Install FDA-Regulated Medical Device Cases into Your CLNC® Business
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INSTALL FDA-REGULATED MEDICAL DEVICE CASES INTO YOUR CLNC® BUSINESS

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I. INTRODUCTION

A. Medical Device Use in Healthcare

1. In the diagnosis and treatment of patients who are already ill or injured.
2. In invasive procedures and those that are inherently risky.
3. In life-and-death situations in which the benefit of the device outweighs its risk.

B. Relevance to Certified Legal Nurse Consultants™

1. Most CLNC® consultants have first-hand knowledge of medical devices used in the care of patients.
2. Product liability litigation involving medical devices is growing into a multibillion-dollar industry.

C. General Medical Devices

1. A medical device is “an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent, or other similar or related article, including a component part, or accessory which is:
   a. Recognized in the official National Formulary, or the United States Pharmacopeia, or any supplement to them.
   b. Intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease, in man or other animals.
   c. Intended to affect the structure or any function of the body of man or other animals, and which does not achieve any of its primary intended purposes through chemical action within or on the body of man or other animals and which is not dependent upon being metabolized for the achievement of any of its primary intended purposes.”

2. Combination products.
   a. A drug + a device.
   b. A drug + a biologic.
c. A device + a biologic.
d. A device + a drug + a biologic.

D. Medical Device Regulation and Law

1. The U.S. Food and Drug Administration (FDA) regulates medical devices from simple, low-risk devices to complex, high-risk medical devices, as well as devices that fall somewhere in between, like sutures.

2. The FDA has the authority to regulate medical devices before and after they reach the marketplace.

3. Medical device law. (Exhibit A)

E. Medical Device Development

1. Primary considerations for product development.
   a. Patient well-being.
   b. Compliance with regulatory requirements and industry standards.
   c. Safety and efficacy on par with competitors.

2. Why bring a device to market?
   a. Offshoring may offer cost benefit to U.S. companies.
   b. Market can bear multiple companies with similar devices.

F. Medical Device Review – Clearance or Approval

1. Premarket considerations.
   a. Device classification and panels. (Exhibit B)
      (1) Class I: Low risk/low tech.
      (2) Class II: Moderate risk/moderate tech.
      (3) Class III: High risk/high tech.
   b. Major medical device application types. (Exhibit C)
      (1) 510(k).
      (2) Premarket approval (PMA).
   c. Ability to insert controls into clearance or approval.

2. Postmarket considerations.
   a. Labeling.
   b. Manufacturing.
   c. Surveillance: Mandatory and Voluntary Medical Device Reporting Basics. (Exhibit D)
d. Compliance.
e. General and special controls.

3. What does FDA approval mean?

II. COMMON MEDICAL DEVICE CASES

A. Products Liability Cases

1. Defective parts of the medical device impacts function.
3. Defective manufacturing related to lack of adherence to industry standards.

B. Medical Malpractice Cases

1. Failure to insert or remove device according to manufacturer’s instructions.
2. Failure to replace devices at manufacturer’s recommended intervals.
3. Failure to monitor device performance according manufacturer’s instructions.
4. Failure to act in a timely manner in response to a medical device recall.

C. Recent Medical Device Cases

1. Hip replacements.
2. Mesh.
3. Morcellators.
4. Defibrillators.
5. Intrauterine devices.
D. Medical Device Standards: Voluntary Recognized Consensus Standards

1. Standards Developing Organizations (SDOs).
   b. Association for the Advancement of Medical Instrumentation (AAMI).
   d. National Institutes of Standards and Technology (NIST).
   e. Underwriter’s Laboratories (UL).

2. Role of standards in the medical device approval process.

E. Medical Device Databases (Exhibit E)

III. COMMON PLAINTIFF ALLEGATIONS FOR MEDICAL DEVICE CASES

A. Specific Allegations

1. Failure of implanting physician to exercise proper caution in introducing medical device in patient resulting in injury or death.
   a. The implanting physician failed to attend manufacturer-sponsored or hospital medical staff-sponsored training on the proper implantation techniques when the device was introduced into central supply.
   b. The implanting physician failed to read and review the professional society’s messaging regarding the device when updated communication was available to the community.
   c. The implanting physician failed to completely read and review the device labeling.
   d. The implanting physician failed to notify medical staff of known safety notice or device recall.

2. Failure of device manufacturer to properly design, construct, and test the medical device resulting in failure of its internal functioning leading to injury or death.
   a. The manufacturer did not comply with industry standards regarding test methods leading to unreliable functioning.
   b. The manufacturer failed to test the device in the pediatric population, and with silence on the topic, provided no indication that it was not to be used in this population.
3. Failure of the provider (nurse or physician) to properly program the device resulting in injury.
   a. The nurse or physician responsible for programming the device failed to attend manufacturer-sponsored or hospital nursing staff-sponsored training on the proper programming when the device was introduced into central supply.
   b. The nurse or physician responsible for programming the device failed to completely read and review the device labeling.

4. Failure of primary provider/specialist/clinic physician to correctly interpret and report data and findings and to make appropriate changes in the device programming resulting in injury or death.
   a. Failure to properly set alarm notifications thereby not recognizing device features.
   b. Failure to properly respond to alarm notification thereby not addressing root cause of notification.
   c. Misinterpretation of alarm notification leading to failure to document and report significant device malfunction.
   d. Failure of hospital or clinic to remove recalled devices from central circulation upon notice of recall.

B. Problems with the Device, the Provider or Both

1. Device problems: Batteries, alarms, probes, sensors and software.

2. Provider problems: Selection of correct device, sterility, technique, programming and lack of necessary and recommended follow-up after device implantation.

IV. COMMON DEFENSES FOR MEDICAL DEVICE CASES

A. Plaintiff Failed to Seek Medical Attention in a Timely Manner

1. Plaintiff developed a non-life-threatening symptom or cluster of symptoms and failed to report the symptom(s) to their healthcare provider.

2. Plaintiff developed a life-threatening symptom or cluster of symptoms and failed to seek emergency medical treatment.

3. Plaintiff was instructed to make a follow-up appointment (routine office visit or post-emergency care visit) and failed to keep this appointment.
B. Plaintiff Failed to Follow the Prescribed Medical Treatment Regimen

1. Plaintiff failed to respond appropriately to device alarm or other known possible device failure and continued to use the device without notifying provider.

2. Plaintiff used the device in a manner not authorized when device was implanted or placed into service.

C. Defendant Adhered to the Standard of Care

1. Manufacturer explained alarm notifications and mitigation in the device labeling.

2. Manufacturer explained appropriate populations and clinical uses in the device labeling.

3. Manufacturer adhered to industry standards in the design, construct and testing of the medical device.

D. Defendant’s Interpretation of the Findings was Logical/Medically Prudent

1. Healthcare provider responded appropriately when alarm notifications sounded and reset the device according to the manufacturer’s recommendations.

2. Healthcare provider reviewed the patient symptoms and responded with the appropriate medical interventions.

V. THE ROLE OF THE CERTIFIED LEGAL NURSE CONSULTANTCM IN MEDICAL DEVICE CASES

A. Review Medical Records Focusing on the Device in Question

1. Device-specific information: Reason for implantation; reason for selection of particular device; date and location of implantation or beginning use; registration and product number; instructions for use; labeling and packaging.

2. Recipient-specific information: Informed consent; completion of teaching; evidence of patient or caregiver competency in using the device; description and reporting patterns of adverse events;
follow-up with healthcare provider; knowledge of troubleshooting strategies; unexplained medical conditions or complications and unexplained death.

3. Determine any relationship between the status of the patient and the end result which may require a review of medical records including:
   a. Implant record (operating room notes).
   b. Anesthesia record.
   c. Nursing record (floor, clinic, OR and recovery).
   d. Controlled substance record (medication administration records).
   e. Laboratory and diagnostic imaging (pre-post placement).
   f. Patient teaching sheets (if separate from nurses notes).
   g. Discharge summary.
   h. Billing and coding records.
   i. Other.

B. Determine Healthcare Provider or Caregiver Interactions with Device and Recipient

1. Healthcare provider-specific information: Completion of teaching, review of manufacturer’s information surrounding device function, maintenance and troubleshooting strategies; documentation of adverse events in the medical record, by the hospital, clinic or manufacturer or with the FDA and known trends in device-related problems.

2. Recipient-specific information: Reporting of frequency of alarms; software reprogramming needed; frequency of necessary battery changes and level of care required to resolve issues.

C. Research the Medical Device for Reported Problems

1. Google search on device for top results (law firms, component failure recall notices, news articles or patient advocacy groups).

2. MEDLINE® search for device and indicated condition.

3. Medical device databases. (Exhibit E)

4. Manufacturer’s websites.

5. Law firms’ advertisements for cases involving device.
D. Assess for Tampering or Missing Records and Flag for Attorney

E. Recommend Potential Defendants
   1. Manufacturer overall, and subcontractor for parts.
   2. Hospital and clinic staff, if negligence identified in the evaluation of physicians, training or supervision of the involved staff, discharge planning and maintenance of equipment (e.g. sterilization).
   3. Physicians – surgeon, follow-up provider, the physical practice of either the surgeon or provider or both.
   4. Staff members – floor, clinic, OR and recovery.

F. Prepare Interrogatories, Requests for Production and Deposition Questions

G. Locate Expert Witnesses with Medical Device Development or Review Expertise
   1. CLNC® subcontractors through the NACLNC® Directory.
   2. Biomedical engineer with regulatory review experience.
   3. Medical officer or nurse with regulator review experience.
   4. Medical device company sales representative.
   5. Medical device company engineer.
   6. Medical device company consultant (nonengineering).
   7. Former medical device reviewers for the FDA.

H. How to Gain Clients in Medical Device Cases
   1. Social media outreach for medical device representatives.
   2. Law firm outreach with focus on personal injury, medical malpractice and mass tort.
3. Develop and present CLE presentations on medical device concepts.

VI. INTERROGATORIES AND REQUESTS FOR PRODUCTION

A. Interrogatories Directed to the Defense

1. Please describe all the facts upon which you base your defense of (Plaintiff) __________ on the part of the plaintiff.

2. Please identify all witnesses whom you believe support your defense of (Plaintiff) __________ on the part of the plaintiff.

3. Please list the names and contact information for any other individuals having a role in the (Plaintiff) __________’s injuries.

4. Please list the name of each physician and provider present in the room during any part of the (Device) __________ insertion for the (Plaintiff) __________ on (Date) __________.

5. Please list the names of the clinic or hospital nursing staff present in the room during any part of the (Device) __________ insertion for the (Plaintiff) __________ on (Date) __________.

6. Please describe any continuing education or training given to (Physician) __________ and (Nurse) __________ for the (Device) __________ in the 6-12 months prior to the (Plaintiff) __________’s procedure involving the device.

7. Please describe any standard operating procedures in place in the hospital, clinic or physician practice for contacting patients post-procedure following implantation of the (Device) __________.

8. Please describe how (Plaintiff) __________ failed to seek medical attention in a timely manner for the problem involving the (Device) __________.

9. Please describe how (Plaintiff) __________ failed to follow the prescribed medical regimen associated with the (Condition) __________ that impacted the functioning of the (Device) __________.

10. Please describe all the mandatory and voluntary reporting to the FDA associated with (Device) __________.
B. Interrogatories Directed to the Plaintiff

1. Please describe all the facts upon which you base your allegation that the defendant(s) failed to __________ (insert allegation).

2. Please identify the name, role or position of all witnesses whom you believe support your allegation that the defendant(s) failed to __________ (insert allegation).

3. Please describe the content of any conversations with the defendant(s) regarding problems with the (Device) __________.

4. Please describe any instructions or teaching that you received by the defendant(s), other physicians and nurses or any member of (Facility) __________ before or after the insertion or implantation of (Device) __________ concerning symptoms or changes in your condition that you were to report to the defendant(s).

5. Please describe every scheduled and unscheduled medical visit with the defendant(s) involving the use of (Device) __________ since it was inserted or implanted.

6. Please describe every event of (Device) __________ failure (Allegation) __________ and the method used to resolve the problem.

7. Please describe the specific event involved in this lawsuit and list who was involved in its resolution (resolved or not).

8. Please describe the injury that occurred when (Device) __________ failed.

9. Please describe the impact of (Device) __________’s failure in terms of lost work, wages and other expenses.

10. Please describe the impact of (Device) __________’s failure in terms of additional symptoms requiring intervention, unanticipated procedures, clinic visits, hospitalizations or rehabilitation.

C. Requests for Production Directed to the Defense

1. Please provide the policies, procedures, manuals, training materials and serial number associated with the particular (Device) __________ implanted on (Date) __________ in (Plaintiff) __________.
2. Please provide the medical device standards adhered to in the manufacturing of the (Device) __________.

3. Please provide a copy of the FDA approval letter for the (Device) __________.

4. Please provide a copy of the FDA Summary of the Safety and Effectiveness Data for this (Device) __________.

5. Please provide (Plaintiff) __________’s cumulative medical record from (Facility) __________ from (Date) __________ to (Date) __________.

6. Please provide any shadow charts or files from all the facilities where (Plaintiff) __________ was seen (Date) __________ to (Date) __________.

7. Please provide a master file of the (Device) __________’s incremental safety checks or transmission of information from the device to (Facility) __________ from (Date) __________ to (Date) __________.

8. Please provide the name, location and contact information for each subcontractor company that manufactures and distributes a part of the (Device) __________.

9. Please provide all the mandatory reporting associated with the (Device) __________ including all manufacturers, device user facilities and importers.

10. Please provide all the voluntary reporting associated with the (Device) __________ including reports from healthcare professional, patients, caregivers and consumers.

D. Requests for Production Directed to the Plaintiff

1. Please provide medical records from any hospital, clinic, surgery center, rehabilitation facility, primary care provider or any other licensed healthcare provider in this or any state from (Date) __________ to (Date) __________.

2. Please provide written instructions you received by the defendant(s), other physicians and nurses, or any member of (Facility) __________ before or after the insertion or implantation of (Device) __________ concerning symptoms or changes in your condition that you were to report to the defendant(s).
3. Please provide copies of the complaint made by (Plaintiff) ________ or made on the plaintiff’s behalf for any personal injuries similar or related to those identified in this complaint.

4. Please provide any written correspondence created by (Plaintiff) ________ related to the incident on (Date) _________.

5. Please provide (Plaintiff) ________’s employment records with date of hire, position and hourly wage as of (Date) _________.

6. Please provide (Plaintiff) ________’s employment records with dates and hours for any absences from (Date) ________ to (Date) ________.

7. Please provide any and all wage or payroll records for (Plaintiff) ________ for the 12 months preceding this claim.

8. Please provide any and all reports produced by the experts who (Plaintiff) ________ anticipates will testify at the trial in this case.

9. Please provide all curriculum vitae(s) of any experts who (Plaintiff) ________ anticipates will testify at the trial in this case.

10. Please provide a copy of any and all billing records associated with the implantation of (Device) ________ from (Date) ________ to (Date) ________.

VII. RECOMMENDED QUALIFICATIONS FOR CLNC® SUBCONTRACTORS FOR MEDICAL DEVICE CASES

A. Regulatory Experience

1. As a medical device reviewer in any of the medical device panels.

2. In premarket reviews.

3. In post-market surveillance.

4. As an end-user or in-patient teacher with the device.

B. Credentials Matching the Device Type and Medical Condition Involved
VIII. CASE STUDIES

A. Contaminated Combination Product in an Oncology Patient (Exhibit F)
   1. Applicable standards.
   2. Resources. (Exhibit H and I)

B. Contaminated Combination Product in a Dialysis Patient (Exhibit G)
   1. Applicable standards.
   2. Resources. (Exhibit H and I)

IX. RESOURCES

A. Associations and Organizations
   1. American Nephrology Nurses Association. annanurse.org
   2. Heart Rhythm Society. hrsonline.org
   3. Infusion Nurses Society. ins1.org
   4. Medical Device Manufacturers Association. medicaldevices.org
   5. Oncology Nursing Society. ons.org

B. Authoritative Textbooks
C. Journal Articles


D. Websites

1. FDA: CDRH Learn.  
   [fda.gov/Training/CDRHLearn/default.htm](http://fda.gov/Training/CDRHLearn/default.htm)

2. FDA: Device Advice: Comprehensive Regulatory Assistance.  
   [fda.gov/MedicalDevices/DeviceRegulationandGuidance/default.htm](http://fda.gov/MedicalDevices/DeviceRegulationandGuidance/default.htm)

3. FDA: Medical Device Databases.  
   [fda.gov/MedicalDevices/DeviceRegulationandGuidance/Databases/default.htm](http://fda.gov/MedicalDevices/DeviceRegulationandGuidance/Databases/default.htm)
## Exhibit A
### Medical Device Law

<table>
<thead>
<tr>
<th>Year</th>
<th>Legislation</th>
<th>Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1938</td>
<td>Federal Food, Drug, and Cosmetic Act (FD&amp;C)</td>
<td>Provided authority to the U.S. Food and Drug Administration (FDA) to oversee the safety of food, drugs, and cosmetics.</td>
</tr>
<tr>
<td>1938</td>
<td>Wheeler-Lea Act</td>
<td>Provided authority to the Federal Trade Commission to oversee advertising of all products regulated by FDA, other than prescription drugs.</td>
</tr>
<tr>
<td>2002</td>
<td>Federal Food, Drug, and Cosmetic Act (Amendment to the FD&amp;C)</td>
<td>Authorized FDA to assess fees for the review of premarket submissions.</td>
</tr>
<tr>
<td>2007</td>
<td>Food and Drug Administration Amendments Act (FDAAA) of 2007</td>
<td>Provided reauthorization to collect user fees from industry to fund reviews. User fees build upon prior legislation authorizing:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Prescription drug provisions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Medical device provisions.</td>
</tr>
<tr>
<td>2012</td>
<td>Food and Drug Administration Safety and Innovation Act (FDASIA)</td>
<td>Provides reauthorization to collect user fees from industry to fund reviews; promotes innovation to expedite patient access; increases stakeholder involvement in FDA process; and increases the safety of the drug supply chain. User fees build upon prior legislation authorizing:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Prescription drug provisions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Medical device provisions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Generic Drug User Fee Amendments of 2012.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Biosimilar User Fee Act.</td>
</tr>
</tbody>
</table>
Exhibit B
Medical Device Classification and Panels

The Food and Drug Administration has established a classification system for approximately 1,700 different types of devices and divided the devices into 16 medical specialty panels. Each of these types of devices is assigned to one of three regulatory classes based on the level of control necessary to assure the safety and effectiveness of the device.

<table>
<thead>
<tr>
<th>Device Class</th>
<th>Regulatory Controls</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class I</strong> low risk/low tech</td>
<td>General Controls: generally exempt from premarket approval or from quality systems regulation</td>
<td>Manual stethoscopes, hydrogel wound/burn dressings, general surgical instruments</td>
</tr>
<tr>
<td><strong>Class II</strong> moderate risk/moderate tech</td>
<td>General Controls and Special Controls apply: premarket approval general required (sometimes exempt)</td>
<td>Electronic stethoscopes, wound dressings with poly additives, endoscopes, infusion pumps, daily wear contact lenses, biliary stents</td>
</tr>
<tr>
<td><strong>Class III</strong> high risk/high tech</td>
<td>General Controls and Premarket Approval: premarket approval required; novel technology, novel indication</td>
<td>Mammography imaging systems, vascular stents, drug-eluting stents, extended wear contact lenses, spinal cord stimulators</td>
</tr>
</tbody>
</table>

**General Controls:** Defined as requirements focused on device company registration, medical device listings, quality systems regulations (cGMP), labeling, recordkeeping, and reporting medical device failures to the FDA.

**Specific Controls:** Defined as requirements more specialized than general controls focused on special labeling, documentation of following industry standards, adherence to facets contained in publically available, final FDA guidance documents, postmarket surveillance (e.g. post-approval studies), and maintaining patient registries.
<table>
<thead>
<tr>
<th>Panel Name</th>
<th>Code of Federal Regulations (CFR) Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesiology</td>
<td>Part 868</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>Part 870</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Part 862</td>
</tr>
<tr>
<td>Dental</td>
<td>Part 872</td>
</tr>
<tr>
<td>Ear, Nose, Throat</td>
<td>Part 874</td>
</tr>
<tr>
<td>Gastroenterology and Urology</td>
<td>Part 876</td>
</tr>
<tr>
<td>General and Plastic Surgery</td>
<td>Part 878</td>
</tr>
<tr>
<td>General Hospital</td>
<td>Part 880</td>
</tr>
<tr>
<td>Hematology</td>
<td>Part 864</td>
</tr>
<tr>
<td>Immunology</td>
<td>Part 866</td>
</tr>
<tr>
<td>Microbiology</td>
<td>Part 886</td>
</tr>
<tr>
<td>Neurology</td>
<td>Part 882</td>
</tr>
<tr>
<td>Obstetrical and Gynecological</td>
<td>Part 884</td>
</tr>
<tr>
<td>Ophthalmic</td>
<td>Part 886</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>Part 888</td>
</tr>
<tr>
<td>Pathology</td>
<td>Part 864</td>
</tr>
<tr>
<td>Physical Medicine</td>
<td>Part 890</td>
</tr>
<tr>
<td>Radiology</td>
<td>Part 892</td>
</tr>
<tr>
<td>Toxicology</td>
<td>Part 862</td>
</tr>
</tbody>
</table>


This database includes a codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government.

**Title 21** of the CFR is dedicated to the rules of the Food and Drug Administration.

*For more information: See Title 21 CFR, Parts 801, 807, 820.*
## Exhibit C
### Major Medical Device Application Types

<table>
<thead>
<tr>
<th>Application Type</th>
<th>Description</th>
<th>What Data Is Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PMA</strong> <em>Premarket approval</em></td>
<td>New or high-risk medical devices that require a more rigorous premarket review than the 510(k) pathway.</td>
<td>Preclinical data if applicable and available and clinical data that demonstrates safety and efficacy.</td>
</tr>
<tr>
<td><strong>510(k)</strong></td>
<td>New devices that have been shown to be &quot;substantially equivalent&quot; to devices that are already marketed legally for the same use.</td>
<td>Preclinical data if applicable and available and clinical data that demonstrates safety and efficacy. May use data generated from other sources or prior applications from other industry sponsors.</td>
</tr>
<tr>
<td><strong>IDE</strong> <em>Investigational device exemption</em></td>
<td>Allows the investigational device to be used in a clinical study in order to collect safety and effectiveness data.</td>
<td>Data is generated after the IDE application is approved. Data is used to prepare for and support a PMA or 510(k) in the future.</td>
</tr>
<tr>
<td><strong>HDE</strong> <em>Humanitarian use device</em></td>
<td>Device that is intended to benefit patients by treating or diagnosing a disease or condition that affects fewer than 4,000 individuals in the U.S. per year. Exempt from the effectiveness requirements of a PMA.</td>
<td>Not required to contain the results of scientifically valid clinical investigations demonstrating that the device is effective for its intended purpose. Must contain sufficient information for FDA to determine that the device does not pose an unreasonable or significant risk of illness or injury, and that the probable benefit to health outweighs the risk of injury or illness from its use.</td>
</tr>
<tr>
<td><strong>De Novo</strong></td>
<td>Device types that have never been marketed in the U.S. but whose safety profile and technology are fairly well understood.</td>
<td>Preclinical data if applicable and available and clinical data that demonstrates safety and efficacy.</td>
</tr>
</tbody>
</table>
Exhibit D
Postmarket Surveillance: Mandatory and Voluntary
Medical Device Reporting Basics

The goal of postmarket surveillance is to monitor device performance, detect potential
device-related safety issues, and contribute to benefit-risk assessments of medical
device products. There are two types of reporting: (a) Mandatory and (b) Voluntary.

**Mandatory reporters:** Manufacturers, device user facilities and importers who are
required to submit certain types of reports for adverse events and product problems to
the FDA about medical devices. Examples of device user facilities: Hospitals,
ambulatory surgical facilities, nursing homes, outpatient diagnostic facilities or
outpatient treatment facilities (Not physicians’ offices).

**Voluntary reporters:** Healthcare professionals, patients, caregivers, consumers who
can submit reports of serious adverse events that may be associated with a medical
device, as well as user errors, product quality issues and therapeutic failures.

<p>| Medical Device Mandatory Reporting by Manufacturers, Importers and Device User Facilities |
|---------------------------------|------------------|------------------|---------------------------------|</p>
<table>
<thead>
<tr>
<th><strong>Reporter</strong></th>
<th><strong>Report Content</strong></th>
<th><strong>Reporting To</strong></th>
<th><strong>Timeframe After Becoming Aware of an Event</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturers</td>
<td>Death, serious injuries, device malfunction</td>
<td>FDA</td>
<td>Within 30 calendar days</td>
</tr>
<tr>
<td></td>
<td>Events designated by FDA that require remedial action to prevent an unreasonable risk of substantial harm to the public health</td>
<td>FDA</td>
<td>Within 5 work days</td>
</tr>
<tr>
<td>Importers</td>
<td>Reports of deaths and serious injuries</td>
<td>FDA and the manufacturer</td>
<td>Within 30 calendar days</td>
</tr>
<tr>
<td></td>
<td>Reports of malfunctions</td>
<td>FDA and the manufacturer</td>
<td>Within 30 calendar days</td>
</tr>
<tr>
<td>Device User Facility</td>
<td>Device-related death</td>
<td>FDA and the manufacturer</td>
<td>Within 10 work days</td>
</tr>
<tr>
<td></td>
<td>Device-related serious injury</td>
<td>Manufacturer; FDA only if manufacturer unknown</td>
<td>Within 10 work days</td>
</tr>
<tr>
<td></td>
<td>Annual summary of death &amp; serious injury reports</td>
<td>FDA</td>
<td>January 1 for preceding year</td>
</tr>
</tbody>
</table>
Caveats

- Due to known under-reporting of events and lack of information about frequency of device use, the incidence or prevalence of an event cannot be determined from this reporting system alone.
- Confirming whether a device actually caused a specific event is difficult based only on information provided in a report. If the circumstances surrounding the event have not been verified or if the device in question has not been directly evaluated, it is difficult to establish a cause-and-effect relationship.
- MAUDE (Manufacturer and User Facility Device Experience) data does not represent all known safety information for a medical device and needs to be evaluated in the context of other available information when making device-related or treatment decisions.
- Submission of a medical device report and the FDA's release of that information is not an admission that a product, user facility, importer, distributor, manufacturer or medical personnel caused or contributed to the event.
## Exhibit E
### Major Medical Device Databases

<table>
<thead>
<tr>
<th>Database</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisory Committee – Panel Meetings</td>
<td>Summaries and transcripts from FDA Advisory and Panel Meetings from 2008 to the present.</td>
</tr>
<tr>
<td>CDRH Inspections</td>
<td>Documentation of FDA inspections of medical device manufacturers from 2008 to the present.</td>
</tr>
<tr>
<td>Clinical Laboratory Improvement Amendments</td>
<td>Laboratory test systems in categories from 2000 to the present in addition to the CDC prior to 2000.</td>
</tr>
<tr>
<td>Home Use (Over the Counter) Lab Tests</td>
<td>Searchable listing of OTC collection kits that are FDA cleared or approved.</td>
</tr>
<tr>
<td>FDA Certified Mammography Facilities</td>
<td>Searchable system of certified mammography facilities by state and zip code.</td>
</tr>
<tr>
<td>Manufacturer and User Facility Device Experience (MAUDE)</td>
<td>Adverse event reports submitted by mandatory reporters and voluntary reporters from 1993 to the present.</td>
</tr>
<tr>
<td>Medical Device Reporting (MDR)</td>
<td>Reports of devices that malfunctioned or caused death or serious injury from 1992 to 1996.</td>
</tr>
<tr>
<td>Premarket Approvals (PMA)</td>
<td>Premarket approval documents searchable by trade name, industry sponsor, PMA number, dates of approval, among other options.</td>
</tr>
<tr>
<td>Premarket Notifications (510(k))</td>
<td>Premarket notification approval documents searchable by trade name, industry sponsor, 510(k) number, dates of approval, among other options.</td>
</tr>
<tr>
<td>Recalls of Medical Devices</td>
<td>Medical device recalls from 2002 to the present.</td>
</tr>
<tr>
<td>FDA-Recognized Consensus Standards</td>
<td>List of standards by which industry sponsors declare conformity to that may be used to determine clearance or approval of a medical device.</td>
</tr>
</tbody>
</table>
Exhibit F  
Contaminated Combination Product in an Oncology Patient

<table>
<thead>
<tr>
<th>Last Name, First Name</th>
<th>Date of Birth</th>
<th>Underlying Diagnosis (es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB</td>
<td>2/14/0000</td>
<td>Myelodysplastic Syndrome</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Admitting Facility</th>
<th>Admit Date/Discharge Date</th>
<th>Presenting Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haven Hospital</td>
<td>1/7/0000, 1/11/0000, 5 days</td>
<td>Weakness, fatigue, lower back pain</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bacteria/Organism (s)</th>
<th>Implanted Access Device Involved in the Infection</th>
<th>Complexity of Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Bacteria</td>
<td>Portacath</td>
<td>Not complex</td>
</tr>
</tbody>
</table>

Causation

Was there a direct relationship between the presence of the identified bacteria and the progression of the patients’ medical condition?  
✔ Yes  ☐ No

Summary of Events

BB is an 82-year-old male who presented to the emergency department on 1/7/0000 with complaints of generalized weakness, fatigue, and lower back pain and was admitted for monitoring. His WBC was elevated at 19,000 (normal 4000-10000). Blood cultures drawn upon admission showed growth of Serious Bacteria in lab cultures. Urinalysis and urine culture were absent of bacteria, and the original diagnosis of urosepsis was changed to bacteremia/sepsis. BB typically receives two units of red blood cells every two weeks for anemia related to the myelodysplastic syndrome. He was anemic upon admission at 8.4g/dl (normal 12-16g/dl). His troponin level was elevated, and a cardiac evaluation including echocardiogram was performed to assess his heart function. It was determined that the elevated troponin was related to sepsis or chronic angina rather than a change in his heart condition.

Summary of Treatment Regimen (Clinical Diagnoses and Treatment)

(1) Bacteremia caused by Serious Bacteria treated with hospitalization and intravenous antibiotics for a 14-day period. BB was discharged to home in the middle of his 14-day regimen with an order for blood cultures every 2 days after the 14-day course was completed; (2) Anemia caused by myelodysplastic syndrome.

Impression(s) of Case

Infection with Serious Bacteria via the blood stream was directly related to the development of sepsis. This septic event required hospitalization but he recovered from the infection with antibiotics. This septic event was not a result of his myelodysplastic syndrome diagnosis.
### Exhibit G
Contaminated Combination Product in a Dialysis Patient

<table>
<thead>
<tr>
<th>Last Name, First Name</th>
<th>Date of Birth</th>
<th>Underlying Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>7/13/0000</td>
<td>End Stage Renal Disease</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Admitting Facility</th>
<th>Admit Date/Discharge Date</th>
<th>Presenting Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hogan Medical Center</td>
<td>1/13/0000, 1/18/0000, 6 days</td>
<td>Chills, fever, leg pain, chest tightness</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bacteria/Organism(s)</th>
<th>Implanted Access Device Involved in the Infection</th>
<th>Complexity of Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Bacteria</td>
<td>Right internal jugular catheter</td>
<td>Not complex</td>
</tr>
</tbody>
</table>

### Causation
Was there a direct relationship between the presence of the identified bacteria and the progression of the patients’ medical condition?  

☑ Yes  ☐ No

### Summary of Events
CC is an 88-year-old female who developed a shaking chill, severe pain in her leg muscles and tightness in her chest during her hemodialysis treatment on 1/12/0000 followed by a temperature elevated to 101F. Blood cultures were drawn, and CC received doses of intravenous antibiotics (vancomycin and gentamicin) in the dialysis clinic and was sent back to the nursing home overnight. The blood cultures drawn on 1/12/0000 grew Serious Bacteria in 2 of 2 bottles, and CC was admitted to the hospital for further intravenous antibiotics and monitoring. She again experienced shaking chills on 1/15/0000 during dialysis with shortness of breath and leg pain. The dialysis catheter was removed after 2 more blood culture bottles were drawn, and additional antibiotics were given during hemodialysis. According to the Discharge Summary written by the attending physician, “…it became apparent that other patients were also developing shaking chills at the same dialysis unit with blood cultures being positive for Serious Bacteria…all contaminated medication was removed from the shelves.” CC’s overall status improved on intravenous antibiotics for a 3-week course with dialysis. She required a new arteriovenous fistula placement in order to continue dialysis.

### Summary of Treatment Regimen (Clinical Diagnoses and Treatment)

(1) Bacteremia caused by Serious Bacteria, treated by hospitalization, intravenous antibiotics and the removal of a permanent internal jugular catheter followed by a planned new placement of a permanent catheter.
Impression(s) of Case

Infection with *Serious Bacteria* via the blood stream was directly related to the development of sepsis. This septic event required hospitalization but she recovered from the infection. This infection did not cause nor was it a result of her other medical problems.
# Exhibit H

## Gram-Negative Bacteremia in Adults

<table>
<thead>
<tr>
<th>Relevant Topic</th>
<th>Clarifying Information Relevant to Cases</th>
</tr>
</thead>
</table>
| **Introductory Remarks** | - Bloodstream infection (bacteremia) is a major cause of morbidity and mortality.  
   - Bacteremia due to gram-negative organisms is a significant problem in hospital and community-dwelling patients.  
     o Gram negative organisms can either be rods or cocci. *Serious Bacteria* is an example of a gram-negative rod or GNR.  
     o The mortality rate of patients with gram-negative bacteremia is 12%-38%. Gram-negative bacteremia sepsis with shock has a mortality rate of 30-50%. Mortality depends, in part, on whether the patient receives timely and appropriate antibiotic therapy.  
       o Morbidity refers to the disease state of an individual, or the incidence of illness in a population. Patients with sepsis have a higher morbidity than patients without sepsis. |
| **Epidemiology**     | - Most hospitalized patients with gram-negative bacteremia have at least one underlying medical problem.                                                                                                                                    |
| **Pathogenic Factors** | - The major clinical manifestation of gram-negative bacteremia is the sepsis syndrome.  
   - Sepsis results from a complicated inflammatory reaction in which the infected cells release “toxins” into the bloodstream. *Serious Bacteria* is among a few gram negative rods that produce higher levels of toxins. |
| **Clinical Manifestations** | - Patients with gram-negative bacteremia typically present with fever with or without chills. The fever is usually short-lived (less than 72 hours).  
   - Aside from fever, symptoms associated with the development of septic shock are disorientation (decreased level of consciousness, confusion), hypotension (low blood pressure) and respiratory failure (requiring oxygen therapy, intubation, ventilator support).  
   - Gram-negative bacteremia rarely occurs without infection at another site. The exceptions to the rule are: (1) patients with insufficient white blood cell counts [neutropenia, generally during or after chemotherapy] and (2) patients without spleens. |
<table>
<thead>
<tr>
<th>Relevant Topic</th>
<th>Clarifying Information Relevant to Cases</th>
</tr>
</thead>
</table>
| **Management** | • Treatment requires urgent antibiotics, good supportive care, careful monitoring, and control of the source of infection. Control of the source of infection may require surgical drainage or removal of the intravenous/intravascular catheter.  
• Intravenous antibiotic therapy should be initiated immediately after obtaining blood cultures, cultures of the suspected source of infection, or after receiving confirmation from the microbiology laboratory reporting positive blood cultures.  
• The choice of antibiotics should consider the patient's history, other underlying medical conditions, current clinical status, sensitivities to antibiotics as determined by the microbiology lab, and previous culture results (if applicable).  
• Treatment recommendations are based on retrospective or observational case series and on the knowledge of the patient or hospital's prior GNR sensitivity date.  
• For immunocompetent (fully-functioning immune system) patients without signs of severe sepsis or septic shock, broad-spectrum antibiotic coverage is recommended.  
• In most cases, 7-14 days of antibiotics is recommended beginning with the intravenous route but once the fever is absent for 48 hours, the route may be changed to an oral agent with similar bacterial coverage. |
| **Control of the Source of Infection** | • Along with antibiotic therapy, bacteremia management requires the identification of the infection source and resolution of the infection. Catheter-related GNR bacteremia most commonly requires the removal of the catheter in order to prevent a recurrence of the infection. |
| **Supportive Care** | • Patients who developed severe sepsis or septic shock should be managed in an ICU setting. |
| **Prognosis** | • One of many factors associated with a higher mortality rate is the presence of a central venous catheter. Other factors are: Acute respiratory distress syndrome, septic shock, disseminated intravascular coagulation (severe bleeding disorder triggered by the body's immune response), anuria (no urine output), unknown origin of infection and inappropriate antibiotic treatment. |
Original reference article:

## Exhibit I

**Sepsis, Septic Syndrome and Septic Shock Defined**

<table>
<thead>
<tr>
<th>Relevant Topic</th>
<th>Clarifying Information Relevant to Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sepsis</strong></td>
<td>The condition that results when an organism is introduced into the bloodstream and the immune system responds to preserve the integrity of all organs. The term ‘sepsis’ is interchangeable with septic syndrome. These terms also overlap with the term ‘septicemia’ which is the condition resulting from the infectious process’ entrance into the body’s circulation and beginning of the body’s struggle and eventual cascade of deterioration in the body’s health maintenance.</td>
</tr>
<tr>
<td><strong>Septic Syndrome</strong></td>
<td>A constellation of signs, symptoms and systemic responses caused by a wide range of microorganisms that may eventuate into septic shock; a systemic response to the presence of infection.</td>
</tr>
<tr>
<td></td>
<td>Defining parameters of septic syndrome are:</td>
</tr>
<tr>
<td></td>
<td>1. Temperature Hypothermia &lt; 35°C–96°F or hyperthermia &gt; 39°C–101°F.</td>
</tr>
<tr>
<td></td>
<td>2. Tachycardia &gt; 90 beats/minute.</td>
</tr>
<tr>
<td></td>
<td>3. Tachypnea &gt; 20 breaths/minute.</td>
</tr>
<tr>
<td></td>
<td>4. Site of infection: Clinically evident focus of infection or positive blood cultures.</td>
</tr>
<tr>
<td></td>
<td>5. Organ dysfunction: 1+ end organs with either dysfunction or inadequate perfusion or cerebral dysfunction.</td>
</tr>
<tr>
<td></td>
<td>6. Metabolic changes: Hypoxia–PaO₂ &lt; 75 mm Hg, ↑ plasma lactate/unexplained metabolic acidosis.</td>
</tr>
<tr>
<td></td>
<td>7. Fluid imbalance: Oliguria&lt; 30 mL/hr.</td>
</tr>
<tr>
<td></td>
<td>8. WBC counts &lt; 2.0 x 10⁹/L; &gt; 12.0 x 10⁹/L–US: &lt; 2000/mm³; &gt; 12 000/mm³.</td>
</tr>
<tr>
<td></td>
<td>In other words: A combination of low/high temperature, rapid heart rate, rapid breathing, organism growing in lab cultures, organ dysfunction (kidney, brain, heart, lungs leading to poor kidney function, decreased level of consciousness, changes in mental status, confusion), body’s heart and lungs try to compensate, urine output decreases, white blood cell counts are either very low or very high.</td>
</tr>
<tr>
<td></td>
<td>o Very low white blood cells counts are possible after chemotherapy and individuals may have immature white blood cell reserves, thereby, not allowing their immune system to fight off infection.</td>
</tr>
<tr>
<td>Relevant Topic</td>
<td>Clarifying Information Relevant to Cases</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>o Very high white blood cell counts reflect the immune system’s increased activity (also called “mounting a response”) to fight the infection in that more white blood cell sub-lines grow/develop in response to the “fight.”</td>
</tr>
<tr>
<td>Septic Shock</td>
<td>• The condition where the presence of infection and its toll on the body can potentially become irreversible.</td>
</tr>
</tbody>
</table>