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materials; well under 10% of total housekeeping costs are for the products used for cleaning and/or disinfecting floors.

If disinfectant-containing products were not used in floor cleaning, it is likely that wet mops would become so contaminated during a work-shift that there might be increased rather than decreased microbial contamination after "cleaning" (and we recommend additionally that the mops be laundered and thoroughly dried daily). Some references cited in our paper "Housekeeping in operating suites," *AORN Journal* 21:213-220, 1975, indicate that disinfectant-containing products are more effective in reducing microbial contamination than detergents and water alone (T.S. Gable, *Hospitals*, 40:107-111, February 16, 1966; G.A.J. Ayliffe, B.J. Collins, E.J.L. Lowbury, *Br Med J* 2:442-445, 1966; W.D. Foster, *Lancet*, 1:670-673, 1960; and J.S. Kuipers, *J Hygiene*, 66:625-631, 1968).

Apparently, use of two cleaning products (one with a disinfecting ingredient and the other with a detergent only) is suggested by Dr. Daschner based on European experience. This policy might increase labor costs of housekeepers and their supervisors because of decisions that would have to be made on how and when a disinfectant-detergent floor cleaning would be justified and dispatched. In my view, such a special cleaning for known presence of potentially infectious material would likely cost more than if a disinfectant-detergent were used for routine cleaning.

In summary, I beleive that it is not a cost disadvantage to use disinfectant-detergent products for all floors in patient-care areas of hospitals.

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Detection of Bacteremia: Technical Aspects of the Blood Culture

To the Editor:

In the article "Detection of Bacteremia: Technical aspects of the blood culture" (2:399-400, 1981), I would like to respectfully disagree with Dr. Weinstein's statement on subcultures. He comments that subcultures are routine at 7 or 14 days before the blood culture is discarded. While this practice may currently be the case in many hospitals, this practice should now be abandoned. In the past two years, several studies have been done which indicate that the terminal subculture does not detect previously unsuspected bacteremia. Those terminal subcultures that are positive usually appear from patients where other blood cultures were positive earlier. These studies have been documented in standard blood culture media involving over 14,000 blood cultures in a study by Campbell and Washington[1] and in 2,780 cultures by Gill.[2] In a study using the BACTEC radiometric blood culture media, Araj et al could not demonstrate any significant value of terminal subcultures in 5,354 blood culture bottles.[3] This laboratory practice should be abandoned. The aforesaid, however, does not denigrate the value of subcultures within the first 24 hours.

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1. Campbell J, Washington JA Jr: Evaluation of the necessity for routine terminal subcultures of previously negative blood cultures. *J Clin Microbiol*, 12:576-578, 1980.
2. Gill VJ: Lack of clinical relevance in routine terminal subculturing of blood cultures. *J Clin Microbiol*, 14:116-118, 1981.
3. Araj GF, Hopfer RL, Wenglar M, et al: Value of terminal subcultures from negative BACTEC blood culture bottles. *J Clin Microbiol*, 14:589-590, 1981.

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Dr. Melvin Weinstein responds to Dr. Gross' comments below.

Dr. Gross correctly points out that three recent studies have demonstrated no advantage to routine terminal subculture after seven days incubation.[1-3] One study reported observations made during a three-week study period[1] and another examined results during a three-month time span.[3] These somewhat limited evaluations may not be adequate to support Dr. Gross' conclusion that the practice of performing terminal subcultures be abandoned completely. Indeed, Araj et al[3] concluded their report by recommending that laboratories review their terminal subculture results before making changes in blood culture policy. In at least one institution where this recommendation was followed, the microbiologist decided to continue performing terminal subcultures.[4]

Campbell and Washington suggest that seven days incubation of blood cultures is probably adequate for general hospitals but that a second week of incubation is indicated in suspected endocarditis, persistent or recurrent infection, and in laboratories which serve referral centers.[1] Reller also has recommended a two-week incubation of blood cultures in suspected endocarditis.[5] To my knowledge there are no published data on the value of terminal subcultures at the end of a two-week incubation period. During a 21-month period (1975-1977) at the University of Colorado Health Sciences Center (UCHSC), more than 15,000 blood cultures were obtained of which 1069 (7%) were positive for microorganisms which represented true bacteremia as determined clinically by members of the Infectious Disease Service (Weinstein MP, Reller LB, unpublished data). Fifty-three microorganisms, representing 5% of all clinically important isolates, were detected only by the terminal subculture at 14 days. Since 1977 the clinical microbiology laboratory at UCHSC has continued to identify 5% of clinically important isolates, in particular gonococci, cryptococci, and *Candida spp.*, only by the terminal subculture (Reller LB, personal communication). While the yield is limited, the accompanying table shows that the microorganisms isolated represent a broad spectrum of human pathogens.

Is the limited yield worth the extra cost and effort? Laboratory directors hopefully in consultation with interested clinicians, will have to judge the relative value of terminal subcultures in their institutions. At our teaching hospital all blood cultures are incubated for 14 days, and terminal subcultures are and will continue to be performed.

Lastly, Dr. Gross' letter confuses data from two of the studies he quotes. Campbell and Washington[1] evaluated

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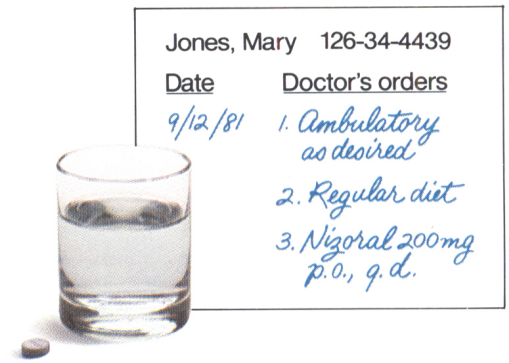

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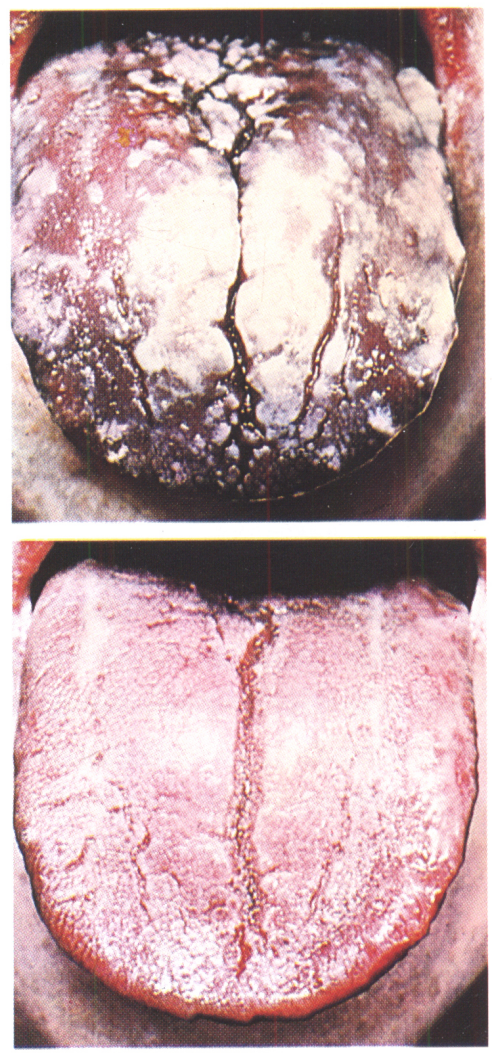

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TABLE

MICROORGANISMS ISOLATED ONLY BY TERMINAL SUBCULTURE AT UCHSC July 1975—April 1977

Microorganism	No.
Staphylococcus aureus	7
Staphylococcus epidermidis	2
Escherichia coli	3
Klebsiella pneumoniae	1
Enterobacter cloacae	1
Proteus mirabilis	1
Citrobacter sp.	1
Serratia marcescens	1
Pseudomonas aeruginosa	1
Pseudomonas sp.	1
Acinetobacter calcoaceticus	1
Haemophilus influenzae	1
Neisseria gonorrhoeae	3
Peptostreptococcus sp.	1
Peptococcus sp.	2
Eubacterium sp.	3
Clostridium sp.	2
Bacteroides fragilis group	2
Bacteroides melaninogenicus	2
Bacteroides sp.	2
Veionnella sp.	1
Candida albicans	5
Candida spp.	4
Cryptococcus neoformans	3
Torulopsis glabrata	2

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1385 blood cultures rather than 14,000 as indicated by Dr. Gross. The study by Gill[2] evaluated over 14,000 bottles from 7579 blood cultures.

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