5/14 (35.7%)	0	10-190	48
Total	38/148 (25.7%)	36/148 (24.3%)	2/148 (1.4%)	10-280	27

Data show that as our workload increases, the more our compliance with hygiene standards decreases



Activity*	Number of observations	Compliance
<20	473	58%
21-40	1,258	51%
41-60	825	40%
>60	278	37%

adapted from Pittet et al. Ann Intern Med. 1999 ²

'The narrow opening of the vial forced healthcare professionals to successive manual contamination of strips by fingers and vice versa.

In our study, the lack of statistical relationship between the filling rates and the bacterial counts showed that internal vial contamination could be delayed or avoided in **performing strict hand hygiene before manipulations.**

Until such behaviours are uniformly implemented and because individual vials were as contaminated as shared ones, it seems legitimate to us that opened GTS vials would be **discarded after the discharge of a patient in isolation precautions**'. ¹

* Number of opportunities to realize a hand hygiene act: when a patient or its close environment is touched.....

Conclusions – take home messages

- ⇒ 25% of GTS from opened vials were contaminated by bacteria
 - These first results should be confirmed by larger multicentre studies including different brand names and packaging of glucose test strips
- ⇒ opened GTS vials should be **discarded after the discharge** of a patient, at least when he is in isolation precautions
 - the single patient use or the discard of remaining strips hindered the financial advantages of multi-units vials.
- ⇒ So, where next? Back to the **unitarian package**? Or **alternatives**?
 - Development of a « **no touch** » package to deliver glucose test strips one by one? (as for artificial sweetener??!!)
 - Development of glucose test strips with intrinsic **antibacterial properties**, i.e. impregnated with an antiseptic, without interfering with their biochemical properties?