

# Investigation on the current status of autoclave steam sterilization procedure in the hospital CSSDs in China

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## Abstract

**Aim:** The purpose of the investigation is to understand the current status of the autoclave steam sterilization procedures in the central sterile supply departments (CSSDs) of hospital and to provide scientific basis for implementing standardized management as well as ensuring the effectiveness and quality of disinfection in Chinese healthcare facilities.

**Method:** We have surveyed the CSSDs in 726 hospitals with Grade B or above in 28 provinces by the questionnaire of the current status of autoclave steam sterilization procedures designed by the CSSD Professional Committee of the Chinese Nursing Association.

**Result:** The investigation among CSSDs in 726 hospitals has revealed that, (1) 71.63% of the surveyed CSSDs prolonging the exposure time in daily sterilization procedures, (2) 83.61% of the surveyed CSSDs following the manufacturers' recommended procedure parameters for cleaning, packaging, sterilization methods and sterilization cycles when handling loaner instruments, implants, power tools and precision instruments, and (3) for the over-size, over-weight and inseparable packages, 77.41% of the surveyed CSSDs extending the sterilization exposure time and drying time: in this part, mostly (38.29%) using 134°C and 10-12 min as sterilization cycle parameters, and mostly (35.61%) prolonging drying time to 10 min. Furthermore, 68.04% of the surveyed CSSDs who did not receive the sterilization instructions for instruments from manufacturers: in this part, 50.46% of the CSSDs chose to use the conventional cycle parameters, while 40.37% of the CSSDs extended exposure time of the sterilization cycles based on the individual experience. In addition, 25.76% of the surveyed CSSDs could not apply the sterilization methods and parameters indicated by manufacturers' instructions for the special equipment because of equipment limitations.

**Conclusion:** There are some problems in the sterilization process of loaner instruments in hospitals, which need to be further strengthened and standardized. As more and more medical instruments requiring extended sterilization procedures, CSSD should strengthen requiring medical device manufacturers provide sterilization methods and sterilization cycle parameters. CSSD should process medical instruments strictly in accordance with the sterilization methods and parameters provided by manufacturers. For specific sterilization procedures, appropriate indicators should be used to monitor the sterilization effectiveness and quality.

## Result

**Table 1 Distribution situation of number of beds, average outpatient monthly and average operation monthly**

No. of beds	No. of hospitals(%)	Average outpatient monthly	No. of hospitals(%)	Average operation monthly	No. of hospitals(%)
500-1000	454 (62.53)	<20000	319 (43.94)	<1000	480 (66.12)
1000-1500	133 (18.32)	20000-60000	270 (37.19)	1000-2000	140 (19.28)
1500-2000	68 (9.37)	60000-100000	137 (18.87)	2000-4000	83 (11.43)
>2000	71 (9.78)	>100000	81 (11.16)	>4000	23 (3.17)

**Table 2 Distribution situation of sterilized items in CSSD monthly**

Package type	No. of hospitals package<5,000(%)	No. of hospitals package between 5,000 and 10,000(%)	No. of hospitals package between 10,000 and 50,000(%)	No. of hospitals package>50,000(%)	Total No. of hospitals(%)
Clinical diagnosis & treatment	311 (42.84)	172 (23.69)	157 (21.63)	86 (11.84)	726 (100.00)
Surgical dressing	486 (66.94)	143 (19.70)	75 (10.33)	16 (2.20)	720 (99.17)
Surgical instrument	467 (64.33)	161 (22.18)	58 (7.99)	19 (2.62)	705 (97.11)

**Table 3 Distribution situation of sterilized loaner sets and implants in CSSD monthly**

Package type	No. of hospitals package<10(%)	No. of hospitals package between 10 and 50(%)	No. of hospitals package between 50 and 100(%)	No. of hospitals package>100(%)	Total No. of hospitals(%)
Loaner sets	226 (31.13)	218 (30.03)	128 (17.63)	146 (20.11)	718 (98.90)
Implants	230 (31.68)	238 (32.78)	125 (17.22)	103 (14.19)	696 (95.87)

**Table 4 The proportion of reprocessing loaner sets in total sterilized instruments**

Proportion	<10%	10%-30%	30%-50%	>50%	Total(%)
No. of hospitals(%)	530 (73.00)	181 (24.93)	13 (1.79)	2 (0.28)	726 (100.00)

**Table 5 Parameter setting of moist heat sterilization process**

Parameter type	134°C	134°C	134°C	134°C	134°C	134°C
	3-4min	5-6min	7-9min	10-12min	13-17min	≥18min
Proportion(%)	30.99	19.97	31.82	38.57	3.72	8.40

**Table 6 Parameter setting for sterilizing oversized and/or overweight sets**

Parameter type	134°C	134°C	134°C	134°C	134°C	134°C	none
	3-4min	5-6min	7-9min	10-12min	13-17min	≥18min	
Proportion(%)	14.05	10.74	23.14	38.29	3.86	7.71	2.20

**Table 7 The current status of CSSD staff's knowledge**

Viewpoint	Proportion of approval (%)
A. The level of surgery is constantly improving, and minimally invasive surgery is constantly developing and increasing.	83.61
B. The medical instruments are more and more complex and sophisticated, and they are getting more and more functions.	94.35
C. It is increasing that instruments need to extend moist heat sterilization process or use low temperature sterilization method.	79.61
D. It is decreasing that instruments need to extend sterilization time.	8.95
E. There is rare training on sterilization methods and sterilization cycle parameters for special instrument, and there is a little related research literature in China.	85.12
F. CSSD should strengthen the training of related sterilization knowledge to conform to the development trend of medical instruments.	95.18
G. The management specification should strengthen the requirement that medical device manufacturers should provide sterilization methods and sterilization cycle parameters.	93.11
H. The sterilization process is not in accordance with the manufacturer's instructions, and all instruments only use the conventional sterilization cycle.	20.66



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