FDA Executive Summary

Prepared for the October 26 & 27, 2022 Meeting of the General and Plastic Surgery Devices Panel of the Medical Devices Advisory Committee

Classification of Mammary Sizer

Product Code: MRD

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1. Introduction

Per Section 513(b) of the Food, Drug, and Cosmetic Act (the Act), the Food and Drug Administration (FDA) is convening the General and Plastic Surgery Devices Advisory Panel (the Panel) for the purpose of obtaining recommendations regarding the classification of mammary sizers, a pre-amendments device type which remains unclassified. Specifically, the FDA will ask the Panel to provide recommendations regarding the regulatory classification of mammary sizers under product code "MRD." The device names and associated product codes are developed by the Center for Devices and Radiological Health (CDRH) in order to identify the generic category of a device for FDA. While most of these product codes are associated with a device classification regulation, some product codes, including "MRD," remain unclassified.

FDA is holding this panel meeting to obtain input on the risks to health and benefits of the mammary sizers under product code "MRD." The Panel will discuss whether mammary sizers under product code "MRD" should be classified into Class II (subject to General and Special Controls). If the Panel believes that classification into Class II is appropriate for the mammary sizers under product code "MRD," the Panel will also be asked to discuss appropriate controls that would be necessary to mitigate the risks to health.

1.1 Current Regulatory Pathways

Mammary sizers are a pre-amendments, unclassified device type. This means that this device type was marketed prior to the Medical Device Amendments of 1976, but was not classified by the original classification panels. Currently these devices are being regulated through the 510(k) pathway, and are cleared for marketing if their intended use and technological characteristics are "substantially equivalent" to a legally marketed predicate device. Since these devices are unclassified, there is no regulation associated with the product code.

1.2 Device Description

Mammary sizers (also known as breast implant sizers) are designed for temporary intraoperative placement in the breast pocket to assist in determining the desired breast implant shape and size for the patient prior to implantation of a breast implant during breast augmentation or breast reconstruction procedures. Mammary sizers are generally constructed with an elastomeric outer shell (e.g., silicone, polyurethane) and can be filled with either silicone gel or saline. The filling material can be pigmented to help differentiate mammary sizers from breast implants. Mammary sizers are available in a range of diameters, projections and volumes to match the range of breast implants they intend to approximate. Some mammary sizers are intended for single use, while others may be re-sterilized and re-used. All mammary sizers are meant for temporary use during the surgery; they are not intended to remain implanted in the body.

2. Regulatory History

FDA first cleared the CUI Mammary Prosthesis Sizer (K831566) under product code "MRD" on August 12, 1983. This product was found substantially equivalent to the pre-amendments device, Silastic Mammary Sizer, manufactured by Dow Corning Wright.

To date, FDA has cleared 11 510(k)s under the MRD product code.

Please refer to Table 1 for a listing of the manufacturers, device names, and associated 510(k) submission numbers for cleared mammary sizers under product code "MRD."

Table 1: 510(k) clearances for mammary sizers under product code "MRD"

510(k) Number	Trade Name	Sponsor
K831566	CUI MAMMARY PROTHESIS SIZER	COX-UPHUFF INTL.
K961356	MAMMARY SIZER	GENERAL SURGICAL INNOVATIONS
K982258	MAMMARY SIZER	SPECIALTY SURGICAL PRODUCTS INC.
K984106	MAMMARY SIZER MAMMARY PROTHESIS SIZER	SPECIALTY SURGICAL PRODUCTS INC.
K010709	MENTOR STERILE SALINE MAMMARY VOLUME SIZERS	MENTOR CORP.
K062421	MENTOR RESTERILIZABLE GEL BREAST IMPLANT SIZER	MENTOR CORPORATION
K131853	MENTOR MEMORYSHAPE RESTERILIZABLE GEL SIZER	MENTOR WORLDWIDE LLC
K151055	Mentor MemoryShape Resterilizable Gel Breast Implant Sizer STERILE	MENTOR WORLDWIDE LLC
K183163	Intraoperative Single-Use Sterile Silicone Breast Sizer Motiva Implant Matrix	Motiva USA LLC
K200706	Sientra OPUS Silicone Gel Breast Implant Sizer	Sientra Inc
K203229	NATRELLE INSPIRA Single Use Sizers for Gel Implants	Allergan

3. Indications for Use

The Indications For Use (IFU) statement identifies the disease or condition the device will diagnose, treat, prevent, cure or mitigate, including a description of the patient population for which the device is intended.

The mammary sizers under the product code "MRD" have been cleared for the following indications for use:

- For temporary placement during breast augmentation or reconstruction procedures to assist the surgeon in determining the appropriate size of the long-term breast implant
- For temporary insertion intraoperatively to evaluate the size and shape of the breast implant
- To evaluate the appropriate mammary prosthesis volume for each patient prior to implantation of mammary prosthesis

4. Clinical Background

4.1 Disease Characteristics

The mammary sizer may be used in patients who are undergoing breast augmentation or reconstruction surgery. It is used to evaluate the appropriate mammary prostheses (i.e., breast implants) volume intraoperatively, before the prostheses are placed.

4.2 Patient Outcomes

The device is a tool used to aid in surgical decision making only during surgery.

4.3 Currently Available Treatment

The currently available alternative is to conduct the breast augmentation or reconstruction surgery without the use of a mammary sizer with the surgeon determining the breast implant size using their clinical judgement.

4.4 Risks

FDA has identified the following risks to health associated with mammary sizers:

Table 2: Risks to Health and Descriptions/Examples for Mammary Sizers

Identified Risk	Description/Examples
Adverse tissue reaction	Device material(s) may elicit adverse tissue reactions, such as allergic reaction, toxicity, and foreign body response.
Infection	Inadequate device sterilization or packaging integrity may lead to infection, leading to additional surgical procedures.
Device malfunction leading to increased operative time	Device malfunction may result in rupture, gel bleed, and gel migration leading to increased

Identified Risk	Description/Examples
	operative time and additional risks, such as increased anesthesia.
Use error/Improper device use	This can result from the device accidentally remaining implanted and not exchanged for a breast implant.

The Panel will be asked whether this list is a complete and accurate list of the risks to health presented by mammary sizers under product code "MRD" and whether any other risks should be included in the overall risk assessment of the device type.

5. Literature Review

5.1 Methods

A systematic literature review was conducted in an effort to gather any published information regarding the safety and effectiveness of mammary (breast implant) sizers under product code "MRD."

Online literature searches were performed in two electronic databases (PubMed and EMBASE/MEDLINE). The literature search was performed using variations of the term, breast implant sizer. The search was limited to human clinical studies published in the English language, with publication dates between April 1, 2012 and April 1, 2022. Database filters were used to exclude laboratory studies, animal studies, economic and cost-effectiveness analyses, non-clinical trials (narrative reviews, conference abstracts, editorials, etc.), case series/single-arm studies (≥10 patients), and case reports (≤9 patients). More details on the search strategy for each database and yield is given in Appendix A.

5.2 Results

In total, 994 unique records were identified for screening at the title/abstract level. After excluding 972 records for not being related to breast implant sizers based on a review of the title and abstracts, there were 22 full-text articles assessed for eligibility and full text screened. Of these, 10 were unrelated to breast implant sizers, seven were not clinical studies, one did not report any outcomes of interest, and one did not address any question of interest. Thus, three records[1,2,3] were relevant and included in this literature review. The total number of articles and

[1] Kim JH, Kim JH, Lee A, Moon SH, Jun YJ, Oh DY. Comparison of the Incidence of Capsular Formation in Two-Stage, Implant-Based Breast Reconstruction Using an Insertion Funnel and Sizer. Biomed Res Int. 2021;2021:3898585. doi:10.1155/2021/3898585

[2] Wang CY, Wang CH, Tzeng YS, et al. Intraoperative Assessment of the Relationship Between Nipple Circulation and Incision Site in Nipple-Sparing Mastectomy With Implant Breast Reconstruction Using the SPY Imaging System. Ann Plast Surg. Feb 2018;80(2S Suppl 1):S59-s65. doi:10.1097/sap.0000000000001296

[3] Khoo LS, Radwanski HN, Senna-Fernandes V, Antônio NN, Fellet LLF, Pitanguy I. Does the Use of Intraoperative Breast Sizers Increase Complication Rates in Primary Breast Augmentation? A Retrospective Analysis of 416 Consecutive Cases in a Single Institution Plast Surg Int. 2016;2016:6584810. doi: 10.1155/2016/6584810.

exclusion criteria is also summarized in the flow diagram in Appendix B.

All three literature articles included studies conducted outside of the US (i.e., South Korea, Taiwan, and Brazil) and that used a retrospective study design. The included studies enrolled between 17 and 4166 patients. Length of follow up ranged from 1 month to 14 months. Patients in the three studies ranged in age from 37 years of age to 55 years, and 100% were female. The included reports evaluated the safety of breast implant sizers and evaluated surgical techniques that may be used in the surgical procedures. The reports evaluated the safety of a "no touch technique" using a mammary sizer to breast implantation versus a conventional technique; the use of mammary sizers in nipple sparing mastectomies and reconstruction; and mammary sizers in routine use compared to no use.

Kim et. al.[1] compared a "no-touch technique" for breast reconstruction (Group A) to a conventional reconstruction technique (Group B) in an attempt to reduce capsule formation. As both groups used a breast implant sizer, the study compared complications between different techniques used to insert a permanent breast implant. A total of 33 breasts (in 31 patients) were included in this study. Group A was composed of 18 breasts and Group B comprised of 15 breasts. The "no-touch technique" (Group A) involved creation of an implant pocket using an implant sizer and implant insertion through a funnel. Group B patients were treated using the conventional technique to insert the permanent implant. Given that there were different surgeons conducting the procedure, there may have been surgical technique variability in the procedures. Capsular thickness around implants in the chest wall, acellular dermal matrix (ADM), and pectoralis muscle were used as a measure of success. The capsular thicknesses around the ADM ($p=0.048$), the chest wall ($p=0.029$) and the muscle of Group A ($p=0.020$) were significantly thinner than those of Group B. In this small, retrospective study, the "no-touch technique" produced significantly fewer peri-implant capsules.

Wang et. al.[2] examined the relationship between nipple areolar complex circulation and incision method for nipple-sparing mastectomy (NSM) with immediate breast implant reconstruction. The authors used breast implant sizers intraoperatively to assess how the size of the breast implant sizer might impact perfusion. The timing of the perfusion study was with the presence of an implant sizer in suitable volume, compared with the contralateral breast, which was not operated on during the procedure. There were 17 patients in the study, including nine who received an infra-areolar incision and eight who received a supra-areolar incision. Nipple-areolar complex perfusion was evaluated using an imaging system after NSM and gel implant breast reconstruction. The results showed that most ingress (arterial inflow) and egress (venous outflow) rates in the infra-areolar incision group were better than those in the supra-areolar incision group. The authors found that they needed to use a smaller permanent implant than that indicated by the implant sizers in 7/17 cases in order to prevent possible ischemia. Despite using a smaller permanent implant than indicated by the breast implant

sizer, one patient still went on to develop epidermolysis of the nipple postoperatively. Some limiting factors in this study are that concomitant surgeries were not reported, and it was not confirmed that all procedures were done in the same institution.

Khoo et. al.[3] reported complications encountered during routine use of intraoperative breast implant sizers in 416 retrospective consecutive cases of primary breast augmentation. The study compared the outcome of cases that employed the use of implant sizers versus those that did not in terms of infection, hematoma/seroma formation, and capsular contracture. There were 212 cases carried out with the use of breast implant sizers and 204 cases without the use of breast implant sizers at a single institution. Of 416 primary breast augmentation cases, there were five cases of infection (1.2%), four cases of seroma (1%), three cases of hematoma (0.7%), and seven cases of capsular contracture (Baker's Grade III/IV) (1.7%). Paired t-test of complication rates in patients who used implant sizers was 4.3% versus no implant sizers that had a rate of 2.3%. The rates demonstrated that the use of mammary sizers was associated with an increase in complications in the study. However, the study limitations (e.g., different surgical technique) complicate conclusions on a definitive adverse event rate associated with the mammary sizer. The study also reported that biofilm accumulation on breast implant sizers due to repeated use could contribute to contamination and infection risks; this may be another confounding factor related to infection risk. Khoo et al. reported no cases of permanent breast implant rupture in their study.

5.3 Adverse Events Associated with Mammary Sizers

None of the three studies summarized above reported on deflation/rupture, mammary sizer left implanted in body, or retention of foreign body, which are the type of adverse events that may be reported for mammary sizers.

In the Khoo et al. study[3], the mammary sizer use was associated with a higher total complication rate of infection, seroma, hematoma, and capsular contracture when the permanent breast implant was placed, compared to no mammary sizer. The complication rate for the mammary sizer group was 4.3% and the complication rate of the non-sizer group was 2.3%. The Kim et al.[1] and Wang et al.[2] articles did not report any adverse events associated with the mammary sizer use.

5.4 Effectiveness Associated with Mammary Sizers

Mammary sizers are intended to be used intraoperatively to assist the surgeon in determining the size of the permanent breast implant to use. In the three articles summarized above, breast implant sizers were used intraoperatively, however, the articles did not describe the overall effectiveness of the mammary sizer.

5.5 Overall Literature Review Conclusions

The three publications evaluated the safety of a "no touch technique" using a sizer to breast implantation versus a conventional technique (Kim et al.[1]); the use of mammary sizers in nipple sparing mastectomies and reconstruction (Wang et al.[2]); and breast implant sizers in routine use compared to no use (Khoo et al.[3]).

In the Kim et al. study[1], the no-touch technique using mammary sizers produced statistically fewer peri-implant capsules and thinner capsule thickness than conventional surgery. However, there may be surgical technique variability because not all procedures were performed by a single surgeon. In the Wang et al. study[2], the sizers used during surgery were sometimes larger than the implanted breast implant in order to prevent ischemia. However, while all patients underwent the same nipple-sparing mastectomy, concomitant surgeries were not reported, and it was not confirmed that all procedures were done in the same institution. In the Khoo et al. study[3], mammary sizer use was associated with a higher total complication rate of infection, seroma, hematoma, and capsular contracture compared to no sizers. However, it is difficult to directly associate the complications to the mammary sizers due to numerous limitations (e.g., different surgical technique, possible biofilm accumulation, and possible linkage to breast implants).

Only one of the three included studies assessed if mammary sizers used during surgery adequately reflected the actual size of the breast implant implanted. In the Wang article[2], for 7/17 surgeries, the permanent breast implant was smaller than the mammary sizer. The other two studies instead reported on the effect of sizers and implants on the surrounding breast tissue.

Overall, the systematic literature review returned three articles. The quality of evidence for the systematic literature review is low since only three studies met the search criteria, the retrospective nature of the reported studies, all studies were conducted outside the US, two of the three studies have a low sample size, and all three studies evaluated different outcomes associated with mammary sizer use.

6. Risks to Health Identified through Medical Device Reports (MDRs)

6.1 Overview of the MDR System

The MDR system provides FDA with information on medical device performance from patients, health care professionals, consumers and mandatory reporters (manufacturers, importers and device user facilities). The FDA receives MDRs of suspected device-associated deaths, serious injuries, and certain malfunctions. The FDA uses MDRs to monitor device performance, detect potential device-related safety issues, and contribute to benefit-risk assessments of these products. MDRs can be used effectively to:

- Establish a qualitative snapshot of adverse events for a specific device or device type
- Detect actual or potential device problems used in a "real world" setting/environment

Although MDRs are a valuable source of information, this passive surveillance system has limitations, including the submission of incomplete, inaccurate, untimely, unverified, duplicated or biased data. In addition, the incidence or prevalence of an event cannot be determined from this reporting system alone due to potential under-reporting of events and lack of information about the frequency of device use. Finally, the existence of an adverse event report does not definitely establish a causal link between the device and the reported event. Because of these limitations, MDRs comprise only one of the FDA's tools for assessing device performance. As such, MDR numbers and data should be taken in the context of the other available scientific information.

6.2 MDR Data: Mammary Sizers

Individual MDRs for mammary sizers are reported through FDA's Manufacturer and User Facility Device Experience (MAUDE) Database, which houses mandatory reports from medical device manufacturers, importers and user facilities, as well as voluntary reports from entities such as health care professionals, patients and consumers.

A search of the MDRs was performed to identify adverse events related to the use of mammary sizers (product code MRD) through April 1, 2022, with no date restriction. The search resulted in the identification of 107 unique MDRs for inclusion in this analysis. The 107 MDRs included 55 malfunctions and 52 serious injuries. Note that the individual submitting the MDR chooses the event type (i.e., serious injury or malfunction) of the MDR.

Of the 107 MDRs, 52 were reported as serious injuries. The narratives for the serious injury MDRs can provide additional information on the events that occurred. The narratives of the serious injuries reported were reviewed and the serious injuries identified are summarized in Table 3 below.

Table 3: Summary of Serious Injury Reports for Mammary Sizers

Serious Injury	MDRs
Ruptured	19
Failed to remove sizer and exchange for breast implant	18
Foreign body on sizer	2
Systemic symptoms/Breast Implant Illness (BII) symptoms	2[a]
Capsular contracture	2[b]
Use of expired sizers	2
User error, damaged during use	2

Premature failure of the device	1
Defective device	1
No information available	1
Allergic reaction	1[c]
Burn to patient	1[d]

[a] One report identifies breast implant placed after mammary sizer use and one report does not provide any information
[b] Not enough information to determine if report is about mammary sizer left implanted or due to subsequent implant, such as breast implant
[c] Immediate reaction upon placing implant sizer, no further information provided
[d] Physician squeezed the sizer causing it to rupture and the "hot" gel inside to be pushed to the surface and burned the patient.

Of the 19 MDRs reporting rupture:

- 17 MDRs reported the rupture occurred while the device was inside the patient, in some cases necessitating manual silicone gel removal.
- 2 MDRs reported that the device did not come in contact with the patient.

Mammary sizers may be available as single-use or re-sterilizable. It is not clear if the risk of rupture is the same for single-use mammary sizes or mammary sizers that have been re-sterilized. Of the 19 MDRs reporting rupture:

- 12 MDRs reported that the breast implant sizer is a style that can be re-sterilizable.
- 4 MDRs do not provide information regarding re-sterilization.
- 3 MDRs are not re-sterilizable.

Of the 18 MDRs that report the surgeon failed to remove the sizer and exchange it for a breast implant, 10 have both the implant and explant date. The shortest time to explant was one day and the longest is 4 years. It is unknown and unreported why the sizer was left in the patient.

There were 55 MDRs for malfunctions; the narratives for the malfunction MDRs can provide additional information on the events that occurred. The narratives of the malfunctions reported were reviewed and the malfunctions identified are summarized in Table 4 below. As the individual submitting the MDR chooses the event type, there may be similar adverse events identified under the serious injury table (Table 3) above and the malfunctions table below (Table 4) (e.g. "ruptured" is reported in both the serious injury category and the malfunction category).

Table 4: Summary of Malfunction MDRs for Mammary Sizers

Malfunction	MDRs
Ruptured	25
Foreign body on sizer	15
Greasy residue after sterilization	3

Failed to remove sizer and exchange with breast implant	3
Out of box failure (implant failed after opening package)	3
Use of expired sizers	2
User error, use of unsterile device	2[a]
Systemic symptoms/BII symptoms	1[b]
Use error, not following cleaning instructions	1

[a] Product was packaged in a way that led the user to believe it was sterile. One sizer reached the patient, the other was caught prior to implantation.
[b] Not enough information to know if report is about mammary sizers left in or subsequent implant, such as breast implant

Of the 25 sizers that reported rupture:

- 12 MDRs reported the rupture occurred while the device was inside the patient, in some cases necessitating manual silicone gel removal.
- 5 MDRs report that the device did not come in contact with the patient.
- 8 MDRs do not provide any information.

Of the 15 MDRs reporting foreign body on the sizer:

- 11 MDRs reported "grit like plastic particles." The devices were new/out of the box, and in all 11 reports the devices were washed and used in the procedure.
- 4 MDRs reported out of box contaminants including hair and cellophane.

Of the 3 MDRs reporting failure of the sizer to be removed and replaced with a breast implant:

- 2 MDRs do not include the implant/explant date.
- 1 MDR reported that the sizer remained implanted for 18 years.

Of the 3 MDRs reporting "greasy" residue after sterilization

- 2 MDRs reported the manufacturer confirmed facility performed cleaning/sterilization correctly.
- The manufacturer in 1 MDR reported that the occurrence of residue is described in the device labeling as a known potential adverse event.

Overall, the MDR analysis shows that there are complications reported with the use of breast implant sizers.

7. Recall History

7.1 Overview of Recall Database

The Medical Device Recall database contains Medical Device Recalls classified since November 2002. Since January 2017, it may also include correction or removal actions initiated by a firm prior to review by the FDA. The status is updated if the FDA identifies a violation and classifies the action as a recall and

again when the recall is terminated. FDA recall classification may occur after the firm recalling the medical device product conducts and communicates with its customers about the recall. Therefore, the recall information posting date ("create date") identified on the database indicates the date FDA classified the recall, it does not necessarily mean that the recall is new.

7.2 Recall Results: Mammary Sizers

A total of four recalls have been reported to date for devices with the product code "MRD." This includes three class II recalls and one class III recall[4], related to labeling errors or shipping of expired devices. The recalls are described below:

- Z-0702-2020: This class III recall was initiated due to error in labeling, which resulted in the 2D barcodes on breast implants and mammary sizers being unreadable by GS-1 configured scanners.

- Z-1988-2015: This class II recall was initiated due to expired mammary sizers being shipped to users.

- Z-0964-2015: This class II recall was initiated due to certain mammary sizers that were packaged with the incorrect instructions for use.

- Z-2591-2014: This class II recall was initiated due to error in labeling, which resulted in certain 380cc mammary sizers being labeled as 330cc mammary sizers.

The recalls identified above are related to labeling errors and do not suggest that there are general safety concerns related to mammary sizer devices as a product class.

8. Summary

In light of the information available, the Panel will be asked to comment on whether mammary sizers under product code "MRD":

meet the statutory definition of a Class III device in accordance with section 513 of the Food, Drug, and Cosmetic Act (FD&C Act):

- insufficient information exists to determine that general and special controls are sufficient to provide reasonable assurance of its safety and effectiveness, and

[4] Recalls are classified into a numerical designation (I, II, or III) by the FDA to indicate the relative degree of health hazard presented by the product being recalled. A Class I recall is a situation in which there is a reasonable probability that the use of, or exposure to, a violative product will cause serious adverse health consequences or death. A Class II recall is a situation in which use of, or exposure to, a violative product may cause temporary or medically reversible adverse health consequences or where the probability of serious adverse health consequences is remote. A Class III recall is a situation in which use of or exposure to a violative product is not likely to cause adverse health consequences.

- the device is purported or represented to be for use in supporting or sustaining human life, or for a use which is of substantial importance in preventing impairment of human health, or

- if the device presents a potential unreasonable risk of illness or injury;

or would be more appropriately regulated as Class II, in which:

- general and special controls, which may include performance standards, postmarket surveillance, patient registries and/or development of guidelines, are sufficient to provide reasonable assurance of safety and effectiveness;

or as Class I, in which:

- the device is subject only to general controls, which include registration and listing, good manufacturing practices (GMPs), prohibition against adulteration and misbranding, and labeling devices according to FDA regulations.

For the purposes of classification, FDA also considers the following items, among other relevant factors, as outlined in 21 CFR 860.7(b):

1. The persons for whose use the device is represented or intended;

2. The conditions of use for the device, including conditions of use prescribed, recommended, or suggested in the labeling or advertising of the device, and other intended conditions of use;

3. The probable benefit to health from the use of the device weighed against any probable injury or illness from such use; and

4. The reliability of the device.

The Panel will be asked whether they believe mammary sizers would be appropriately regulated as Class II. If the Panel does not agree with FDA's proposed classification, the Panel will be asked to provide their rationale for recommending a different classification.

8.1 Special Controls

FDA believes that special controls, in addition to general controls, can be established to mitigate the risks to health identified, and provide a reasonable assurance of the safety and effectiveness of mammary sizers. Following is a risk/mitigation table, which outlines the identified risks to health for this device type and the recommended controls to mitigate the identified risks:

Table 5: Summary of Risks to Health and Proposed Special Controls for Mammary Sizers

Identified Risk	Recommended Mitigation Measure
Adverse tissue reaction	Biocompatibility evaluation Labeling
Infection	Sterilization testing/validation/ information Reprocessing validation Shelf-life testing Labeling
Device malfunction leading to increased operative time	Non-clinical performance testing Labeling
Use error/Improper device use	Labeling

Based on the identified risks and recommended mitigation measures, FDA believes that the following special controls would provide reasonable assurance of safety and effectiveness for the mammary sizers under product code "MRD":

1. Non-clinical performance testing must demonstrate the mechanical function and durability of the device.

2. The device must be demonstrated to be biocompatible.

3. Performance data must demonstrate the sterility of the device.

4. Performance data must support the shelf life of the device by demonstrating continued sterility and package integrity over the intended shelf life.

5. Performance data must validate the cleaning and disinfection instructions for reusable devices.

6. Labeling must bear all information required for the safe and effective use of the device, specifically including the following:
   i) A clear description of the technological features of the device, including identification of device materials, shapes, and sizes.
   ii) Information on how the device operates.
   iii) Validated methods and instructions for reprocessing if the device is reusable, including the number of times device can be re-sterilized.
   iv) A warning against implantation of the device.
   v) A shelf life.
   vi) Disposal instructions.

If the Panel believes that Class II is appropriate for the mammary sizers under product code "MRD," the Panel will be asked whether the identified special controls appropriately mitigate the identified risks to health and whether additional or different special controls are recommended.

8.2 Overview of Proposed Classification/FDA Recommendation

Based on the safety and effectiveness information gathered by the FDA, the identified risks to health and recommended mitigation measures, we recommend that mammary sizers indicated for use as temporary placement during breast augmentation or reconstruction procedures to evaluate the appropriate breast implant size and shape for the patient prior to implantation of a breast implant be regulated as Class II devices.

878.5060 Mammary sizer.

(a) *Identification.* A mammary sizer is intended for temporary intraoperative placement to assist in determining the desired breast implant shape and size for the patient. The device consists of an elastomeric outer shell that is filled with either silicone gel or saline. Mammary sizers are not intended for implantation.

(b) *Classification.*
Class II (special controls). The special controls for this device are:

1. Non-clinical performance testing must demonstrate the mechanical function and durability of the device.
2. The device must be demonstrated to be biocompatible.
3. Performance data must demonstrate the sterility of the device.
4. Performance data must support the shelf life of the device by demonstrating continued sterility and package integrity over the intended shelf life.
5. Performance data must validate the cleaning and disinfection instructions for reusable devices.
6. Labeling must bear all information required for the safe and effective use of the device, specifically including the following:
    - i) A clear description of the technological features of the device, including identification of device materials, shapes, and sizes.
    - ii) Information on how the device operates.
    - iii) Validated methods and instructions for reprocessing if the device is reusable, including the number of times device can be re-sterilized.
    - iv) A warning against implantation of the device.
    - v) A shelf life.
    - vi) Disposal instructions.

Based on the available scientific evidence, the FDA will ask the Panel for their recommendation on the appropriate classification of the mammary sizers under product code "MRD."

Appendix A: Literature Search Terms and Filters for Breast Implant Sizers

The following tables provide details on the search strategies for PubMed and Embase for the literature search on mammary (breast implant) sizers.

Table 6: Literature Search Strategy for PubMed

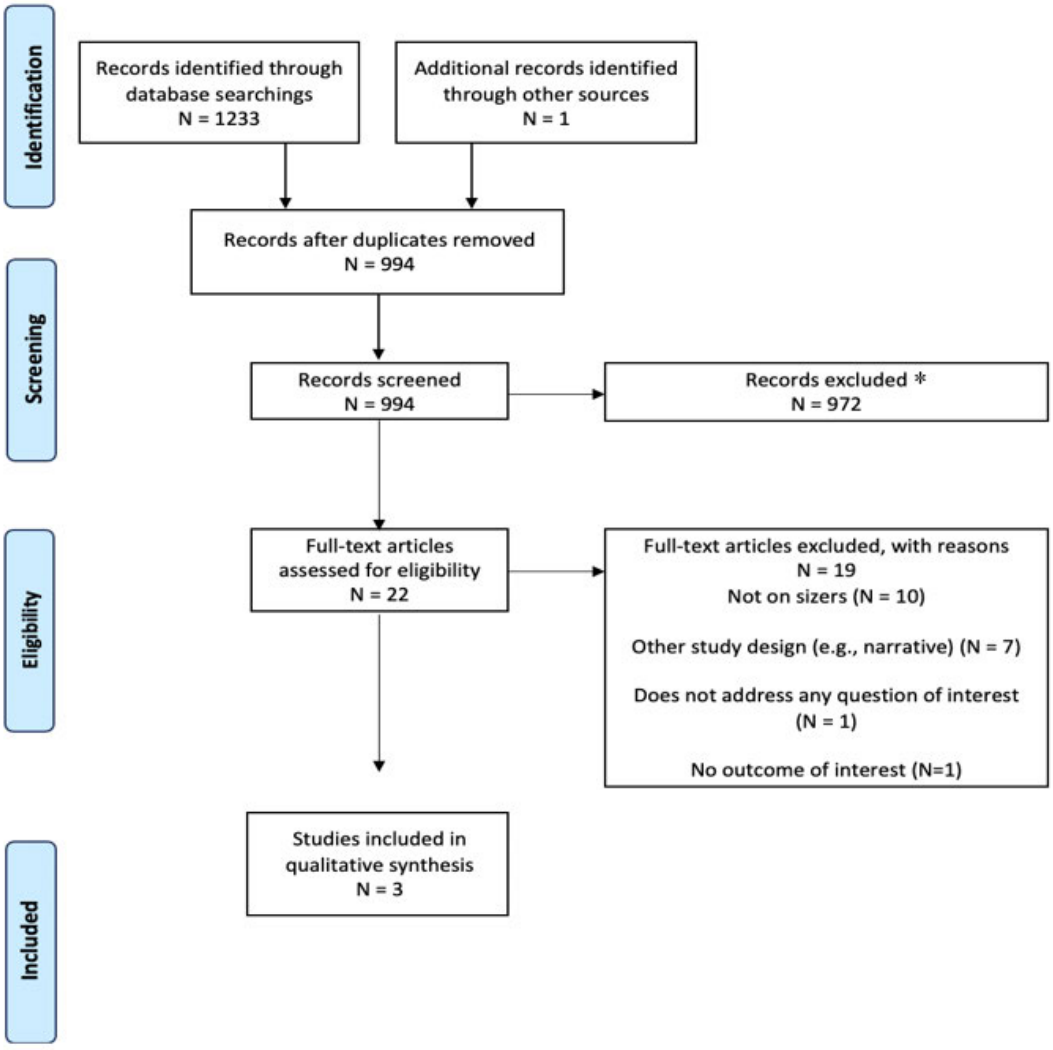
Search number	Query	Results
#7	#6 AND Clinical Study, Clinical Trial, Comparative Study, Controlled Clinical Trial, Meta-Analysis, Multicenter Study, Observational Study, Randomized Controlled Trial, Systematic Review, Validation Study	858
#6	#5 AND 04/01/2012-04/01/2022	4,891
#5	#4 AND Humans	6,900
#4	#3 AND English	8,279
#3	#1 AND #2	9,011
#2	Reconstruction OR Tissue expander OR Sizer OR Mammaplasty	558,427
#1	Breast Implant Sizer OR Breast Prosthesis, Internal OR Breast Prostheses, Internal OR Internal Breast Prostheses OR Internal Breast Prosthesis OR Prostheses, Internal Breast OR Prosthesis, Internal Breast OR Implants, Breast OR Breast Implant OR Implant, Breast	14,760

Table 7: Literature Search Strategy for Embase

Search number	Query	Results
#8	#6 AND #7	375
#7	'comparative clinical' OR 'meta analysis,' OR 'multicenter and observational and study' OR 'randomized controlled trial' OR 'systematic review' OR 'validation study'	1,503,283
#6	#1 AND #2 AND [2012-2022]/py AND [english]/lim AND human	4,580
#5	#1 AND #2 AND [2012-2022]/py AND [english]/lim	4,729
#4	#1 AND #2 AND [2012-2022]/py	4,871
#3	#1 AND #2	7,475
#2	reconstruction OR (tissue AND expander) OR sizer OR mammaplasty	373,132
#1	breast AND implant AND sizer OR 'breast endoprosthesis' OR (implant AND breast)	14,791

Appendix B: Flow Diagram of Systematic Literature Review Search Results

Figure 1: Flow Diagram of Systematic Literature Review Search Results



* Records were excluded as "not related to breast sizers" based on a review of the title and abstracts.