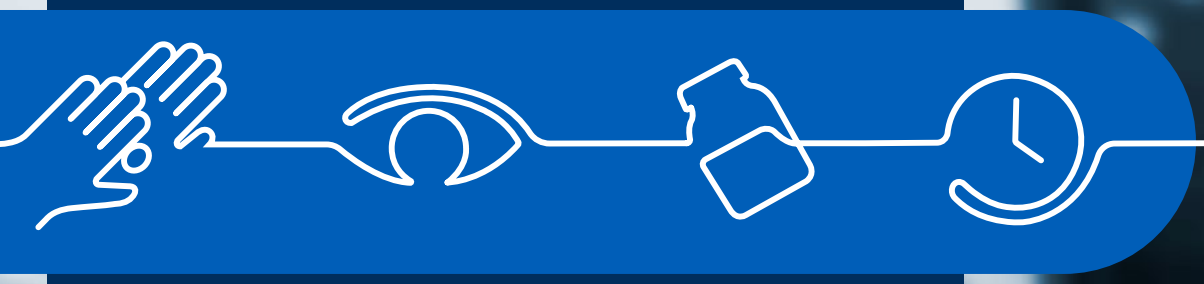
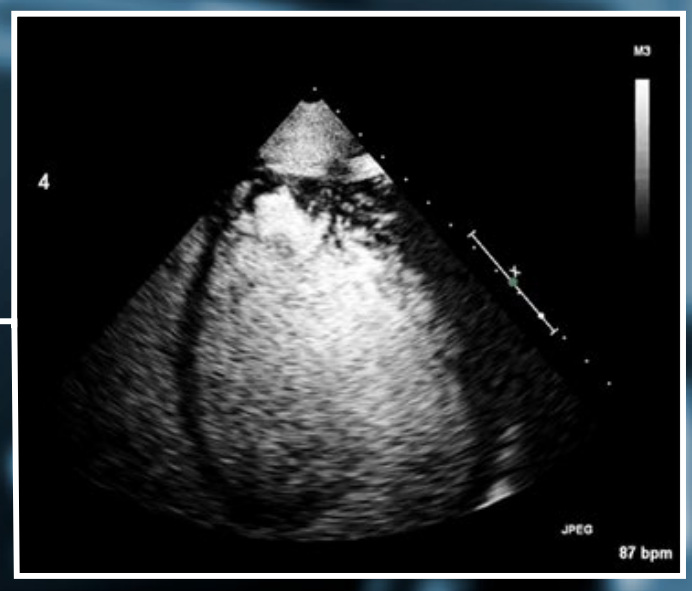
A clear path forward™





Consider Optison for clarity in left ventricle image enhancement

A Step-by-Step Quick Reference Guide

Imaging With Optison Ultrasound Enhancing Agent

OPTISON™
(Perflutren Protein-Type A Microspheres Injectable Suspension, USP)

INDICATIONS AND USAGE: OPTISON (Perflutren Protein-Type A Microspheres Injectable Suspension, USP) is indicated for use in patients with suboptimal echocardiograms to opacify the left ventricle and to improve the delineation of the left ventricular endocardial borders.

IMPORTANT SAFETY INFORMATION ABOUT OPTISON

WARNING: SERIOUS CARDIOPULMONARY REACTIONS

Serious cardiopulmonary reactions, including fatalities, have occurred uncommonly during or following perflutren-containing microsphere administration. Most serious reactions occur within 30 minutes of administration

- **Assess all patients for the presence of any condition that precludes Optison administration**
- **Always have resuscitation equipment and trained personnel readily available**

- **CONTRAINDICATION:** Do not administer OPTISON to patients with known or suspected hypersensitivity to perflutren or albumin.

Please see additional Important Safety Information, here, and Full Prescribing Information, here.

OPTISON™
(Perflutren Protein-Type A Microspheres Injectable Suspension, USP)

CONTENTS

OPTISON™
(Perflutren Protein-Type A Microspheres Injectable Suspension, USP)

Enhance Echocardiography Workflow With Time-Saving Efficiency

On-the-cart portability

- Vials go directly from storage to cart without premixing

Rapid bedside resuspension

- Ready for resuspension right from the cart
  - No vial mixer, reconstitution, or preactivation required
- Fast preparation can enhance workflow and reduce staff demand
  - Go from resuspension to injection in **less than 60 seconds**[1]
- Invert the vial and gently roll between palms to resuspend; if not used within one minute, resuspend again[1]
- If unopened and at room temperature up to 24 hours, Optison may be returned safely to refrigeration for use at a later time[1]

Dosing flexibility

- Can be **injected at any stage** of the procedure[1]
- Multiple doses can be administered in the same study for further ultrasound enhancement with no waiting period[1]
- Recommended dose is 0.5 mL injected into a peripheral vein at a rate not exceeding 1 mL per second. Additional doses in increments of 0.5 mL may be repeated for further enhancement as needed, using up to 5.0 mL in any 10-minute period; do not exceed 8.7 mL in any patient study[1]
- Each vial must be drawn from only once and used for a single patient

IMPORTANT SAFETY INFORMATION ABOUT OPTISON

Optison is for single use only. Each vial must be withdrawn from only once and used for a single patient. Follow labeled instructions for product handling and use; discard unused product properly.

OPTISON™
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Please see additional Important Safety Information, including Boxed Warning, here, and Full Prescribing Information, here.

INTRODUCTION

Easy to integrate into your current workflow

- Minimal preparation and administration times
- No added costs or space needed for vial mixing equipment
- Helps reduce waste — if unopened and at room temperature up to 24 hours, Optison may be returned safely to refrigeration for use at a later time[1]

Consistent supply to meet market demands

- Optison is manufactured internally by GE Healthcare to help ensure that market demands are met

PRODUCT INDICATIONS AND IMPORTANT SAFETY INFORMATION ABOUT OPTISON

PRODUCT INDICATIONS: Optison is an ultrasound contrast agent indicated for use in patients with suboptimal echocardiograms to opacify the left ventricle and to improve the delineation of the left ventricular endocardial borders.

CONTRAINDICATIONS: Do not administer Optison to patients with known or suspected hypersensitivity to perflutren or albumin.

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PREPARATION

Storage and Handling[1]

- Store upright
- Refrigerate from 2° to 8°C (36° to 46°F)
- Storage at room temperature (up to 25°C/77°F) for up to 24 hours is permitted
- Do not freeze
- For each 3-mL vial per box
  - — Each vial must be withdrawn from only once
  - — Product withdrawn from a vial to be used for one patient only

Patient Counseling[1]

Check for:

- Congenital heart defect or recent worsening of heart or lung conditions
- Perflutren or albumin hypersensitivity

The FDA Adverse Event Reporting System (FAERS)

- A database that contains adverse event reports, medication error reports, and product quality complaints resulting in adverse events that were submitted to the FDA. This does not include nonreported adverse events
- Healthcare professionals, consumers, and manufacturers submit reports to the FAERS
- FAERS data cannot be used to calculate the incidence of an adverse event or medication error in the US population. The FAERS data by themselves are not an indicator of the safety profile of the drug

www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Surveillance/AdverseDrugEffects/ucm070093.htm

FDA, U.S. Food & Drug Administration.

IMPORTANT SAFETY INFORMATION ABOUT OPTISON

ADVERSE REACTIONS: Serious adverse reactions related to cardio–pulmonary and hypersensitivity reactions are described in the WARNINGS AND PRECAUTIONS section. The most frequently reported adverse reactions following clinical trial use of Optison were headache, nausea and/or vomiting, warm sensation or flushing, and dizziness.

OPTISON™
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Please see additional Important Safety Information, including Boxed Warning, here, and Full Prescribing Information, here.

PREPARATION

Supplies Needed[1]

- 20-gauge or larger angiocatheter
- Suggested methods of administration, all with a three-way stopcock, include:
  - — Short extension tubing
  - — Heparin lock
  - — Intravenous (IV) line
- Either one sterile vent spike or one sterile 18-gauge needle
  - — Syringe should be 3 cc with 18-gauge needle
- Additional 10-cc syringe for flush
- 0.9% sodium chloride injection, USP (or 5% dextrose injection, USP)

Optimize ultrasound enhancing agent (UEA) presets per the ultrasound equipment manufacturer instructions.

For information on administration, please see page 11.

Preparation for Administration[1]

- Start an IV in a peripheral vein with a 20-gauge needle for UEA procedure (anticubital recommended)
- Invert the vial and gently roll between palms to resuspend microspheres
- Inspect for complete resuspension to ensure adequate UEA
  - — Check to make sure the solution is opaque and milky-white rather than clear
- Vent vial with sterile vent spike or sterile 18-gauge needle; withdraw solution and prepare to inject
- If not used within one minute, resuspend vial again
  - — Do not use if, after resuspension, the product remains clear rather than opaque and milky-white

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Dosing[1]

- Recommended dose is 0.5 mL IV at a rate not exceeding 1 mL per second
- As needed, use additional doses of 0.5 mL, up to 5.0 mL in any 10-minute period
- Do not exceed 8.7 mL total dose in any one patient study

Individualization of dose

- Recommended dose is 0.5 mL IV
- Image quality in cardiac ultrasound is a function of the acoustic window, which is influenced by many variables, including:
  - Body habitus
  - Intervening lung tissue
  - Adequacy of transducer skin interface
  - Other acoustic factors

  These variables may influence ultrasound enhancing agent (UEA) effect.
- If the UEA enhancement is inadequate after the dose of 0.5 mL, additional doses in increments of 0.5 mL — up to 5.0 mL cumulatively in a 10-minute period — may be injected intravenously, up to a maximum total dose of 8.7 mL in any one patient study

Continuous IV line

- Open an IV line with 0.9% sodium chloride injection, USP (or 5% dextrose injection, USP)
- Use a slow infusion rate to maintain vascular patency
- Flush the line immediately after injection of Optison

Short extension or heparin lock

- Fill one syringe with 0.9% sodium chloride injection, USP (or 5% dextrose injection, USP)
- Flush the line for patency before and after injecting Optison

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PREPARATION

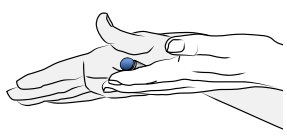
Drug-Handling Directions[1]

- For single use only
  - — Each vial must be withdrawn from only once and used for a single patient
- Optison does not contain preservatives
  - — Bacterial contamination with the risk of postinfusion septicemia can occur if the container has been damaged or following puncture of the rubber cap
- Discard unused product properly

DO NOT USE if the container has been damaged or the protective seal and/or rubber cap have been entered.

DO NOT USE if the upper white layer is absent. This indicates the microspheres may have been damaged and may result in poor or no echo contrast.

DO NOT INJECT air into the vial.



1. Invert the vial and gently roll between the palms to resuspend the microspheres. This process will allow the product to come to room temperature before use

2. Inspect the vial for complete resuspension. Failure to adequately resuspend Optison may cause an underdelivery of the microspheres and may result in inadequate contrast

3. Do not use Optison if, after resuspension, the solution appears to be clear rather than opaque and milky-white

4. Vent the vial with a sterile vent spike or with a sterile 18-gauge needle before withdrawing the suspension with Optison into the injection syringe

OPTISON™
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Please see Important Safety Information, including Boxed Warning, here, and Full Prescribing Information, here.

Administration[1]

- Inject 0.5 mL at a rate not to exceed 1 mL per second
- Follow with a saline flush or 5% dextrose injection, USP, to clear IV line

Injection procedure

- The time from resuspension of Optison to injection must not exceed one minute.
  NOTE: Resuspend if solution starts to separate
  — If one minute is exceeded, resuspend the microspheres in the syringe by gently rotating and inverting the syringe
- Before injection, provide IV access in a peripheral vein with a 20-gauge or larger angiocatheter
- Suggested methods of administration, all with a three-way stopcock, include:
  — Short extension tubing — Heparin lock — IV line
- For short extension tubing or heparin lock, fill one syringe with 0.9% sodium chloride injection, USP, and flush the line for patency before and after injection of Optison
- For a continuous IV line, open an IV line with 0.9% sodium chloride injection, USP (or 5% dextrose injection, USP) at a slow infusion rate to maintain vascular patency. The line should be flushed immediately after injection of Optison
- **DO NOT ASPIRATE** blood back into the syringe containing Optison before administration; this may promote the formation of a blood clot within the syringe

Ultrasound Device Optimization[2]

Recommended Ultrasound Device Settings for Optison

Order	Control	Feature	Recommended Setting	Result
1	Receiver	Boosts amplification of received echoes	**High:** Compensates for lower transmission power and boosts visibility of softer echoes from UEA	Optimizes UEA visualization
2	Gain (TGC, DGC, LGC)	Boosts amplification of received echoes	**High:** Compensates for lower transmit power and boosts visibility of softer echoes from UEA	Optimizes UEA visualization, especially in the basal walls
3	Compression (dynamic range)	Displays range of shades of gray	**Narrow:** Eliminates low-level gray shades, which improves visibility of cavity from myocardium	Optimizes UEA visualization
4	Transmit power (MI, TI, intensity)	Regulates intensity of ultrasound sent into the body (deeper target requires increased power)	**Low:** Prolongs UEA visualization by reducing destruction of microspheres	Optimizes UEA visualization

DGC, depth gain compensation; **LGC,** lateral gain compensation; **MI,** mechanical index; **TGC,** time gain compensation; **TI,** tissue index; **UEA,** ultrasound enhancing agent.

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Please see Important Safety Information, including Boxed Warning, here, and Full Prescribing Information, here.

OPTIMIZING EQUIPMENT SETTINGS

Optimize Your Ultrasound System for Optison

1. Activate harmonics; decrease frequency to 1.5 -1.6 for more penetration
2. Set the MI (0.18 or lower is ideal)
3. Set focal zone to the mitral valve level
4. Adjust the dynamic range and compression as necessary
5. Adjust the overall gain as necessary
6. Adjust the TGCs as necessary, especially near the base of the left ventricle and mitral valve

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Ultrasound Enhancing Agent (UEA) Guidelines

IAC Standards

The 2021 *Intersocietal Accreditation Commission (IAC) Standards* recommends UEA use when two or more left ventricular (LV) segments cannot be visualized adequately for the assessment of LV function and/or in settings in which the study indication requires accurate analysis of regional wall motion.[3]

ASE GUIDELINES

"The use of ultrasound enhancing agents (UEAs) has become an integral component of echocardiography practice." With UEAs, suboptimal echocardiograms (i.e., nonvisualization of two or more segments) can be converted to diagnostic examinations.[4]

Product Indications and Use

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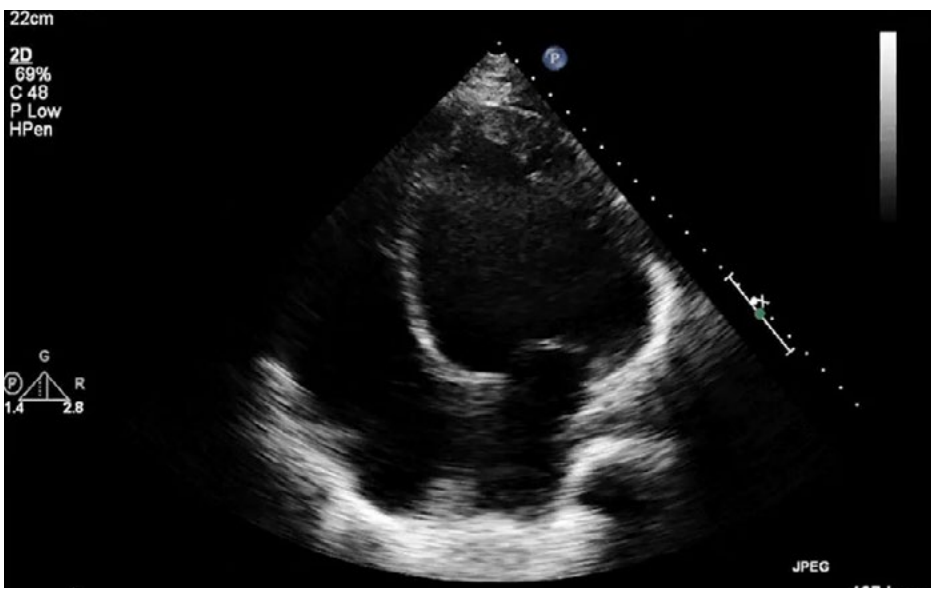
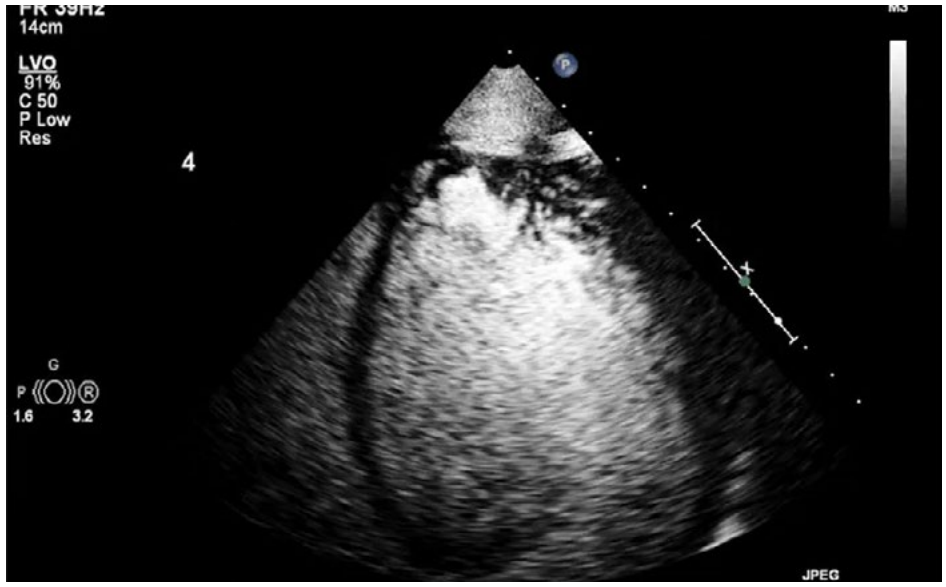
Please see Important Safety Information, including Boxed Warning, here, and Full Prescribing Information, here.

Suboptimal Images

Twenty percent of echoes are suboptimal[5]



Nonenhanced



Optison-Enhanced

Product Indications and Use

OPTISON (Perflutren Protein-Type A Microspheres Injectable Suspension, USP) is indicated for use in patients with suboptimal echocardiograms to opacify the left ventricle and to improve the delineation of the left ventricular endocardial borders.

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Please see Important Safety Information, including Boxed Warning, here, and Full Prescribing Information, here.

IMAGE ENHANCEMENT

Tips for Optimal Image Enhancement

- The recommended dose of Optison is 0.5 mL injected into a peripheral vein followed by a flush with 0.9% sodium chloride injection, USP, or 5% dextrose injection, USP
- Inject through a 20-gauge or larger angiocatheter into a peripheral vein at a rate not exceeding 1 mL per second. Suggested methods of administration include a short extension tubing, heparin lock, or intravenous line, all with a three-way stopcock
- Injection rate should not exceed 1 mL per second

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Please see Important Safety Information, including Boxed Warning, here, and Full Prescribing Information, here.

SUPPORT RESOURCES

If you have questions regarding Optison, please refer to the below resources for assistance:

Customer Service

To place an order, call 800 292 8514

Medical Affairs

800 654 0118 (option 2, then option 3) or medical.affairs@ge.com

Reimbursement Hotline

For reimbursement-related questions (eg, appropriate coding), call 800 767 6664

Education Portal

Browse through our numerous educational programs on our educational portal, here. All are available through your local Cardiology Account Manager or Product Clinical Specialist, with CE credits available for sonographers.

gehealthcare.com/products/contrast-media/optison

gehealthcare.com

References:

1. Optison [prescribing information]. Marlborough, MA: GE Healthcare; 2021.
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3. Intersocietal Accreditation Commission Website. *IAC Standards and Guidelines for Adult Echocardiography Accreditation*. https://intersocietal.org/wp-content/uploads/2021/10/IACAdultEchocardiographyStandards2021.pdf. Accessed February 8, 2022.
4. Porter TR, Mulvagh SL, Abdelmoneim SS, et al. Clinical applications of ultrasonic enhancing agents in echocardiography: 2018 American Society of Echocardiography Guidelines Update. *J Am Soc Echocardiogr*. 2018;31:241-247.
5. Waggoner AD, Ehler D, Adams D, et al. Guidelines for the cardiac sonographer in the performance of contrast echocardiography: recommendations of the American Society of Echocardiography Council on Cardiac Sonography. *J Am Soc Echocardiogr*. 2001;14:417-420.

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PRODUCT INDICATIONS AND IMPORTANT SAFETY INFORMATION

PRODUCT INDICATIONS AND USE

Optison™ (Perflutren Protein-Type A Microspheres Injectable Suspension, USP) is an ultrasound contrast agent indicated for use in patients with suboptimal echocardiograms to opacify the left ventricle and to improve the delineation of the left ventricular endocardial borders.

IMPORTANT SAFETY INFORMATION ABOUT OPTISON

WARNING: SERIOUS CARDIOPULMONARY REACTIONS

Serious cardiopulmonary reactions, including fatalities, have occurred uncommonly during or following perflutren-containing microsphere administration. Most serious reactions occur within 30 minutes of administration

- **Assess all patients for the presence of any condition that precludes Optison administration**
- **Always have resuscitation equipment and trained personnel readily available**

- **CONTRAINDICATION:** Do not administer Optison to patients with known or suspected hypersensitivity to perflutren or albumin.
- **WARNINGS AND PRECAUTIONS:** Serious cardiopulmonary reactions, including fatalities, have occurred uncommonly during or shortly following administration. The risk for these reactions may be increased among patients with unstable cardiopulmonary conditions (acute myocardial infarction, acute coronary artery syndromes, worsening or unstable congestive heart failure, or serious ventricular arrhythmias).
- Serious anaphylactic reactions have been observed during or shortly following perflutren-containing microsphere administration, including shock, hypersensitivity, bronchospasm, throat tightness, angioedema, edema (pharyngeal,palatal, mouth, peripheral, localized), swelling (face, eye, lip, tongue, upper airway), facial hypoesthesia, rash, urticaria, pruritus, flushing, and erythema have occurred in patients with no prior exposure to perflutren-containing microsphere products.
- When administering Optison to patients with a cardiac shunt, microspheres can bypass filtering of the lungs and enter the arterial circulation. Assess patients with shunts for embolic phenomena following Optison administration.

(Continued on next screen)

IMPORTANT SAFETY INFORMATION

IMPORTANT SAFETY INFORMATION ABOUT OPTISON (CONT'D)

- High ultrasound mechanical index values may cause microsphere rupture and lead to ventricular arrhythmias. Additionally, end-systolic triggering with high mechanical indices has been reported to cause ventricular arrhythmias. Optison is not recommended for use at mechanical indices greater than 0.8.
- This product contains albumin, a derivative of human blood. Based on effective donor screening and product manufacturing processes, it carries an extremely remote risk for transmission of viral disease.
- **ADVERSE EVENTS:** The most frequently reported adverse reactions in clinical trials were headache, nausea and/or vomiting, warm sensation or flushing and dizziness. Cardiac arrests and other serious but nonfatal adverse reactions were uncommonly reported in post-approval use. Reports also identified neurologic reactions (loss of consciousness or convulsions) as well as anaphylactoid reactions.

Prior to Optison administration, please read the full Prescribing Information, including Boxed Warning, here.

To report SUSPECTED ADVERSE REACTIONS, contact GE Healthcare at 800 654 0118 (option 2, then option 1), or the FDA at 800 FDA 1088 or www.fda.gov/medwatch.

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