# Guidelines for the control of shigellosis, including epidemics due to *Shigella dysenteriae* type 1

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# Introduction

Shigellosis is an acute invasive enteric infection caused by bacteria belonging to the genus *Shigella*; it is clinically manifested by diarrhoea that is frequently bloody. Shigellosis is endemic in many developing countries and also occurs in epidemics causing considerable morbidity and mortality. Among the four species of *Shigella*, *Shigella dysenteriae* type 1 (Sd1) is especially important because it causes the most severe disease and may occur in large regional epidemics. Major obstacles to the control of shigellosis include the ease with which *Shigella* spreads from person to person and the rapidity with which it develops antimicrobial resistance.

These guidelines are intended to assist national health authorities, public health officers and health-care providers, including members of international agencies and nongovernmental organizations (NGO), in their efforts to control both endemic and epidemic shigellosis. The text describes the epidemiology, clinical features and management of the disease, and measures to prepare for and control epidemics caused by Sd1.

The following definitions apply to terms used in this document:

- **Bloody diarrhoea**. This is a clinical diagnosis that refers to any diarrhoeal episode in which the loose or watery stools contain visible red blood. This does not include episodes in which blood is present in streaks on the surface of formed stool, is detected only by microscopic examination or biochemical tests, or in which stools are black owing to the presence of digested blood (melena). Although bloody diarrhoea has numerous causes, this simple definition is widely used in community-based surveillance for shigellosis.
- **Dysentery**. This has the same meaning as bloody diarrhoea. Although clinical texts often use this term to describe the syndrome of bloody diarrhoea with fever, abdominal cramps, rectal pain and mucoid stools, these feature do not always accompany bloody diarrhoea, nor do they necessarily define its aetiology or determine appropriate treatment.
- **Bacillary dysentery.** This is dysentery caused by *Shigella*. The term is often used to distinguish shigellosis from amoebic dysentery, caused by *Entamoeba histolytic*a.
- **Invasive diarrhoea.** This refers to diarrhoea caused by bacterial pathogens, including *Shigella*, and some *Salmonella, E. coli* and *Campylobacter jejuni*, that invade the bowel mucosa, causing inflammation and tissue damage. When visible blood is present, the episode may also be termed dysentery or bloody diarrhoea.

# Epidemiology

## The organism

*Shigella* are Gram-negative, non-motile bacilli belonging to the family *Enterobacteriacae*. The genus *Shigella* includes four species: *S. dysenteriae, S. flexneri, S. boydii* and *S. sonnei*, also designated groups A, B, C and D, respectively. The first three species include multiple serotypes. S. *sonnei* and *S. boydii* usually cause relatively mild illness in which diarrhoea may be watery or bloody. *S. flexneri* is the chief cause of endemic shigellosis in developing countries. Immunity is serotype-specific.

Sd1, also known as the Shiga bacillus, differs from other *Shigella* in four important ways:

- it produces a potent cytotoxin (Shiga toxin);
- it causes illness that is more severe, more prolonged, and more frequently fatal than is illness caused by other *Shigella*;
- resistance to antimicrobials occurs more frequently than among other *Shigella*; and
- it causes large, often regional, epidemics, frequently with high attack rates and high case fatality rates.

**TABLE 1.** Species and serogroups of *Shigella*

| Species | Serogroup | Serotypes |
|---|---|---|
| *S. dysenteriae* | A | 1 - 15 |
| *S. flexneri* | B | 1 - 6 (with 15 subtypes) |
| *S. boydii* | C | 1 - 18 |
| *S. sonnei* | D | 1 |

All species of *Shigella* cause acute bloody diarrhoea by invading and causing patchy destruction of the colonic epithelium. This leads to the formation of micro-ulcers and inflammatory exudates, and causes inflammatory cells (polymorphonuclear leucocytes, PMNs) and blood to appear in the stool. The diarrhoeal stool contains $10^6$-$10^8$ *Shigellae* per gram. Once excreted, the organism is very sensitive to environmental conditions and dies rapidly, especially when dried or exposed to direct