a minimal effect on *E. coli* O157:H7. For these reasons, it will be important for the long term that testing be pathogenspecific: i.e., establishments should look for what is known to be important in a particular product line, and target interventions and monitoring to that particular pathogenic microorganism. As a part of implementing HACCP, processors will need to determine what pathogens are a major risk for their product, and design interventions and monitoring accordingly.

Even under HACCP, it will not be practical or necessary to test all products for all pathogens. Nonetheless, there are certain pathogens, such as Salmonella, which are present on virtually all raw food products. Salmonella is the leading cause of bacterial foodborne illness in this country, and causes the greatest economic burden. As such, it is likely that virtually any HACCP based testing program for pathogens on raw product would identify Salmonella during the hazard analysis as an organism of primary concern. Based on these considerations, FSIS is proposing reduction in the incidence of product contamination with Salmonella as an interim target for pathogen reduction.

FSIS recognizes that reductions in incidence of Salmonella contamination does not guarantee equal reduction in other pathogens. Nonetheless, insofar as interventions designed to decrease the incidence of contamination with Salmonella reduce overall levels of fecal and ingesta contamination, which is the largest single avenue for contamination of meat and poultry by pathogenic microorganisms, those interventions should have a beneficial effect on other human pathogens of animal intestinal origin. The Agency recognizes that there are other foodborne human pathogens of public health concern that can be isolated from raw meat and poultry product. The Agency would welcome comments on the targeting of other pathogens in addition to or in lieu of Salmonella.

The following sections discuss the major elements of the proposed interim targets for pathogen reduction and requirements for microbial testing.

## 4. Use of Salmonella as a Target Pathogen

FSIS proposes to require that each establishment that conducts slaughter operations or produces raw, ground meat or poultry products sample and test representative product daily for the presence of *Salmonella*.

Due to logistical problems involved with attempting to test for all possible pathogens, the Agency is proposing the use of Salmonella at this stage as a target organism. Salmonella was selected for this purpose because: (1) intervention strategies aimed at reducing Salmonella can be expected to have comparable effects against most other human enteric foodborne pathogens, (2) current methodologies are available to recover Salmonella from a variety of products, (3) FSIS baseline data suggest that Salmonella colonizes a variety of animals and birds often enough for changes to be detected and monitored, and (4) Salmonella is the most common cause of foodborne illness.

## 5. The Identification of National Baseline Levels as Reference Points for Pathogen Reduction

FSIS proposes that all establishments that conduct slaughter operations or produce raw ground meat or poultry products produce such products such that the frequency of occurrence of *Salmonella* is at or below the current national baseline average. These proposed baseline levels tentatively identified by FSIS are provided in the chart below, showing the frequency of occurrence in terms of the percent of tests expected to be positive for *Salmonella*:

Commodity	Frequency of occur- rence of Salmonella (% +)
Steers/Heifers Broilers Raw Ground Beef Fresh Pork Sausages Cows/Bulls Hogs Turkeys Ground Poultry	1 25 4 12 1 18 15

To the extent possible, FSIS has used data from its Nationwide Microbiological Baseline Data Collection Program as the basis for the proposed baselines assigned to these raw commodities. This program provides data on the prevalence of major pathogens and indicator microorganisms associated with meat and poultry. The data generated from these programs provide a comprehensive microbiological profile of the raw commodities studied. The baseline studies on steers and heifers and ground beef are completed. Studies on cows and bulls, market hogs, and ground turkey and broilers are in progress, while studies are planned for ground chicken and turkeys.

The pathogen reduction baselines for those commodities where FSIS baseline studies have not been completed are estimates based on the best data currently available to the Agency. FSIS recognizes that the data available for some species are limited. The Agency believes, however, that this rulemaking will generate additional data that will help refine the baselines tentatively identified here.

The following is a summary of how the baselines were determined for each of the raw products of concern.

The baseline established for Salmonella frequency of occurrence on steer and heifer carcasses is based on the FSIS Nationwide Microbiological Baseline Data Collection study conducted from 1992 to 1993. In this program, 2,089 samples were analyzed for Salmonella, as well as other microorganisms, and 1 percent of the samples were found to contain Salmonella.

Raw ground beef from federallyinspected establishments was tested by FSIS. Out of 563 samples taken in this baseline study, 4 percent were positive for *Salmonella*.

FSIS has also conducted several, more limited studies which help provide an estimate of the frequency of occurrence of *Salmonella* in regulated commodities, such as broilers, where baseline studies are underway or planned. The data for *Salmonella* on broilers is from a FSIS nationwide study conducted from 1990 to 1992. This survey found *Salmonella* in 25 percent of the 1,874 birds sampled.

A 1979 FSIS study of retail-size, fresh pork sausages showed *Salmonella* in 12 percent of the 603 samples tested. The 12 percent frequency of occurrence for *Salmonella* as a baseline in fresh sausages was derived from this study.

The 1 percent frequency of occurrence of *Salmonella* on cow and bull carcasses is an estimate based on the completed baseline study on steers and heifers. The baseline study for cows and bulls is in progress.

As noted above, FSIS has not completed nationwide surveys for hogs, turkeys, or ground poultry, but such studies are in progress or scheduled for 1995. There have been no studies conducted for Salmonella in ground poultry, so revelant data was not available to establish a baseline. Few studies have been conducted for Salmonella on hog carcasses. An industry group's recent review of the literature reported several studies of Salmonella on pork carcasses conducted between 1961 and 1973. The studies reported wide ranges in the incidence of Salmonella, from 49 percent to 56 percent, due in large part to the variety of sampling procedures used. FSIS believes that in the absence of more