

Review Article

Are Currency Notes Carrying Harmful Microbes? Risks and Precautions

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How to cite this article:

Saini A. Are Currency Notes Carrying Harmful Microbes? Risks and Precautions. *J Surg Nurs Allied Health Sci.* 2026;2(2): 1-6.

Date of Submission: 2026-09-20

Date of Acceptance: 2026-10-21

A B S T R A C T

Currency notes pass through many hands and may become contaminated with bacteria, fungi, and other microorganisms. Studies from different countries have identified organisms such as *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella* species, and other bacteria on circulating money. A common habit of touching the tongue or lips before separating notes may increase the opportunity for microbial transfer between the mouth, fingers, and currency. However, finding microorganisms on money does not by itself prove that routine cash handling directly causes infection. This short review explains the evidence on microbial contamination of currency, the role of hands and saliva, situations in which contamination may be more important, and the relevance of safe cash handling for nurses and other healthcare workers. It also presents ten practical precautions that can be used in hospitals, community health settings, food-service areas, banks, shops, and homes. The main public-health message is simple: currency should be handled normally but hygienically; saliva should not be used while counting notes; and hands should be cleaned at appropriate times, especially before eating, preparing food, touching the face, or returning to patient care.

Keywords: Currency Notes, Bacterial Contamination, Hand Hygiene, Saliva, Fomites, Infection Prevention, Nursing, Public Health

Introduction

Cash remains an important part of daily life even with the rapid growth of digital payment systems. Currency notes are exchanged in shops, markets, hospitals, pharmacies, public transport, banks, schools, restaurants, and households. One note may pass through many people within a short period. During this movement it can come into contact with hands, pockets, bags, counters, food surfaces, dust, moisture, and body secretions. Unlike many objects, banknotes are not routinely cleaned by users. This makes them useful surfaces for studying how microorganisms move through the community.

A growing number of studies have reported bacteria and other microorganisms on used banknotes. A global systematic review and meta-analysis by Appiah et al. (2026) showed that microbial contamination of circulating money is common across different settings. Earlier experimental work also demonstrated that some microorganisms can remain viable on banknote materials for hours or days, depending on the organism, material, temperature, humidity, and condition of the note (Cozorici et al., 2022). These findings are important for infection-prevention education, but they should be interpreted carefully.

The presence of a microorganism on a note does not mean that every person who touches the note will become

infected. Disease transmission requires several steps: the organism must remain alive, transfer from the note to the hand or another surface, reach a suitable entry point such as the mouth, nose, eyes, or a wound, and be present in a sufficient amount to overcome normal body defences. Therefore, the correct public-health message is not to fear cash. Rather, people should use simple hygiene measures that reduce unnecessary cross-contamination.

Currency Notes as Potential Microbial Reservoirs

Currency can collect microorganisms from many sources. Skin bacteria may be transferred directly from fingers. Organisms from the respiratory or gastrointestinal tract may reach money after coughing, sneezing, poor hand hygiene, or handling notes after using the toilet. Food vendors may transfer microbes between raw foods, ready-to-eat foods, hands, and cash. Dust, soil, moisture, and contaminated storage areas can also affect the microbial load of banknotes.

Ofoedu et al. (2021) investigated Nigerian currency collected from food vendors and identified bacterial contamination in a large proportion of the notes examined. Organisms of interest included *Escherichia coli*, *Klebsiella* species, and *Staphylococcus* species. Yar (2020) also identified bacterial contaminants on Ghanaian paper currency and reported antibiotic resistance in some isolates. More recent studies have continued to report potentially important bacteria and resistance patterns on banknotes (Arhin et al., 2024; Olaleye et al., 2024).

The type and physical condition of a note can influence microbial survival. Older, dirty, folded, or damaged notes may provide more irregular surfaces where moisture and

organic material can remain. Polymer and cotton-based notes may also differ in the way bacteria attach and survive. Cozorici et al. (2022) showed that survival depended on both the microorganism and the banknote material. These results suggest that currency contamination is not a fixed property; it changes with handling practices, circulation time, environmental exposure, and the material used to make the note. Table 1 briefly summarises representative evidence used in this review.

How Cross-Contamination May Occur

The main concern is not simply that microorganisms are present on money, but that hands may carry them from one place to another. A person may receive a contaminated note, count it, touch a mobile phone, open a door, prepare food, rub the eyes, touch the lips, or assist a patient. Each contact creates another opportunity for microorganisms to move. The actual amount transferred may be small, and many organisms will not cause disease, but repeated contact can increase exposure.

Figure 1 shows a simple pathway through which cross-contamination may occur during routine cash handling. It is a conceptual pathway rather than proof that infection will occur after every contact.

Hands are especially important in this process because they repeatedly touch both environmental surfaces and the body. Cantrell et al. (2023), in a large systematic review and meta-analysis, found frequent contamination of hands with fecal indicator organisms and enteric pathogens in community and household settings. This does not mean that money is the main source of hand contamination, but it supports the broader concept that hand hygiene can interrupt movement of microorganisms between surfaces and people.

Table 1. Selected evidence on microbial contamination of currency and hands

Study	Main focus	Key observation	Practical meaning
Cozorici et al. (2022)	Survival on different banknotes	Microbial survival varied by organism and note material.	Banknote material and environment influence persistence.
Cantrell et al. (2023)	Microbial contamination of hands	Hands frequently carried fecal indicators and enteric pathogens.	Hands can connect contaminated surfaces with the mouth, food, and people.
Sabesan & Venkatesan (2024)	Saliva, hands, and currency	Microorganisms were assessed across all three sources.	Saliva-assisted counting can create avoidable cross-contact.
Olaleye et al. (2024)	Currency contamination and resistance	Bacteria with antimicrobial resistance were reported.	Good hygiene is important, especially in high-contact settings.
Almogbel et al. (2025)	Contaminated banknotes and wallets	Wallets and money can serve as microbial reservoirs.	Storage practices may contribute to contamination.
Appiah et al. (2026)	Global systematic review and meta-analysis	Currency contamination was reported across multiple settings.	Evidence supports hygiene, but contamination does not equal proven infection.

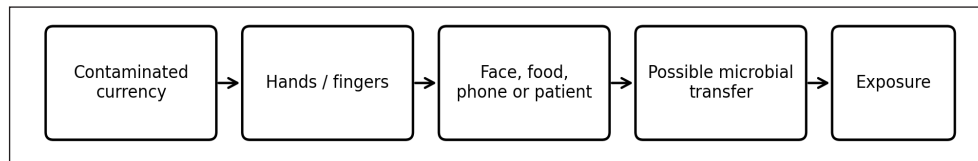


Figure 1. Possible pathway of cross-contamination during cash handling

Why Saliva Should Not Be Used While Counting Notes

Some people wet a fingertip with saliva to separate banknotes during counting. This habit may appear convenient, especially when notes are dry or tightly packed, but it is not hygienic. Human saliva normally contains many microorganisms. When a finger touches the tongue or lips and then touches a series of notes, microbes from the oral cavity may be transferred to the finger and then to the currency. The process can also occur in the opposite direction: microorganisms on notes may reach the finger and then the mouth.

Sabesan and Venkatesan (2024) specifically studied microorganisms obtained from saliva, hands, and currency notes. Their work is directly relevant to this behaviour because it highlights the close microbiological connection between these three sources. Other literature on contaminated currency has also identified saliva-assisted counting as an avoidable practice that may increase cross-contact.

From a nursing and health-education perspective, this message is easy to communicate: notes should be separated with dry fingers, a clean finger-moistening pad intended for office use, or a note-counting machine. Using saliva is unnecessary and introduces an additional route of contact between the mouth and a surface that has passed through many hands.

Hand Hygiene After Cash Handling

Handwashing with soap and water is one of the simplest methods for reducing microbial transfer. It is not necessary

to wash the hands after every single note is touched. Instead, hand hygiene should be performed at sensible moments, such as after prolonged cash handling, before eating or preparing food, before touching the face, after using the toilet, and before returning to patient care.

Ross et al. (2023) reported in a systematic review and meta-analysis that handwashing with soap reduced the risk of acute respiratory infections in low- and middle-income countries. Although this study was not specifically about money, it supports the wider public-health value of proper handwashing. In healthcare settings, hand hygiene is already a core infection-prevention practice, and cash handling should be considered one more activity that can temporarily contaminate the hands.

Alcohol-based hand rub can be useful when hands are not visibly dirty and washing facilities are not immediately available. However, soap and water remain important when hands are visibly soiled. The emphasis should be on correct timing and technique rather than excessive cleaning. Overuse of harsh cleaning products may damage the skin, which itself can affect comfort and compliance with hand hygiene.

Situations Where Extra Care Is Reasonable

Routine cash handling by healthy adults is unlikely to require special precautions beyond normal hygiene. However, some situations deserve greater attention because the consequences of cross-contamination may be more important. These settings are summarized in Table 2.

Table 2. Settings in which careful cash handling is especially useful

Setting	Why extra care is useful	Simple action
Hospitals and clinics	Patients may be vulnerable because of illness, wounds, age, or reduced immunity.	Perform hand hygiene after cash handling and before direct patient care.
Food service	The same hands may touch money and ready-to-eat food.	Separate duties where possible; clean hands before food contact.
Banks and cash counters	Workers may handle a high number of notes for long periods.	Avoid touching the face and clean hands at breaks and before meals.
Pharmacies	Cash handling may occur close to medicines and patient interaction.	Keep money away from medicine-preparation surfaces and clean hands when needed.
Homes with young children	Children often place objects or fingers in the mouth.	Keep notes and coins away from infants and toddlers.
Community outreach	Nurses may collect fees, distribute materials, and examine people in the same session.	Place hand hygiene between cash handling and clinical contact.

Relevance to Nursing Practice

Nurses work at the point where infection prevention, patient education, and everyday behaviour meet. They may not directly manage large amounts of cash, but they frequently teach patients and families about hand hygiene, food safety, wound care, respiratory hygiene, and prevention of communicable disease. Safe cash handling can be included naturally within these messages.

In outpatient departments, community clinics, vaccination camps, health fairs, and home visits, a nurse may move between administrative tasks and patient contact. If money is received or handled during these activities, hand hygiene before the next clinical contact is a simple precaution. In wards and treatment areas, cash should preferably remain away from medication preparation, dressings, procedure trays, and other clean clinical surfaces.

Nurses can also help correct two opposite misunderstandings. The first is that money is sterile or harmless simply because it looks clean. The second is that touching cash is extremely dangerous and will easily cause disease. Neither view is supported by the evidence. Currency can carry microorganisms, but contamination is not the same as infection. The most balanced message is that normal use of money is acceptable when combined with sensible hygiene.

This type of education is especially useful for food handlers, cashiers, older adults, carers of children, and patients with weakened immunity. Short messages such as “Do not use saliva to count notes” and “Clean your hands before eating or patient care” are easy to remember and can be included in nursing counselling.

Ten Practical Precautions for Safer Cash Handling

Figure 2 presents the main prevention framework. The same ideas are expanded below as ten simple precautions.

- Do not use saliva while counting notes. This removes an avoidable connection between the mouth, fingers, and currency. Dry fingers or a proper counting aid should be used instead.
- Clean hands after prolonged cash handling. People who handle many notes, such as cashiers and bank staff, should wash or sanitise their hands at appropriate intervals, particularly before meals.
- Always clean hands before eating or preparing food. This is one of the most important moments because fingers can transfer organisms directly to food or the mouth.
- Avoid touching the face while handling money. Touching the eyes, nose, lips, or mouth can create a route for microbial transfer from the hands.

- Keep currency away from food-preparation surfaces. Notes should not be placed on plates, chopping boards, food counters, or surfaces used for ready-to-eat food.
- Separate cash handling from direct food handling. Where possible, one worker should receive payment, and another should prepare food. If this is not possible, hand hygiene should occur between tasks.
- Store money in clean, dry places. Notes should not be kept in damp or visibly dirty locations because moisture and dirt may support microbial persistence.
- Use digital or contactless payment when practical. Digital payment can reduce physical exchange of notes in high-contact settings, although phones and payment terminals also require normal hygiene.
- Keep currency away from the mouths of young children. Notes and coins should not be used as toys because young children frequently place objects and fingers in their mouths.
- Use routine hygiene, not fear. There is no need to disinfect every note. The aim is to reduce unnecessary transfer through sensible hand hygiene and safe behaviour.

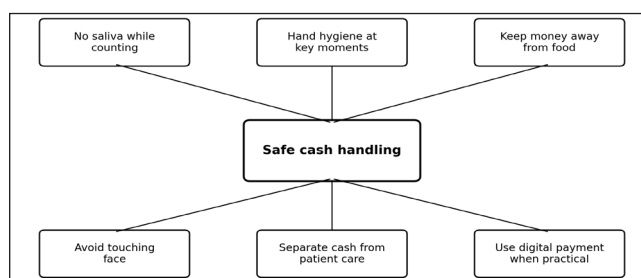


Figure 2. Practical prevention framework for healthcare and community settings

Interpreting the Evidence Carefully

An important limitation of the currency literature is that most studies measure contamination rather than actual infection in people. Researchers may culture bacteria from notes or detect microbial genetic material, but this does not show that a specific illness was caused by handling that note. Meister et al. (2023), in a narrative review of pathogen stability on banknotes and coins, noted that different pathogens can survive on currency, but available evidence does not show that money is uniquely important compared with other frequently touched surfaces.

Another limitation is that studies use different sampling methods, culture techniques, currencies, climates, and definitions of contamination. Results from one country or one type of banknote cannot always be directly applied to every other setting. Some studies also examine heavily circulated or visibly dirty notes, which may not represent all money in use.

Antimicrobial resistance findings should also be explained carefully. Detecting a resistant organism on a banknote is important from an environmental-health perspective, but it does not mean that the person touching the note will acquire a resistant infection. The finding mainly shows that resistant microorganisms can be present in everyday environments and reinforces the value of routine infection-prevention practices.

For these reasons, public-health messages should avoid exaggerated claims such as “money spreads disease” or “cash is dangerous”. A more accurate statement is that currency can become contaminated and can participate in cross-contamination, especially when hand hygiene is poor. This wording is scientifically more responsible and is suitable for nursing education.

Public Health and Health-Education Implications

Simple behaviour-change messages can reduce avoidable contact without causing anxiety. Posters in banks, pharmacies, clinics, food stalls, and cash counters can remind people not to wet their fingers with saliva. Nursing students and community health nurses can include currency hygiene in demonstrations on handwashing and food safety.

Educational material should also emphasise that hygiene measures are most useful at key moments. Handwashing before eating, before food preparation, after toilet use, after visibly dirty work, and before direct patient care provides greater practical value than repeated handwashing after every small cash transaction. This approach is easier to follow and avoids creating unnecessary fear.

Digital payment may reduce physical exchange of cash, but it should not be presented as a complete infection-control solution. Mobile phones, touch screens, payment terminals, pens, counters, and door handles are also frequently touched surfaces. Therefore, the broader lesson is about hand hygiene and safe behaviour rather than about eliminating one particular object.

Future Directions and Recommendations

Future research should move beyond reporting the presence of microorganisms on currency notes and determine whether routine cash handling contributes meaningfully to human infection. Well-designed studies should measure the viability and quantity of microorganisms transferred from different banknote materials to fingers, food, and frequently touched surfaces under realistic conditions. Standardised sampling, culture, and molecular methods would improve comparisons across countries, denominations, circulation periods, and environmental conditions. Where feasible, prospective observational studies could examine exposure patterns and health outcomes while accounting for other sources of microbial contact. Such studies are necessary

to distinguish possible contamination pathways from demonstrated disease transmission.

Further investigation is also needed into antimicrobial-resistant organisms identified on circulating notes. Research should assess their survival and transfer potential without assuming that detection on currency necessarily leads to resistant infections. Comparative studies of paper and polymer notes, as well as older and newer notes, may help identify conditions associated with greater microbial persistence. Practical intervention studies should test whether targeted hand-hygiene education, avoidance of saliva-assisted counting, separation of cash and food-handling tasks, and appropriate use of contactless payments measurably reduce cross-contamination. These interventions should be evaluated for feasibility, cost, and acceptability in healthcare facilities, food-service settings, banks, and community environments.

Based on the evidence reviewed, healthcare institutions and public-health educators should promote clear, proportionate recommendations rather than discourage normal cash use. Staff should perform hand hygiene before patient contact or food preparation, keep notes away from clean clinical and food-contact surfaces, and avoid wetting fingers with saliva when counting currency. Nurses can incorporate these messages into routine patient counselling, community awareness programmes, and infection-prevention training. Banks, shops, and food vendors should make appropriate hand-cleaning facilities or counting aids accessible where practical. Public guidance should also emphasise that mobile phones and payment terminals are shared touch surfaces, so digital payment does not replace general hygiene. Future policies should be guided by evidence of actual transmission risk and the demonstrated effectiveness of preventive measures, not by microbial detection alone.

Conclusion

Currency notes can carry bacteria and other microorganisms because they circulate through many people and environments. Evidence from microbiological studies and recent reviews supports the view that banknotes can act as potential fomites. At the same time, microbial detection on a note does not prove that routine cash handling directly causes infection.

The practice of wetting fingers with saliva while counting notes is unnecessary and may increase opportunities for cross-contamination between the mouth, hands, and currency. People who handle cash should follow simple precautions: avoid saliva, keep money away from food and clean clinical surfaces, avoid touching the face, and clean the hands at appropriate times.

For nurses, the topic is useful because it connects everyday behaviour with infection prevention and health education. A balanced message is most appropriate: money need not be feared, but it should be handled hygienically. Short, practical advice can help patients, families, food handlers, cashiers, and healthcare workers reduce avoidable microbial transfer in daily life.

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