FDA Update on Infections Associated with Reprocessed Duodenoscopes

HICPAC

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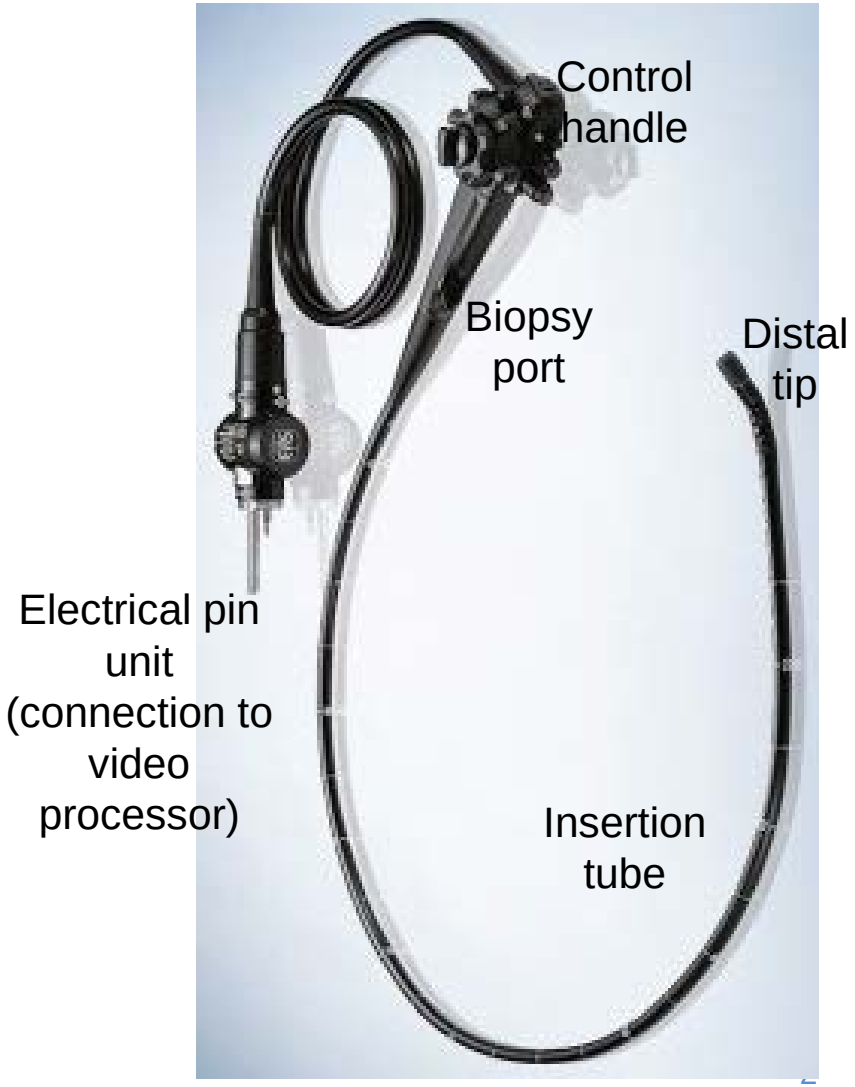
Shani Haugen, Ph.D., Microbiologist
Center for Devices and Radiological Health
U.S. Food and Drug Administration

Infections Associated with Reprocessed Duodenoscopes

- In September 2013, CDC alerted FDA of association of multi-drug resistant organism infections and duodenoscopes

- Since that time, healthcare facilities have reported infections associated with duodenoscope use



http://www.medtechtrade.com/en/equipment/duodenoscope-2

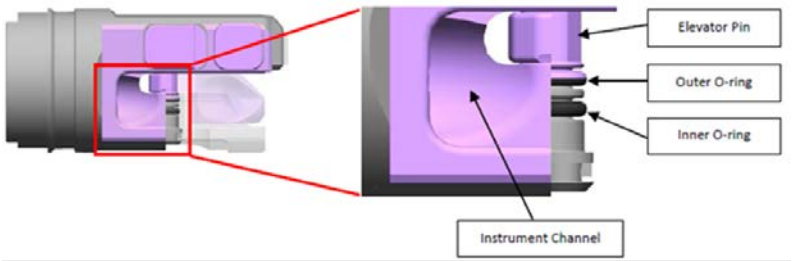
FDA Actions:

Revised Reprocessing Instructions

- FDA worked with duodenoscope manufacturers as they updated and validated their reprocessing instructions
- Updated instructions include additional cleaning and disinfection steps for the elevator recess

http://www.medtechtrade.com/en/equipment/duodenoscope-2

FDA Actions:
Device Design



- FDA cleared duodenoscopes with design modifications to the elevator channel sealing mechanism
- The labeling was also revised to recommend annual inspection to identify wear and tear

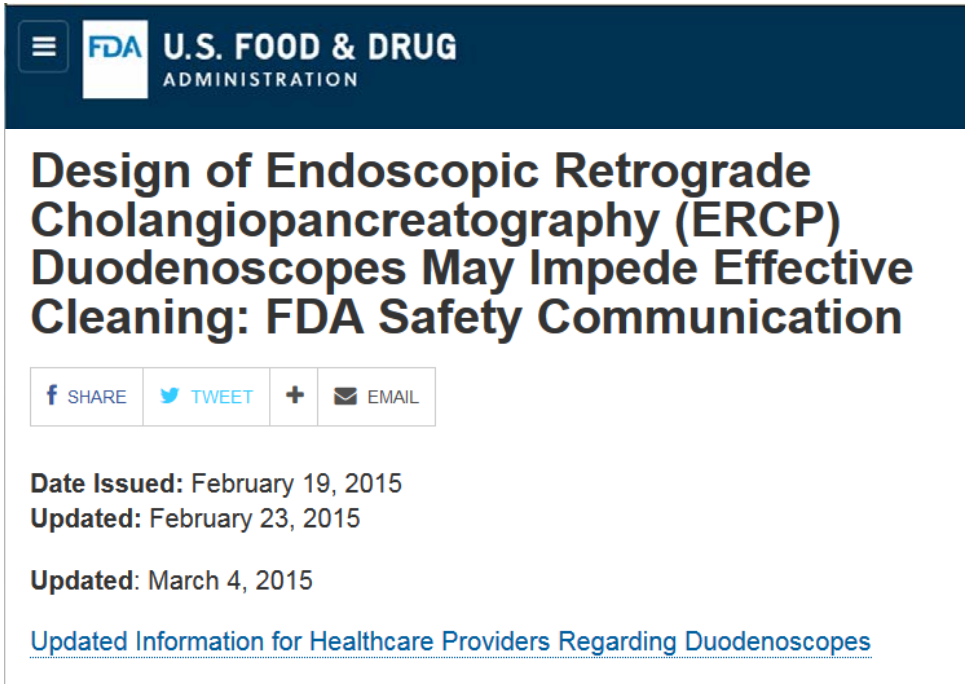
- New duodenoscope device designs

www.fda.gov

https://www.pentaxmedical.com/pentax/en/99/1/PENTAX-MEDICAL-RECEIVES-BREAKTHROUGH-TECHNOLOGY-AWARD-FROM-PREMIER-INC-FOR-CAP-HD-DUODENOSCOPE

FDA Actions:
Outreach

- February 2015 FDA Safety Communication
- 2015 FDA Advisory Committee Meeting
- 2015 HICPAC Meeting



- Additional Communications: revised reprocessing instructions, clearance/recall of duodenoscopes, webpage for Infections Associated with Reprocessed Duodenoscopes

Prior FDA Actions:
Supplemental Measures

- FDA released a summary of supplemental measures to enhance duodenoscope reprocessing that emerged from the Advisory Committee meeting (August 2015)

- FDA worked with CDC and ASM to develop a protocol for sampling and culturing duodenoscopes (February 2018)

Prior FDA Actions:
Regulatory Actions

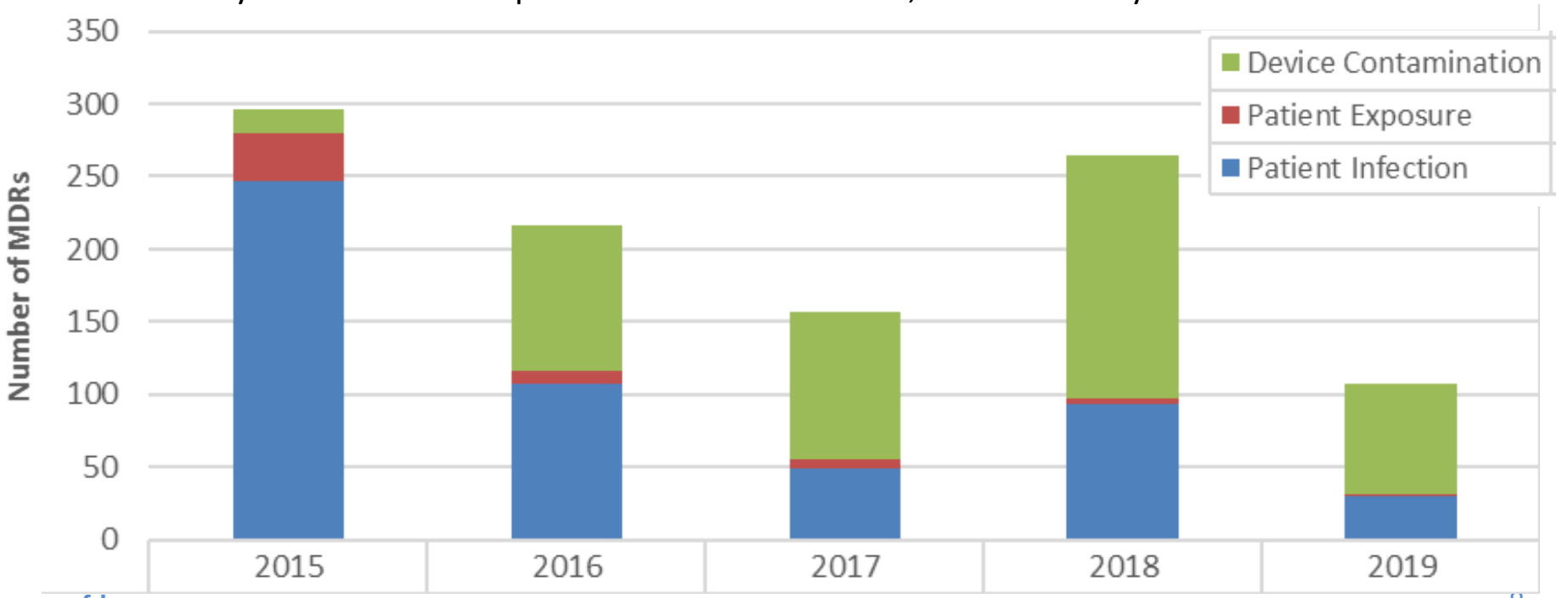
- FDA conducted directed inspections and issued Warning Letters to duodenoscope manufacturers in 2015
- In October 2015, FDA ordered duodenoscope manufacturers to conduct postmarket surveillance studies
  - Human factors studies and Sampling/culturing studies
  - FDA issued Warning Letters in March 2018 for failing to comply with postmarket surveillance studies

Current Data:
Duodenoscope Medical Device Reporting

- In 2018, 3 deaths were reported in the US related to duodenoscopes
- Reports of infections declined from 2015
- There is a continued need to improve the safety of reprocessed duodenoscopes

Duodenoscope MDRs associated with infection, exposure, or device contamination

* Note that the year is when the report was submitted to FDA, not necessarily the date of event



https://www.fda.gov/medical-devices/safety-communications/fda-continues-remind-facilities-importance-following-duodenoscope-reprocessing-instructions-fda

Current Data: Human Factors Validation Testing Report

- Results from human factors studies indicate that reprocessing instructions in current user manuals can be strengthened because they are difficult for reprocessing staff to comprehend and follow
  - Some reprocessing staff missed one or more steps in the process and needed additional training to complete the process properly
  - The descriptions of some of the processing steps in the user manuals were unclear

Current Data:

Interim Sampling and Culturing Results

- Up to 3.6% of properly collected samples tested positive with low to moderate concern organisms > 100 CFU
- Up to 5.4% of properly collected samples tested positive for high concern organisms, defined as organisms that are more often associated with disease, such as *E. coli* and *Pseudomonas aeruginosa*

https://www.fda.gov/medical-devices/safety-communications/fda-continues-remind-facilities-importance-following-duodenoscope-reprocessing-instructions-fda

Literature: Supplemental Measures

- Survey results indicate widespread implementation of supplemental measures to enhance duodenoscope reprocessing (Thaker 2018)
  - Of 249 facilities, 90% implement one or more supplemental measures

Repeat manual cleaning and HLD 157/249 (63%)	Surveillance microbiological culturing 133/249 (53%)	Liquid chemical sterilization 86/249 (35%)	Ethylene oxide gas sterilization 30/249 (12%)

Literature: Supplemental Measures

- Results of the sampling/culturing postmarket surveillance study are consistent with published reports (Bartles 2018, Rauwers 2018, Ross 2015, Rex 2018, Snyder 2017, Visrodia 2017)
  - Some percentage of duodenoscopes remain contaminated after use
- Repeat HLD does not significantly impact the contamination rate compared to single HLD (Bartles 2018, Snyder 2017)

Reprocessing Validation

Process	Test Organism Inoculum	Minimum bacterial count	Test Cycle	Test Endpoints
High Level Disinfection	*Mycobacterium terrae (*in soil)	6 $\log_{10}$	Full cycle (minimum cycle conditions)	6 $\log_{10}$ reduction
Liquid Chemical Sterilization	*Bacillus atrophaeus* spores (in soil)	6 $\log_{10}$	Full cycle (minimum cycle conditions)	6 $\log_{10}$ reduction
Ethylene Oxide Sterilization	*Bacillus atrophaeus* spores (no soil)	6 $\log_{10}$	Half cycle	Complete microbial inactivation

Literature: Sterilization

- Contamination rates after EO sterilization are variable (Naryzhny 2016, Snyder 2017)
- Ethylene oxide sterilization of duodenoscopes led to cessation of outbreaks (Epstein 2015, Smith 2015, Humphries 2017)
- Additional sterilization technologies are in development for duodenoscopes (Molloy-Simard 2019)

FDA Conclusion

- Current practices for reprocessing duodenoscopes are not sufficient to avoid all infections associated with the use of duodenoscopes
- In appropriately selected patients, the benefits of the procedure still outweigh the risks

Questions the FDA is Exploring

What changes could be made to ensure the safer use of duodenoscopes, and how should those changes be implemented, considering potential challenges?

Questions the FDA is Exploring

Given the information provided today, what level of concern do you have regarding the safety of reprocessed duodenoscopes?

Questions the FDA is Exploring

Do you think high level disinfection provides an adequate assurance of safety?

Questions the FDA is Exploring

What are the challenges to sterilizing duodenoscopes?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ADMINISTRATION

FDA Duodenoscope Website: https://www.fda.gov/medical-devices/reprocessing-reusable-medical-devices/infections-associated-reprocessed-duodenoscopes

Revised Reprocessing Instructions:

Olympus March 2015: http://wayback.archive-it.org/7993/20170722213115/https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm439999.htm

Fujifilm December 2015: http://wayback.archive-it.org/7993/20170722062401/https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm478290.htm

Pentax February 2016: http://wayback.archive-it.org/7993/20171115052156/https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm486772.htm

Clearance of Modified Duodenoscopes

Olympus January 2016: https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm481956.htm

Fujifilm July 2017: https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm567793.htm

Pentax February 2018: https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm595603.htm

Additional Resources:

FDA AER website:
https://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ReprocessingofReusableMedicalDevices/ucm483896.htm

May 2015 Advisory Committee Meeting Summary: https://wayback.archive-it.org/7993/20170112083625/http:/www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/MedicalDevices/MedicalDevicesAdvisoryCommittee/Gastroenterology-UrologyDevicesPanel/UCM447407.pdf

August 2015 Supplemental Measures to Enhance Duodenoscope Reprocessing: https://wayback.archive-it.org/7993/20170406123633/https://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumanMedicalProducts/ucm457132.htm

October 2015 Postmarket Surveillance Studies: https://wayback.archive-it.org/7993/20180126064842/https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm465639.htm

522 Status: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMA/pss.cfm

FDA/CDC/ASM Surveillance Sampling and Culturing Protocol:
https://www.fda.gov/downloads/MedicalDevices/ProductsandMedicalProcedures/ReprocessingofReusableMedicalDevices/UCM597949.pdf

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