

Management of Skin and Soft Tissue Infections

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Disclosures

- Grant Support
 - Merck (*C. difficile* trials)
 - GSK (Staphylococcal vaccine development)
- Consultant
 - GSK (Staphylococcal vaccine development)
 - Pfizer (Staphylococcal vaccine development)
 - Summit (*C. difficile* therapeutics)
 - Premier (HPV vaccine education)
- Royalties
 - UpToDate

Take Home Points

- Colonization typically precedes infection
- Skin and soft tissue infections recur frequently, with some studies demonstrating upwards of 50-60% recurrence risk over the course of one year
- Choice of therapy for the initial infection may influence likelihood of recurrence (clindamycin appears superior to TMP-SMX)
- Decolonization techniques are typically effective in reducing recurrent disease, but typically do not change frequency of colonization

Outline

- Historical and Epidemiological Context
- Basic Tenets of Staphylococcal Pathogenesis
- Strategies for Management
- Discussion

HOLT'S
DISEASES
OF
INFANCY
AND
CHILDHOOD

HOLT
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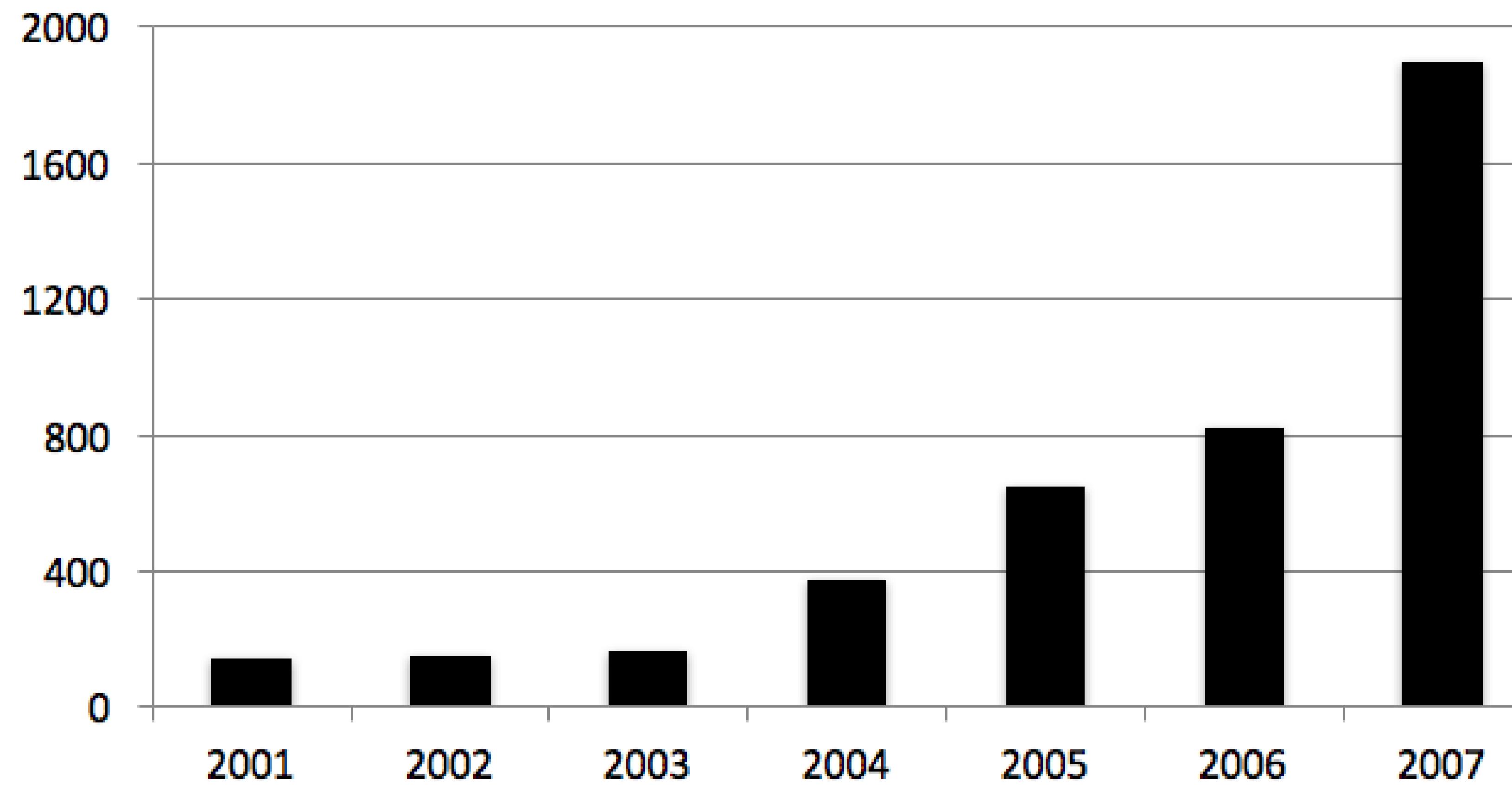
may appear all over the body. Most of these infections are due to staphylococci, but streptococci are sometimes responsible. Debilitated infants are particularly susceptible; want of cleanliness and overclothing may be predisposing factors in starting new follicular infections. Once the organisms gain a foothold they may be very difficult to eradicate; sometimes boil after boil appears and these lesions may continue to develop in crops for months. The scalp, face and shoulders are favorite sites but any part of the body may be involved; in some instances the entire body is covered with furuncles.

Treatment is both general and local. Every effort should be made to build up the patient's nutrition. Yeast seems to be of distinct benefit in some obstinate cases; dried brewer's yeast may be given in half-tablespoonful doses two or three times a day, or one-quarter to one-half of an ordinary yeast cake may be taken. We are under the impression that patients with these infections do badly on a high carbohydrate diet; marked improvement sometimes follows the substitution of fat for carbohydrate in an infant's formula. A convenient feeding consists of equal parts of 20 per cent cream and milk without added sugar. Vaccines are of undoubted help in some instances and should be given in all chronic cases. Injections may be given at intervals of four or five days, beginning with a dose of 50 million organisms and increasing to double this quantity or more. Autogenous vaccines are probably to be preferred but in most instances stock vaccines are equally effective.

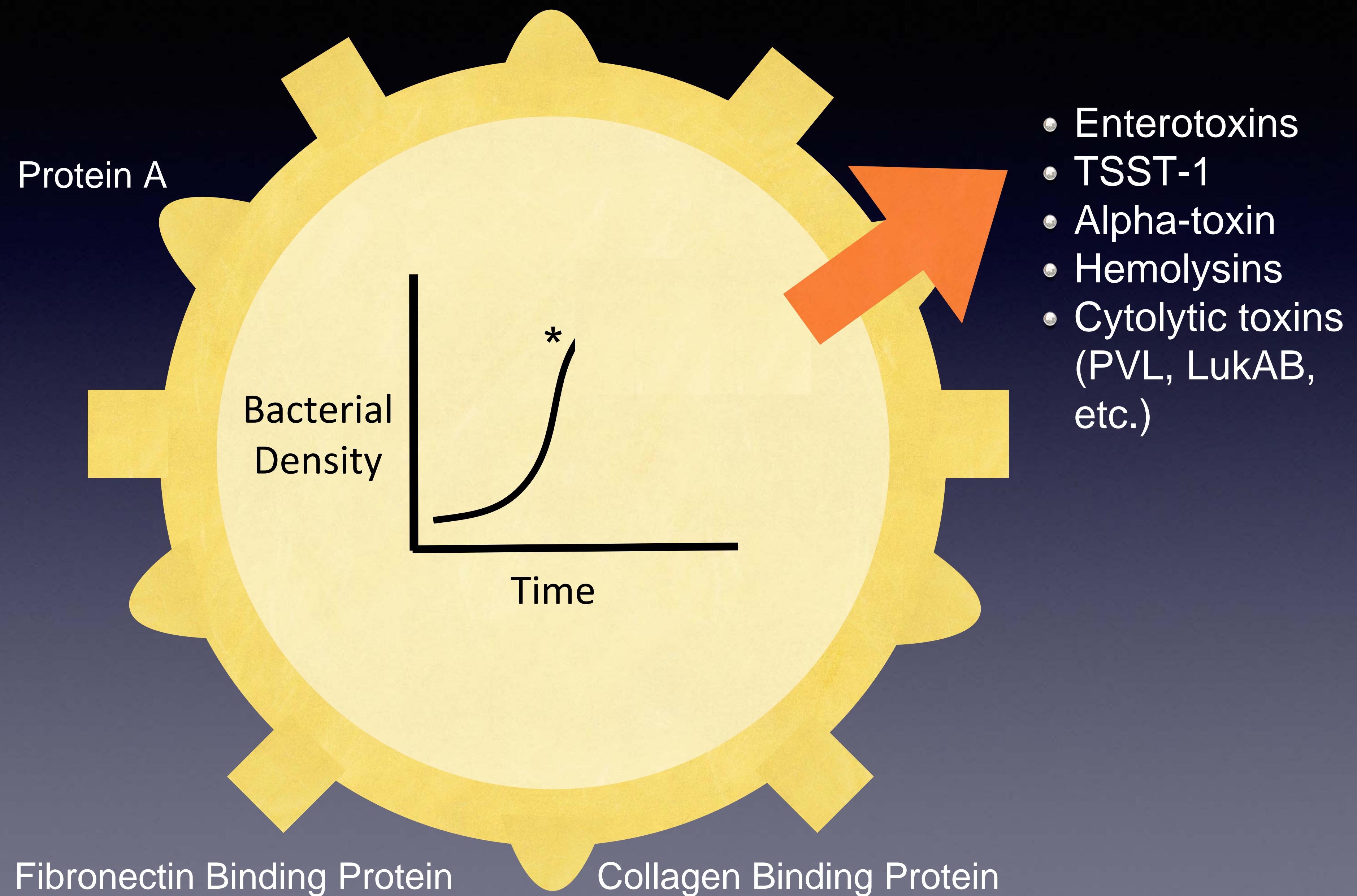
Local treatment involves scrupulous attention to cleanliness of the skin; this is best secured by frequent bathing of the parts with alcohol. If the scalp is involved the area surrounding the lesions should be shaved. Daily exposure to sunlight or an ultraviolet lamp is beneficial in some instances. Incision of furuncles should be delayed until the furuncles have pointed; all draining areas should be well protected by dressings. Cultures of the pus are desirable. Staphylococcus toxoid has been used with success, but in our own experience improvement attributable to its use has been exceptional. Sulfanilamide or sulfathiazole may be useful.

Incision/Drainage Procedures Performed

(VUMC ED 2001-2007)



Anatomy of a *Staphylococcus*

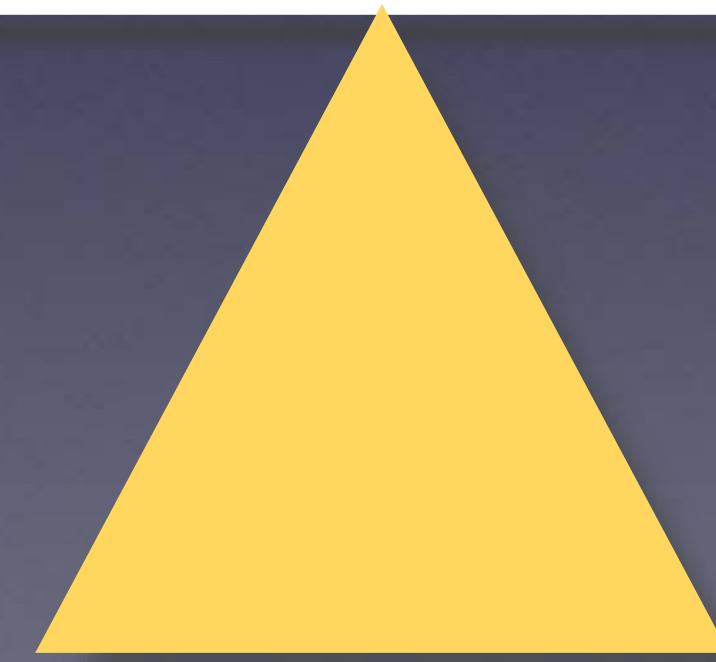


Staphylococcal Balance of Power



Nasal Carriage in 30%

Antibody response to the
Nasal Strain



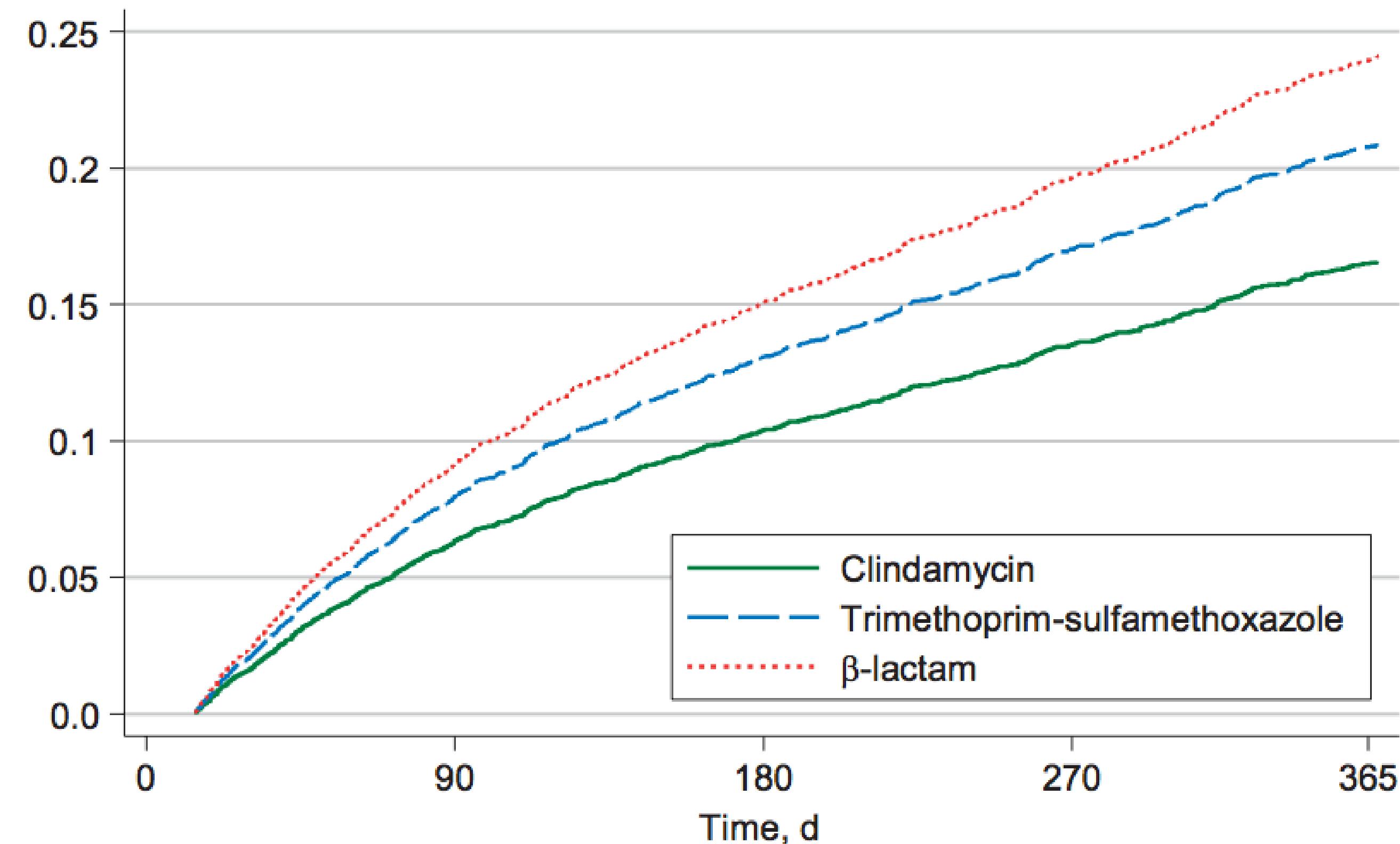
Skin and soft tissue infections
occurring in the setting of
previous exposure and antibody
response to staphylococcal
components

Typical Case

- 6 year old, previously healthy girl presents with a 3 x 5 cm abscess on the left buttock.
- The lesion is fluctuant, with surrounding induration and erythema. No other lesions are present, she does not have erythroderma or vital sign abnormalities, and otherwise looks well.
- What is your antibiotic of choice?
- How does your management change (if at all) if this is a recurrent episode of furunculosis/abscess?

Initial Choice of Therapy (Retrospective Study)

- Retrospective study of nearly 50,000 children 0-17 years of age in Tennessee
- Treatment with TMP-SMX nearly doubled the risk of treatment failure and increased risk for recurrence by 25%



Initial Choice of Therapy (Large Abscesses)

- 524 adults and children with uncomplicated skin infections who had cellulitis, large abscesses (>5 cm) or both.
- All patients underwent incision and drainage and were randomized to receive either clindamycin or TMP-SMX
- Clinical cure at the end of treatment (10 days) was 90% for the clindamycin group and 88% for the TMP-SMX group
- Compliance greatly impacted efficacy - for patients that were <75% compliant, efficacy was only 56% in the clindamycin group and 42% in the TMP-SMX group

Effect of Therapy on Recurrence (Large Abscesses)

	Clindamycin	TMP/SMX
	N=212	N=202
Infection free at OM FU (n,%)	193 (91%)	171 (84.7%)
95% CI	87.0 – 95.1%	79.4% - 89.9%

p=0.0507 (Fisher)
p=0.0322 (Pearson chi-square)

Data are limited to those who were deemed clinical cures at TOC visit

- Overall, slightly more participants in the TMP-SMX group experienced a recurrence at the one-month follow-up visit.
- Importantly, this observation was strongest in children; no statistically significant difference was seen in adults

Initial Choice of Therapy (Small Abscesses)

- Are antibiotics necessary for abscesses <5 cm that are adequately drained?
- 786 participants enrolled in a double-blind, randomized trial

Group	Clindamycin	TMP-SMX	Placebo
All Participants	83%	82%	69%
Children	89%	82%	69%
Adults	79%	81%	69%
<i>S. aureus</i> isolated	84%	83%	64%
MRSA	82%	85%	63%
No <i>S. aureus</i> identified	84%	82%	83%

Effect of Therapy on Recurrence (Small Abscesses)

- Among the participants who were initially cured, new infections at 1 month of follow-up were less common in the clindamycin group (6.8%) than in the TMP-SMX group (13.5%, $p=0.03$) or the placebo group (12.4%, $p=0.06$).
- Adverse events were more frequent with clindamycin (21.9%) than with TMP-SMX (11.1%) or placebo (12.5%)
 - One participant who received TMP-SMX had a hypersensitivity reaction.

Take Home Points

- For staphylococcal SSTI, antibiotics have additional benefit over placebo for drained abscesses
- Cure rates are similar between TMP-SMX and clindamycin
- Side effects are more common with clindamycin
- Recurrence rates are higher in patients treated with TMP-SMX

Questions to Consider re: Decolonization

- Goals of decolonization
- When to decolonize
- Who to decolonize
- What to decolonize
- How to decolonize

Decolonization Argument

- Some strains are more “accident prone” than others; as a result, decolonization of strains more likely to cause disease could have benefit
- The 1960s experience with intentional colonization with *S. aureus* strain 502A would support this hypothesis
- The goal of decolonization is not actually decolonization; rather, it is eradication of a particularly problematic strain

When to Decolonize?

- A single episode of furunculosis/abscess is insufficient to warrant antimicrobial efforts to decolonize
 - First, there should be a focus on maintaining hygiene and optimizing skin care
- Upon first recurrence, or in situations where there is ongoing transmission within a household, decolonization can be considered

Who to Decolonize

- Randomized study of 183 households (Fritz et al) compared decolonization of the patient one with decolonization of the entire household
 - Three months later, SSTI incidence in the index patient was significantly lower in those where the entire household had been decolonized (28% vs. 47%, p=0.02)
 - This benefit also extended to household contacts, with 4% of contacts in the household decolonization group experiencing an SSTI (compared to 10% in the patient-only decolonization group)

What to Decolonize

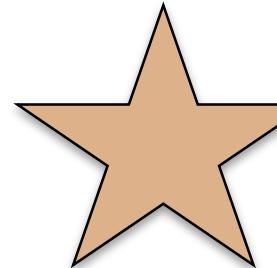
- The anterior nares are one of the most critical niches for staphylococcal colonization
 - Eradication of *S. aureus* from the anterior nares will result in eradication from the hands as well (Reagan et al)
 - Failure of decolonization typically due to mupirocin resistance, not topical antiseptic resistance (Johnson et al)
- Other sites of colonization include the skin (particularly axilla and groin), the GI tract and perineum, and the oropharynx
- Therefore, in general, we suggest decolonization of the nose and skin

How to Decolonize

- Mupirocin is highly effective in temporarily eradicating nasal colonization, particularly when combined with topical antiseptic use (e.g., chlorhexidine or dilute bleach) and attention to environmental surfaces
- Typical Regimen
 - Mupirocin 2% ointment to the nares twice daily for 5 days
 - Chlorhexidine 4% washes daily for 5 days
 - Careful attention to bed linens, pajamas, towels, washcloths, and high touch surfaces

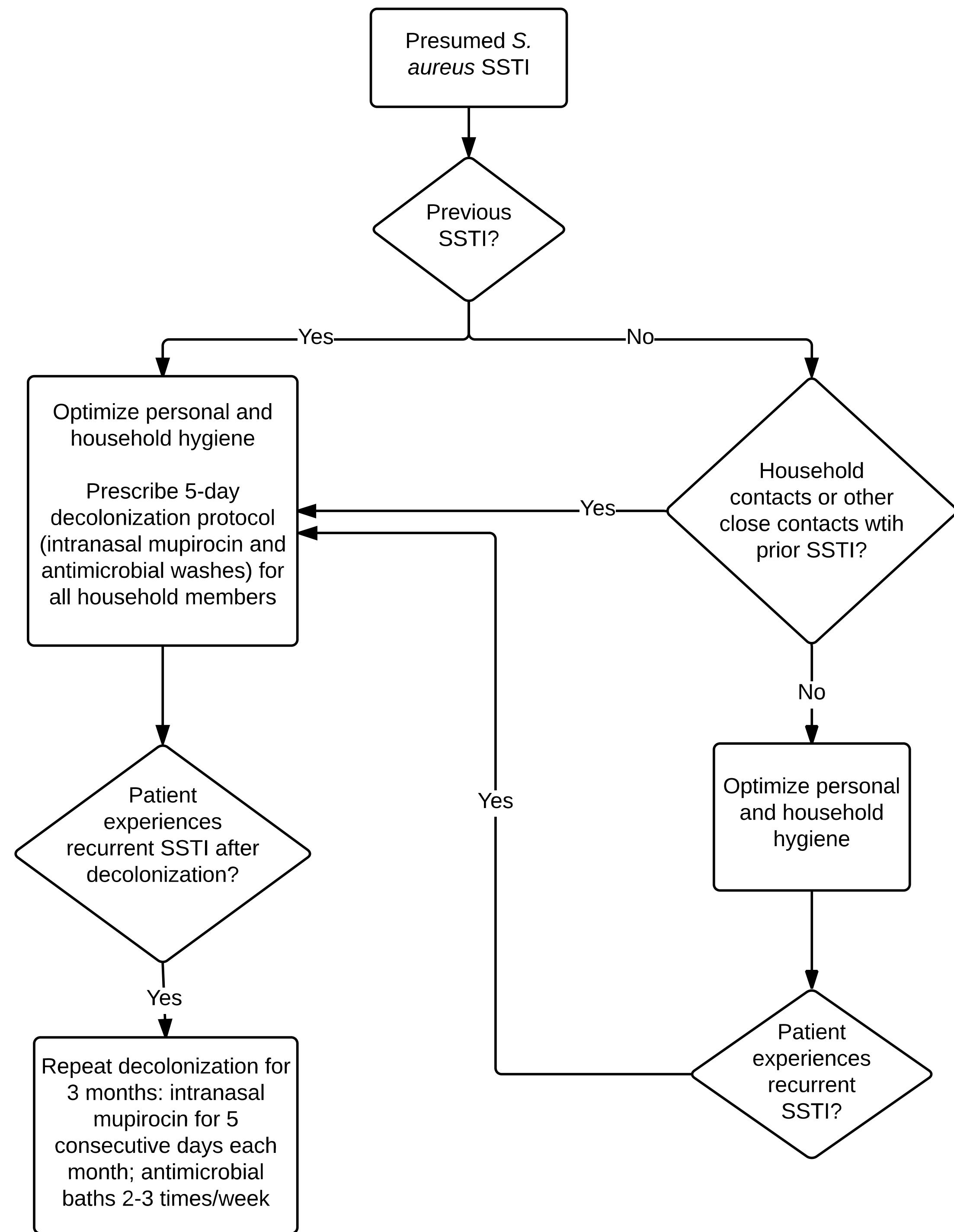
Random Question

- *S aureus* can be recovered from an environmental surface for how long?
 - 3 hours
 - 3 days
 - 3 weeks
 - 3 months



Alternative Approaches

- Retapamulin is a topical antimicrobial currently approved for treatment of impetigo due to MSSA or *S. pyogenes*. RCTs are underway to determine its utility for nasal decolonization
- Since chlorhexidine can result in significant skin drying, some have advocated dilute bleach solutions. Current strategies include 1/2 cup bleach in a 1/2 bathtub full of water.
 - Exposure for 15 minutes is likely to lead to ~4-log reduction in bacterial load



Summary

- In general, risk of recurrent SSTI is ~20%
- Initial SSTI management may influence risk for recurrent infections
 - Clindamycin may have some benefit over TMP-SMX
- In situations of recurrent disease or multiple affected household members, nasal/topical decolonization with environmental decontamination is reasonable
- Nasal mupirocin and topical chlorhexidine for all household members is superior to decolonization of the index patient alone.