New York City
Department of Environmental Protection

Hillview *Cryptosporidium* and *Giardia* Action Plan

Guidelines for Inter-Agency Notifications and Coordination

Rev #9

Effective Date: December 1, 2018

** Appendix II (contact info) is for restricted distribution **

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Water Quality Science & Research

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REVISION HISTORY

Revision Number	Revision Date	Revisions made to prior version, starting with August 1, 2011 CGAP (Such as the section that was changed, the reasons for the change, etc., as appropriate.)
01	01/20/12	Updated several DOH, DOHMH, DEP phone numbers and contacts.
02	12/31/12	Revised in response to comments made after 3/1/12 functional exercise.
03	12/31/13	Reviewed and revised per annual review protocol. Revisions made primarily included updates to Contacts sheet and Background section.
04	12/31/14	Some revisions to actions for CGAP activation and deactivation, based upon 3/19/14 Plan activation. Also, minor revisions/updates to Background text, and updates to Contacts information. Notification templates added. (This version was distributed as a Draft Revised version, in order to allow comment before becoming effective: See Revision #5 below.)
05	02/02/15	This is the final version of revised 2014-2015 CGAP, which includes revisions contained in Revision #4 (issued 12/31/2014 as Draft Revised version), plus minor revisions/clarifications, per request by NYSDOH (1/14/15, P. Young)
06	12/30/15	Revised per annual review protocol. Revisions include updates to: Background section, Attachment C (Contacts sheet), Attachment A, and minor modifications to cover pages.
07	12/22/16	Revised per annual review protocol. Revisions include updates to: Background section, Attachment A, and Attachment C.
08	12/20/17	Revised as per recommendations from CGAP Functional Exercise on 5/23/17. Also report formatting revisions and new appendices.
09	11/16/2018	Updated contacts (Appendix II); updated communications flowchart (Appendix I); additions to resources listing (Appendix VI); wording re DAPI.

Acknowledgements: *Numerous individuals have contributed toward the development of the NYC CGAP document, and its predecessor, the NYC Cryptosporidium Action Plan (CAP). Initially developed in 2001, the NYC CAP was a NYCDEP & NYCDOHMH joint-agency effort coordinated under the NYC Waterborne Disease Risk Assessment Program. Lead author of the initial CAP document was A. Seeley, working with A. Ashendorff, S. Balter, and others. D. Lipsky was lead author in transition from CAP to CGAP. Since the transition to CGAP, updates have been coordinated by A. Seeley. Thanks to all for contributions toward this action plan series over the years, including staff of the NYCDEP Bureau of Water Supply, Water Quality Directorate, the NYCDOHMH Bureau of Communicable Diseases, and from other bureaus and agencies. For Revision #8, special thanks to L. Janus, and to P. Bennett for his work on the CGAP Functional Exercise held in May 2017.*

--- A. Seeley

CONTENTS

LIST OF ACRONYMS

AL	Action Level
BCD	Bureau of Communicable Diseases/NYCDOHMH
BESE	Bureau of Environmental Science & Engineering/NYCDOHMH
BPA	Bureau of Public Affairs
BWS	Bureau of Water Supply
BWSP	Bureau of Water Supply Protection
CAP	*Cryptosporidium* Action Plan
CDC	Communicable Disease Control/NYSDOH
CGAP	*Cryptosporidium* & *Giardia* Action Plan
DAPI	4'6-diamidino-2-phenylindole
DEP	NYC Department of Environmental Protection
DOH	NYS Department of Health
DOHMH	NYC Department of Health & Mental Hygiene
DWQO	BWS/WQ Distribution Water Quality Operations
EOH	BWS/WQ East of Hudson Watershed Water Quality Operations
EPA	US Environmental Protection Agency
HAN	NYCDOH Health Advisory Notice
HAPC	BWS/WQ Health Assessment & Policy Coordination
HVR	Hillview Reservoir
NSF	National Sanitation Foundation
NCYWT	New York City Watershed Team/USEPA
NYCWU	New York City Watershed Unit/NYSDOH
OEA	Office of External Affairs/NYCDOHMH
OPHE	Office of Public Health Engineering/NYCDOHMH
PDSP	Parasitic Disease Surveillance Program
RAU	Research Applications Unit/BWS
Site3	Hillview Reservoir Site #3 (Downtake #1)
WQD	Water Quality Directorate/BWS
WQSR	Water Quality Science and Research/BWS
WWQO	Watershed Water Quality Operations/BWS

BACKGROUND

The purpose of this Hillview *Cryptosporidium* and *Giardia* Action Plan (CGAP) is to provide guidance for intra- and inter-agency action and coordination in response to potential elevations in levels of either *Giardia* cysts or *Cryptosporidium* oocysts at Hillview Reservoir (HVR), Site 3 (Downtake 1)[1]. Sampling is currently performed by DEP on a weekly basis at Hillview Site 3. In developing the CGAP, the New York City Department of Environmental Protection (DEP) has assumed that all *Cryptosporidium* oocysts and *Giardia* cysts entering HVR from the source waters have been deactivated by UV treatment and chlorine. This Plan is intended to address elevated *Giardia* or *Cryptosporidium* concentrations that could theoretically originate from sources at the Hillview Reservoir, which is an uncovered, finished water reservoir regulated under the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).

The Hillview CGAP was initially developed based upon a review of *Cryptosporidium* and *Giardia* data from Kensico Reservoir for the period 2001-2010 and the results of the Hillview Reservoir (HVR) inflow and outflow study (conducted in 2006-2008)[2] of *Giardia* and *Cryptosporidium* (Alderisio, et al., 2008). The first CGAP (effective date: August 1, 2011), was a required deliverable under the Hillview Reservoir Administrative Order on Consent (AOC), SDWA-02-2010-8027, dated May 24, 2010. The 2010 Hillview AOC also required DEP to submit by December 31, 2012 any proposed revisions to the CGAP. The document is updated on an annual basis. (See the Hillview AOC and the subsequent "HVR AOC Technical Memorandum to EPA and NYSDOH from DEP", November 15, 2012, for revision requirements). Experience was gained from the CGAP activation of March 19, 2014 in response to an elevated *Giardia* finding at Hillview Reservoir. Revision #8 incorporates improvements gained from the May 2017 CGAP Functional Exercise, captured in the After Action Report, and Improvement Plan. The modifications made to the CGAP versions are summarized in the Revision History table (page i).

The NYC Cryptosporidium Action Plan (CAP), which was created prior to the CGAP, was developed for responding to the detection of *Cryptosporidium* in the City's source water reservoirs: Kensico Reservoir and the New Croton Reservoir. The CAP was created as part of a deliverable under the NYC Filtration Avoidance Determination (FAD) and did not directly address *Giardia* since any cysts detected in source water should be inactivated by chlorine. CAP documents were developed by NYC from 2001 to 2011. With the completion of NYC's Catskill/Delaware ultraviolet treatment plant (plant on line October 2012), the CAP has been phased out (per NYC FAD Long-Term Watershed Protection Program document, December 2011, page 83)[3]. Note that the Croton system had been off line for several years, and was brought back into service in 2015, following completion of the Croton Filtration Plant and associated infrastructure work. As Croton water is filtered and there is no open finished water reservoir involved, no action plan based on pathogen testing results is needed for the Croton System.

The Hillview CGAP has a baseline (no-action) level and two action levels, as well as de-escalation plans. The no-action level consists of enhanced scrutiny of Hillview Reservoir, and disease and syndromic, data. The first action level involves notification of the Director of Water Quality, who directs additional data gathering, data evaluation, and communication by conference calls with regulators. The second action level involves consideration of additional response actions, including operational and treatment changes, enhanced interagency communications at the Deputy Commissioner or Commissioner level, and potential advisories for the public.

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[1] Hillview Reservoir Site 3 located in Downtake 1 is also called BX-3 in some DEP reports.

[2] Alderisio, K.A. and S. DiLonardo. 2008. Monitoring of Giardia spp. cysts and Cryptosporidium spp. oocysts at the Uptakes and Downtakes of Hillview Reservoir (Yonkers, NY). NYC DEP Internal Report, December 2008.

[3] NYSDOH continues to use detection of 6 Giardia cysts/50L for a 2-week running average in Kensico source water as a benchmark that may trigger additional investigation of water system conditions.

GUIDELINES FOR INTER-AGENCY NOTIFICATION AND COORDINATION[4]

NO-ACTION LEVEL: 0 - 6 *GIARDIA* CYSTS OR 0-3 *CRYPTOSPORIDIUM* OOCYSTS DETECTED - SITE 3

PATHOGEN DATA DISTRIBUTION

Hillview, Site 3 (Downtake 1), *Giardia* and *Cryptosporidium* weekly monitoring results are sent from the DEP Pathogen Laboratory via e-mail.

SURVEILLANCE DATA REVIEW

DEP and the New York City Department of Health and Mental Hygiene (NYCDOHMH) conduct routine review of water quality and disease/syndromic surveillance data, respectively.

ACTION LEVEL 1: 7-15 *GIARDIA* CYSTS OR 4-6 *CRYPTOSPORIDIUM* OOCYSTS DETECTED - SITE 3

Follow steps in No-Action Level above.

NOTIFICATION – INTERNAL

Immediately following the detection of Action Level 1 (AL-1) levels of cysts or oocysts, the DEP Pathogen Laboratory Director will affirmatively contact the DEP Director of Water Quality and the Chiefs of the Water Quality Directorate, Bureau of Water Supply.

NOTIFICATION – EXTERNAL

The Director of Water Quality for the DEP Bureau of Water Supply or designee will affirmatively contact by email and/or phone the key individuals for the involved agencies:

- NYCDOHMH's Bureau of Communicable Disease (BCD) and its Bureau of Environmental Sciences and Engineering (BESE),
- NYSDOH Bureau of Water Supply Protection/NYC Watershed Unit (BWSP/NYCWU),
- USEPA's NYC Watershed Team (NYCWT).
- See Appendices I (notification flow chart) and II (contact information). The key individuals are responsible for notifying personnel and coordinating within their respective agencies.

DATA COMPILATION

DEP will assemble all available relevant water quality, water system operations, meteorological data, and protozoan data (*Giardia* and *Cryptosporidium*). DOHMH will provide relevant disease/syndromic surveillance information for the period surrounding the sampling date (taking into account the incubation period for *Giardia* or for *Cryptosporidium*). These data will be assembled and reviewed by staff at the NYCDOHMH and DEP. Appendix III

[4] *All Action Levels are based upon an approximately 50L sample*

provides a list of representative parameters to be considered for review. The data review will include water quality and other data both for Hillview Reservoir and Kensico Reservoir.

TREATMENT INFORMATION

DEP will also assemble and review information concerning the status of UV disinfection and chlorine disinfection from Kensico through to the distribution system entry points.

PATHOGEN MONITORING AT HILLVIEW

DEP will conduct additional monitoring at Hillview Site 3 for *Giardia* and *Cryptosporidium*, on an expedited basis.

- Duplicate samples should be collected, to be archived and analyzed in the event that the repeat sample has a high number of oocysts.
- Matrix spikes will be collected and analyzed with resamples

FURTHER ACTION DETERMINATION

To determine if any further action is warranted, as soon as possible after notification, the DEP's Water Quality Directorate (WQD) will confer with:

- NYCDOHMH's Bureau of Communicable Disease (BCD) and its Bureau of Environmental Sciences and Engineering (BESE),
- NYSDOH Bureau of Water Supply Protection/NYC Watershed Unit (BWSP/NYCWU), and
- USEPA's NYC Watershed Team (NYCWT).

Further actions to consider:

- No further action;
- Additional sampling of source waters, HVR uptakes and/or downtakes;
    - duplicate samples should be collected, to be archived and analyzed in the event that the repeat sample has a high number of oocysts
    - matrix spikes are required with all resamples
- Expedited sample processing times (to more rapidly assess any trends and determine the need for more frequent monitoring);
- An expedited sanitary survey at HVR;
- Calculation of CT Inactivation Ratios for secondary disinfection;
- Consideration will be given to analyzing and/or genotyping fecal matter collected at Hillview Reservoir for *Cryptosporidium* and/or *Giardia*;
- Escalation to AL-2, or to any of the actions included in AL-2.

Consider Context

- In deciding if additional actions are warranted, the data will be evaluated with respect to historic seasonal and temporal trends.

ACTION LEVEL 1: DE-ESCALATION PLAN

If results from a subsequent sampling event indicate that *Giardia* concentrations have dropped below 7 cysts/50 L or that *Cryptosporidium* concentrations have dropped below 4 oocysts/50L:

DATA REVIEW

All available relevant water quality, water system operations, meteorological data and disease/syndromic surveillance information for the period surrounding the sampling date will again be reviewed by staff at the NYCDOHMH and DEP (See Appendix III).

DEACTIVATION DETERMINATION

DEP's BWS/WQD will confer with NYCDOHMH's BCD and BESE, the NYSDOH BWSP/NYCWU, and USEPA NYCWT. If data from successive *Giardia* and *Cryptosporidium* sample(s), disease/syndromic monitoring and other data indicate there is no need for continued response actions under Action Level 1, these data will be presented during the conference call and the Action Level 1 alert will be rescinded or modified, as appropriate. If data are pending during the joint-agency deactivation conference call, the parties to the call may make a determination proactively whether the alert activation would be continued or rescinded depending on different potential future sampling or data collection outcomes; thus the continued event activation or deactivation would be able to occur without the necessity of an additional conference call.

AFTER ACTION REPORT

An After Action Report on the activation of this Plan will be prepared by DEP and submitted to NYSDOH and USEPA after the return to "No Action" status.

DISEASE/SYNDROMIC SURVEILLANCE

Information will continue to be collected and reviewed with heightened attention even after CGAP deactivation, for a period deemed appropriate by DOHMH/BCD and DEP, taking into account the date(s) of the elevated pathogen result(s), and the incubation period for *Giardia* and/or for *Cryptosporidium*, as appropriate. (This period will most likely be for approximately two weeks following the elevated *Giardia* and/or *Cryptosporidium* levels, unless determined otherwise). If any public health surveillance findings of significant concern are observed, DOHMH/BDC will immediately report such findings to DEP, and DEP will immediately report such to NYSDOH/BWSP/NYCWU, USEPA NYCWT, and NYCDOHMH BESE. DOHMH/BCD will also provide a summary report on the findings to DEP following the event, and in a timeframe agreed upon by DEP and DOHMH. A summary of syndromic findings will be included in the above-mentioned After Action Report.

ACTION LEVEL 2: >15 *GIARDIA* CYSTS OR > 6 *CRYPTOSPORIDIUM* OOCYSTS DETECTED - SITE 3

Follow steps in the No-Action Level above.

ADDITIONAL PATHOGEN MONITORING

DEP will immediately conduct additional monitoring for *Giardia* and *Cryptosporidium* at a minimum frequency of three times per week (one routine sample plus two additional samples), at Hillview Reservoir and the upstream source water keypoints, with expedited processing time, to the extent practicable. The first sample will be collected within 24 hours of notification. Resamples will be collected in duplicate along with a matrix spike. The duplicate sample will be archived and analyzed in the event that the repeat sample has a high number of oocysts. If resamples are positive, samples may also be collected at Hillview Site 1 to help ascertain if HVR is the source of the pathogens.

NOTIFICATION – INTERNAL

Immediately following the detection of Action Level 2 (AL-2) levels of cysts or oocysts, the DEP Pathogen Laboratory Director will affirmatively contact the DEP Director of Water Quality and the Chiefs of the Water Quality Directorate to start the process of assembling appropriate data for review.

NOTIFICATION – EXTERNAL

The Director of Water Quality for the DEP Bureau of Water Supply or designee will affirmatively contact by email and/or phone the key individuals for the involved agencies:

- NYCDOHMH's Bureau of Communicable Disease (BCD) and its Bureau of Environmental Sciences and Engineering (BESE),
- NYSDOH Bureau of Water Supply Protection/NYC Watershed Unit (BWSP/NYCWU), and
- USEPA's NYC Watershed Team (NYCWT).
- See Appendices I (notification flow chart) and II (contact information). The key individuals are responsible for notifying personnel and coordinating within their respective agencies.

TREATMENT DETERMINATION

Upon notification that *Giardia* levels have triggered an AL-2 response, the DEP Director of Water Quality for the Bureau of Water Supply will consult with staff and make a determination whether to raise secondary chlorine disinfection levels.

DATA COMPILATION

All available relevant water quality, water system operations, meteorological data, and disease/syndromic surveillance information for the period surrounding the sampling date (taking into account the incubation period for *Giardia* or for *Cryptosporidium*) will be assembled and reviewed (see Appendix III for parameters to be considered). DEP and NYCDOHMH will evaluate any unusual (or otherwise significant) findings, events, or water system operating conditions. Information will be sent to relevant DEP and NYCDOHMH personnel.

CONSIDER CONTEXT - In deciding if additional actions are warranted, the data will be evaluated with respect to historic seasonal and temporal trends.

WILDLIFE AND SANITARY INSPECTIONS

Census data and other data collected as part of DEP's enhanced wildlife management program and the results of recent sanitation inspections implemented under the Hillview Reservoir AOC will also be evaluated.

HILLVIEW RESERVOIR VISUAL INSPECTION

DEP will conduct a visual inspection of Hillview Reservoir to qualitatively assess and document possible issues associated with existing sanitary barriers. This will include, but not be limited to documenting:

- visual evidence of increased presence of waterfowl, birds, and other wildlife in/near the Reservoir;
- evidence of fecal matter in or near the reservoir;
- visual inspection of wiring, fencing and other barriers to wildlife.

CONFERENCE CALL

Deputy/Assistant Commissioners or their designees and appropriate managers and staffs of DEP (BWS) and NYCDOHMH (BCD and BESE) will confer as soon as possible.

BOIL WATER CONSIDERATION

The Deputy/Assistant Commissioners or their designees and staff will apprise the Commissioners of DEP and NYCDOHMH of a possible pending boil water situation.

PUBLIC NOTIFICATION PREPARATION

The Deputy/Assistant Commissioners or their designees, in conjunction with public affairs staff from each agency will initiate preparation of public notification materials (fact sheets in Appendix IV and notification templates in Appendix V).

FURTHER ACTION

Based on consideration of all available relevant information and data (see Appendix III), the Deputy/Assistant Commissioners or their designees and staff, in consultation with NYSDOH (BWSP), and USEPA (NYCWT) will decide:

- whether to notify the general public, and/or certain subpopulations, and/or health care provider organizations;
- whether to undertake any other response actions (e.g. activation of the DEP Crisis and Consequence Management Plan);
- whether to consult with the Commissioners of DOHMH, DOH and DEP for escalation to a boil water advisory (in the event of a boil water advisory, may refer to the New York City Drinking Water E. coli Action Plan);
- the form, content and mechanism for effectively and rapidly communicating with the public; and
- whether there are potential concerns or issues with the existing sanitary barriers and BMPs implemented at Hillview Reservoir under the Hillview Reservoir AOC, which might have contributed to the elevated levels of *Cryptosporidium* or *Giardia*, and whether additional corrective actions are required.
- Corrective action may include minimizing flow through, or by-passing one basin at Hillview Reservoir.

ACTION LEVEL 2: DE-ESCALATION PLAN

If results from two successive sampling events indicate that *Giardia* concentrations have dropped below 16 cysts/50 L or that *Cryptosporidium* concentrations have dropped below 7 oocysts/50 L, de-escalation may occur as follows:

DATA REVIEW

All available relevant water quality, water system operations, meteorological data and disease/syndromic surveillance information for the period surrounding the sampling date will again be reviewed by staff at the NYCDOH and DEP.

DEACTIVATION DETERMINATION

DEP's BWS/WQD will confer with NYCDOHMH's BCD and the BESE; the NYSDOH BWSP/NYCWU; and USEPA NYCWT. If data from *Giardia* and *Cryptosporidium* resample(s), disease/syndromic monitoring and other data indicate there is no need for continued response actions under Action Level 2, these data will be presented during the conference call and the Action Level 2 alert will be rescinded or modified, as appropriate. If data are pending during the joint-agency deactivation conference call, the parties to the call may make a determination proactively whether the alert activation would be continued or rescinded depending on different potential future sampling or data collection outcomes; thus the continued event activation or deactivation would be able to occur without the necessity of an additional conference call.

DEACTIVATION NOTIFICATION

Commissioners, Deputy Commissioners, Public Affairs, USEPA, and NYSDOH will be notified.

Any parties notified of the alert will be informed that the alert has been rescinded (e.g. via the Health Advisory Notification (HAN), postings on NYC websites).

AFTER ACTION REPORT

An After Action Report on the activation of this Plan will be prepared and submitted to NYSDOH and USEPA after the return to "No Action" status.

DISEASE/SYNDROMIC SURVEILLANCE

Information will continue to be reviewed with heightened attention after CGAP deactivation, for a period deemed appropriate by DOHMH/BCD and DEP -- taking into account the date(s) of the elevated pathogen result(s), and the incubation period for *Giardia* and/or for *Cryptosporidium*. (This period will most likely be for approximately two weeks following the elevated pathogen level.) If any public health surveillance findings of significant concern are observed, DOHMH/BDC will immediately report such findings to DEP, and DEP will immediately report such to the key contacts at NYCDOHMH, NYSDOH, and USEPA. DOHMH/BCD will also provide a summary report on the findings to DEP following the event, and in a timeframe agreed upon with DEP. A summary of syndromic findings will be included in the After Action Report.

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APPENDIX - I

FLOW CHART FOR INTERAGENCY COMMUNICATION

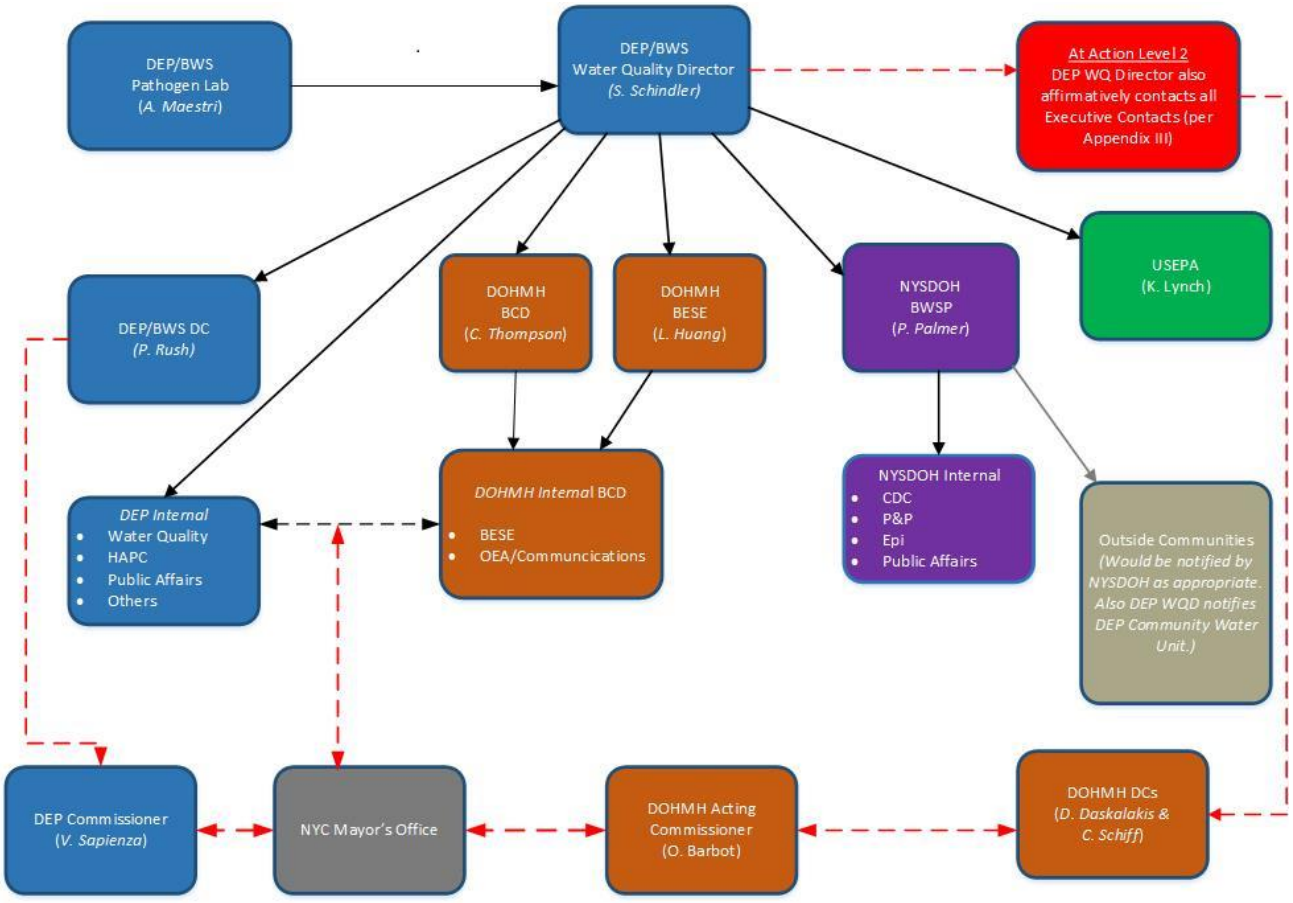
- If primary contact cannot be reached, seek alternate. Ensure notification continues down flow chart to reach next party.
- See APPENDIX II for contact details & for internal notification lists for each agency.

BOXES:

- NYC DEP
- NYSDOH
- NYCDOHMH
- USEPA
- NYC Mayor's Office
- Outside Communities
- Action Level 2

ARROWS:

- Notification by E-mail (phone, alternate)
- Notification if needed
- Collaboration on Public/Press info
- Additional Notification for Action Level 2



APPENDIX - II

CONTACT INFORMATION FOR INTERAGENCY COMMUNICATION

DO NOT DISSEMINATE –CONFIDENTIAL INFORMATION

NOTES: Primary Contacts are marked by "1". These individuals or their designees shall ensure that appropriate personnel within their agencies are notified. Executive contacts, marked with "2" will be affirmatively contacted by DEP for Action Level 2 events.

NYCDEP (DEP 38th St. Emergency Command Center: 212-689-1520/1620)						
Name	**Unit**	**Title**	**Phone**	**Cell**	**Home**	**E-mail**
[redacted]						

NYCDOHMH (24-hour emergency number: 212-POISONS [212-764-7667] or 800-222-1222)

Name	Title	Phone	Cell	Home	E-mail
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

NYSDOH (NYSDOH 24-hour duty officer #: 866-881-2809)

Name	Title	Phone	Cell	Home	E-mail
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

USEPA

Name	Title	Phone	Cell	Home	E-mail
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

APPENDIX - III

DATA COMPILATION FORM FOR DEP AND DOHMH

This form is to facilitate the compilation of relevant information – i.e., water quality, water system and disease/syndromic surveillance results --for review during CGAP event conference calls. Current data for the parameters below should be interpreted in the context of historical records and seasonal trends.

DATE OF DATA COMPILATION: _____

WATERSHED WATER QUALITY AND OPERATIONS

Site	Date of sample collection	Crypto	Giardia	Total Coliform	Fecal Coliform	Turbidity
DEL17 (Kensico Inflow)						
DEL18DT(Kensico Outflow)						
Other locations? (see "B" for Hillview sites)						

- Treatment operations/disruptions (chlorine residuals, CT IAR changes, at Kensico Reservoir; UV plant information). Include date & any other relevant details;
- Spills, overflows or other failures in watershed wastewater infrastructure or other events in the watershed which could potentially result in microbial contamination of the water supply;
- Wildlife data – Kensico (and any changes observed over time);
- *Cryptosporidium* and/or *Giardia* supplemental data or additional analysis, if any;
- Meteorological data (i.e., storm events upstream of sampling points);
- QA/QC data (lab blanks and matrix spikes).
- Consideration can be given to DAPI staining, and reviewing staining characteristics and trends. If DAPI is performed, negative DAPI will not be used to rule out the presence of *Cryptosporidium* oocysts.

HILLVIEW & DISTRIBUTION WATER QUALITY AND OPERATIONS

Site	Date of Sample Collection	Crypto	Giardia	Total Coliform	E. coli	Turbidity
Hillview Site 1						
Hillview Site 3						
Distribution sites						

- Changes or disruptions in water system operations (flow changes, operational mode changes, valve operations). Indicate what, where, dates, & info source (BWSO Ops, Police, BEDC, Contractors): [Contact person: Chief, BWS Upstate/Eastern Operations].
- Any treatment operations/disruptions (chlorine residuals, CT IAR changes) at Hillview. Include date & any other relevant details.

- Any spills, overflows or other failures in watershed wastewater infrastructure or other events event in the watershed which could result in microbial contamination of the water supply;
- Wildlife data – Hillview (and any changes observed over time);
- Customer complaints called to DEP or to DOHMH (assess nature and location of any complaints);
- QA/QC data (lab blanks and matrix spikes);
- Consideration can be given to DAPI staining, and reviewing staining characteristics and trends. If DAPI is performed, negative DAPI will not be used to rule out the presence of *Cryptosporidium* oocysts.

DISEASE/SYNDROMIC SURVEILLANCE PARAMETERS

DOHMH/BCD (or BWS/HAPC as alternate) to provide overall impression based on public health data. Indicate if any changes have occurred and dates.

- Cryptosporidiosis and giardiasis case surveillance data;
- Emergency department data;
- Pharmacy sales (anti-diarrheal medications) surveillance data (Pharmacy OTC Dashboard data from DOHMH);
- Nursing home outbreak surveillance data;
- Clinical lab surveillance data: (see Clinical Lab Stool Specimen Submission Charts from DOHMH).

Note: Review of disease/syndromic surveillance should take into consideration incubation periods for these infections, as appropriate. Also, review of above-noted public health information should be continued with heightened attention even after CGAP deactivation, for a period deemed appropriate by DOHMH/BCD and DEP.

APPENDIX - IV

CRYPTOSPORIDIOSIS FACT SHEET

https://www1.nyc.gov/site/doh/health/health-topics/cryptosporidiosis.page

WHAT IS CRYPTOSPORIDIOSIS?

Cryptosporidiosis is a diarrheal illness caused by the microscopic parasite *Cryptosporidium*, which until 1976 was not known to cause disease in humans. In 2008, there were 107 cases reported among New York City residents (rate of 1.3 cases per 100,000 persons).

WHO GETS CRYPTOSPORIDIOSIS?

Anyone can get cryptosporidiosis. However, it causes more severe illness in persons with HIV/AIDS and others with impaired immune systems, such as people receiving cancer chemotherapy and transplant patients on immunosuppressive drugs.

HOW IS CRYPTOSPORIDIOSIS SPREAD?

Infected animals and humans have *Cryptosporidium* in their digestive systems. The parasite is passed in the stool (feces) of an infected person or animal as an oocyst (egg-like form of the organism). When it is outside the body it is protected by an outer shell and can live in the environment for long periods of time.

- People become infected by ingesting the organism.
- Infection can occur by touching stool or objects contaminated by stool and then touching the mouth with unwashed hands.
- Persons and animals can also become infected by drinking water or by eating raw or undercooked food that is contaminated with stool from infected animals or persons.
- Some people have become sick after swimming in public pools contaminated with stools from infected persons.
- Sexual activity in which the mouth or hand may come into contact with a partner's anus or stool presents a risk. It may take very few oocysts to cause infection.

WHAT ARE THE SYMPTOMS OF CRYPTOSPORIDIOSIS?

The most common symptoms are watery diarrhea and abdominal cramping. Vomiting, low-grade fever, loss of appetite, weight loss, and dehydration may occur. In persons with healthy immune systems, symptoms may last about 1 to 2 weeks. In persons with weakened immune systems, especially persons with HIV/AIDS, the infection may lead to prolonged illness. Some people infected with *Cryptosporidium* may not have any symptoms.

HOW SOON AFTER INFECTION DO SYMPTOMS APPEAR?

Symptoms usually appear within 2 to 10 days after exposure, with an average of 7 days.

HOW IS CRYPTOSPORIDIOSIS DIAGNOSED?

If your doctor suspects cryptosporidiosis, you will be asked to submit one or more stool samples. Diagnosis is made by examining the stool under a microscope or by using special detection tests for *Cryptosporidium*. The test for *Cryptosporidium* must be specifically requested by your doctor. Sometimes, several stool samples obtained on different days are necessary, since the number of *Cryptosporidium* parasites shed in the stool varies from day to day.

WHAT IS THE TREATMENT FOR CRYPTOSPORIDIOSIS?

- People with healthy immune systems usually get well without treatment.
- People with diarrhea should drink plenty of fluids.
- Young children and pregnant women may be more susceptible to the dehydration resulting from diarrhea, so it is especially important that they drink plenty of fluids while ill.

Currently, there is no standard treatment for cryptosporidiosis. One drug, nitazoxanide, has been approved for the treatment of diarrhea caused by *Cryptosporidium* in people who are not immunocompromised. For people living with AIDS, antiretroviral therapy that improves immune status can decrease or eliminate symptoms. Symptoms may recur if immune status worsens. Persons with cryptosporidiosis should consult with their health care provider regarding treatment options.

SHOULD AN INFECTED PERSON BE EXCLUDED FROM WORK OR SCHOOL?

Since the *Cryptosporidium* parasite is passed in the stool, people with active diarrhea who are unable to control their bowel habits (for example, infants, young children, and certain disabled individuals) may need to be excluded from group settings where they may present a risk to others. Most infected people may return to work or school when their stools become formed as long as they wash their hands thoroughly after using the toilet. Food handlers, certain health care workers, employees and children in day care, pre-kindergarten and kindergarten settings must obtain approval from the Health Department before returning to their routine activities, even if they are not having diarrhea. This requires follow-up stool testing to be sure that they are no longer infectious.

HOW CAN CRYPTOSPORIDIOSIS BE PREVENTED?

The following measures for preventing cryptosporidiosis are recommended:

PRACTICE GOOD HYGIENE.

- Always thoroughly your wash hands with soap and warm running water before touching food, after using the toilet or changing diapers, after handling animal stools, and after gardening or other direct contact with soil.
- If you work in a child-care center where you change children's diapers, wash your hands carefully between changing each child's diapers. When using gloves, wash your hands and change gloves between each child.
- If you take care of persons with cryptosporidiosis, or persons who have diarrhea, wash your hands after bathing patients, emptying bedpans, changing soiled linen, or otherwise coming in contact with stool.

AVOID WATER THAT MAY BE CONTAMINATED.

- Do not drink water directly from streams, lakes, springs or swimming pools.
- Heat water to a rolling boil for 1 minute whenever you are unsure of the safety of a drinking water source.

- Carefully dispose of sewage wastes so as not to contaminate surface water or ground water.
- Comply fully with water advisories whenever issued by public health or government authorities.

AVOID FOOD THAT MAY BE CONTAMINATED.

- Avoid eating unwashed fruits and vegetables, and drinking unpasteurized milk or other milk products that are not pasteurized. Unpasteurized apple cider has also caused infection in the past.

TAKE EXTRA CARE WHEN TRAVELING.

- If you travel to developing countries, you may be at greater risk for cryptosporidiosis because of poorer water treatment and food sanitation. Avoid raw fruits and vegetables that you did not peel or wash yourself, unboiled tap water, ice made from unboiled tap water, unpasteurized dairy products, and items purchased from street vendors.

PROTECT YOURSELF AND OTHERS.

- If you have cryptosporidiosis, wash your hands often to prevent spreading the disease to other people.
- If you have diarrhea, protect others by not swimming. Persons with diarrhea should not use public swimming facilities. If you have cryptosporidiosis, you should not swim in any recreational water for at least 2 weeks after diarrhea stops. You can pass *Cryptosporidium* in your stool and contaminate water for several weeks after your symptoms have ended. *Cryptosporidium* can survive in chlorine-treated swimming pools.
- Sexual practices that may result in hand or mouth contact with stool, such as anal sex, touching the anus, or oral-anal sex ("rimming"), increase the risk for cryptosporidiosis transmission. Risk of transmission may be decreased by washing thoroughly with soap and water before and after any anal contact, and by using a barrier such as a dental dam or household plastic wrap during oral-anal contact. Persons with any diarrheal illness should avoid any sexual practice that may expose a partner to their stool.

IS *CRYPTOSPORIDIUM* IN NYC WATER?

Very low levels of *Cryptosporidium* oocysts are sometimes found in public water supply sources, including in New York City's water supply reservoirs. Laboratory tests cannot yet determine if any cysts found in the water supply are alive or dead, and no one knows for sure if these very low levels can cause infection among persons with healthy immune systems or immunocompromised persons. At this time there is no evidence to suggest that there is a significant risk of cryptosporidiosis from New York City drinking water. Information on New York City source water testing results for *Cryptosporidium* is available at the NYC Department of Environmental Protection website.

For more information regarding cryptosporidiosis and drinking water, see the information below on "Extra Precautions to Avoid Cryptosporidiosis for Persons with HIV/AIDS or Other Causes of Immunosuppression."

EXTRA PRECAUTIONS TO AVOID CRYPTOSPORIDIOSIS FOR PERSONS WITH HIV/AIDS OR OTHER CAUSES OF IMMUNOSUPPRESSION

If you are HIV positive or otherwise immunocompromised, be extra careful about hand washing, carefully wash food before eating, and thoroughly cook foods that are heated before eating. Do not let raw foods contaminate other foods. Avoid drinking or accidentally swallowing water from lakes, rivers, streams, springs or swimming pools. Follow "safer sex" guidelines. Any sex act that involves hand or mouth contact with the anus or stool (feces) increases the risk for cryptosporidiosis. Oral-anal contact (rimming) is very likely to spread infection, therefore you

should avoid it, even if you and you partner wash well before. Always wash your hands well after touching your partner's anal area.

You may want to discuss the need for taking further protective measures with your medical provider.

Drinking water that is considered safe for persons with healthy immune systems may contain some *Cryptosporidium* oocysts. No one knows whether a small number of oocysts could create a risk for someone who is immunocompromised. Some researchers think that oocysts ingested while you are still relatively healthy can remain in your digestive system until your immune system is severely depressed and then cause serious illness.

IF YOU WANT GREATER ASSURANCE THAT YOUR DRINKING WATER IS SAFE TO DRINK, HERE ARE SOME OPTIONS FOR SAFER BEVERAGES:

- Heat tap water to a rolling boil for 1 minute before using. This will kill all microorganisms including *Cryptosporidium*. To avoid burning yourself, allow water to cool before pouring into a clean, dry container.
- Use boiled water for ice cubes, tooth brushing, washing vegetables that will be eaten raw, and mixing with concentrates. You do not need to use boiled water for food that will be cooked before eating. Dishes, silverware, pots, and pans may be washed with tap water as long as they are dry before being used.
- Not all available home or office water filters remove *Cryptosporidium*. Point-of-use filters with an absolute pore size of less than or equal to 1 micron in diameter will remove *Cryptosporidium*. Filters designed to remove *Cryptosporidium* will have one of the following labels: "Absolute pore size of 1 micron or smaller," "Tested and certified by the National Sanitation Foundation (NSF) Standard 53 for cyst removal," "Tested and certified by NSF Standard 53 for cyst reduction," or "Reverse osmosis." Follow manufacturer's directions for routine maintenance, and replace filters according to schedule. Filters collect microorganisms, so someone who is not immunocompromised should change filter cartridges. Anyone changing cartridges should wear gloves and wash hands afterwards.
- Bottled water is not necessarily free of *Cryptosporidium*. Bottled water from a surface water source (for example, a river or lake) offers the same risk of cryptosporidiosis as tap water from the same source unless additional treatment is provided. Bottled water can be considered free of *Cryptosporidium* if it has been filtered through an absolute 1 micron or smaller filter, or treated with reverse osmosis or distillation. Bottled water that comes from deep ground water sources (for example, well water) is less likely to contain *Cryptosporidium* than bottled water from surface water sources. Only bottled water certified by the New York State Department of Health for sale in New York should be considered. Look for the New York State Department of Health certification on the label (it will read "NYSHD Cert # ---"). A list of certified bottled waters for sale in New York along with their sources can be obtained from the New York State Department of Health by calling (518) 402-7676 or by going to the New York State Department of Health website.

GIARDIASIS FACT SHEET

https://www1.nyc.gov/site/doh/health/health-topics/giardiasis.page

WHAT IS GIARDIASIS?

Giardiasis, an intestinal illness, is caused by a microscopic parasite called *Giardia* lamblia. In 2008, there were 840 cases reported among New York City residents (rate of 10.2 cases per 100,000 persons).

WHO GETS GIARDIASIS?

Anyone can get giardiasis. However, it tends to occur more often in people residing in institutional settings, diaper-aged children in day care centers, child care workers, parents of infected children, foreign travelers, and individuals who drink improperly treated surface water (such as from lakes, rivers, or streams) or who swim in contaminated water. Men who have sex with men may also be at increased risk of contracting giardiasis.

HOW IS GIARDIASIS SPREAD?

The parasite is passed in the stool (feces) of an infected person or animal. When it is outside the body, it is protected by an outer shell, and can survive in the environment for long periods of time. It may contaminate soil, water, food or surfaces. People become infected by swallowing the parasite. Person-to-person transmission may occur in day care centers or other settings where hand-washing practices are poor. Sexual practices in which the mouth or hand comes into contact with a partner's anus or stool may result in spread.

WHERE ARE THE *GIARDIA* PARASITES FOUND?

Giardia has been found in infected people (with or without symptoms) and wild and domestic animals. The beaver has gained attention as a potential source of *Giardia* contamination of lakes, reservoirs, and streams, but human fecal wastes may be just as important.

WHAT ARE THE SYMPTOMS OF GIARDIASIS?

People exposed to *giardia* may experience mild or severe diarrhea, abdominal cramps, bloating, and fatigue. In some instances, there may be no symptoms at all. Fever is rarely present. Occasionally, chronic diarrhea may develop over several weeks or months, with significant weight loss. In otherwise healthy persons, symptoms may last 2 to 6 weeks.

HOW SOON AFTER INFECTION DO SYMPTOMS APPEAR?

The symptoms may appear from 3 to 25 days after exposure, but usually within 10 days.

HOW LONG CAN AN INFECTED PERSON CARRY *GIARDIA*?

The carrier stage generally lasts from a few weeks to a few months. Treatment with specific antibiotics may shorten the carrier stage.

HOW IS GIARDIASIS DIAGNOSED?

Diagnosis is made by examining the stool under a microscope or by using special detection tests for *Giardia*. Sometimes, several stool samples obtained on different days are necessary, since the number of *Giardia* parasites shed in the stool varies from day to day.

WHAT IS THE TREATMENT FOR GIARDIASIS?

Anti-infective drugs such as metronidazole, tinidazole, or nitazoxanide are often prescribed by doctors to treat giardiasis. Drug resistance or relapse may occur with any drug. Some individuals may recover on their own without medication. Although *Giardia* can infect all people, young children and pregnant women may be more susceptible to the dehydration caused by diarrhea and should drink plenty of fluids while ill.

SHOULD AN INFECTED PERSON BE EXCLUDED FROM WORK OR SCHOOL?

Since the *Giardia* parasite is passed in the stool, people with active diarrhea who are unable to control their bowel habits (for example, infants, young children, and certain disabled individuals) may need to be excluded from group settings where they present a risk to others. Most infected people may return to work or school when their stools become formed as long as they wash their hands thoroughly after using the toilet. Food handlers, certain health care workers, children in day care, pre-kindergarten or kindergarten, and employees in day care, pre-kindergarten and kindergarten must obtain approval from the Health Department before returning to their routine activities, even if they are not having diarrhea. This requires follow-up stool testing to be sure that they are no longer infectious.

HOW CAN GIARDIASIS BE PREVENTED?

The most important preventive measures include:

PRACTICE GOOD HYGIENE.

- Always thoroughly wash hands with soap and water before handling food, after using the toilet or changing diapers, after handling animal stools, and after gardening or other direct contact with soil.
- If you work in a child-care center where you change children's diapers, wash hands carefully between changing each child's diapers. When using gloves, wash your hands and change gloves between each child. If you take care of persons with giardiasis, or persons who have diarrhea, wash your hands after bathing patients, emptying bedpans, changing soiled linen, or otherwise coming in contact with stool.

AVOID WATER THAT MAY BE CONTAMINATED.

- Do not drink water directly from streams, lakes, springs or swimming pools.
- If there is a possibility of *Giardia* contamination in a drinking water source, you can make the water safe to drink by: (1) Heating water to a rolling boil for 1 minute, or (2) Using a water filter that has an absolute pore size of at least 1 micron or smaller, or one that has been National Sanitation Foundation (NSF) rated for "cyst removal."

AVOID FOOD THAT MAY BE CONTAMINATED.

- Uncooked fruits and vegetables should be washed thoroughly before being eaten.

TAKE EXTRA CARE WHEN TRAVELING.

- If you travel to developing countries, you may be at greater risk for giardiasis because of poorer water treatment and food sanitation. Avoid raw fruits and vegetables that you did not wash or peel yourself, unboiled tap water, ice made from unboiled tap water, and items purchased from street vendors.

PROTECT YOURSELF AND OTHERS.

- Carefully dispose of sewage wastes so as not to contaminate surface water or ground water.
- If you have giardiasis, wash your hands often to prevent spreading the disease to other people.
- If you have diarrhea, protect others by not swimming. Persons with diarrhea should not use public swimming facilities. If you have giardiasis, do not swim in recreational waters while experiencing diarrhea and for at least 2 weeks after the diarrhea stops. You can pass *Giardia* in your stool and contaminate water for several weeks after your symptoms have ended.
- Sexual practices that may result in hand or mouth contact with stool, such as anal sex, touching the anus, or oral-anal sex ("rimming"), increase the risk for giardiasis transmission. Risk of transmission may be decreased by washing thoroughly with soap and water before and after any anal contact, and by using a barrier such as a dental dam or household plastic wrap during oral-anal contact. Persons who are infected with giardiasis, or any diarrheal illness, should refrain from sexual activity that may expose a partner to their stool until they are effectively treated.

APPENDIX - V

SAMPLE NOTIFICATION TEMPLATES

Note: The attached notification templates are draft samples only, and should not be considered final documents. Any notification would need to be modified as appropriate for a specific event, and would also require clearance by appropriate parties at both NYCDEP and NYCDOHMH, in addition to by any other appropriate agencies.

Note: Sections of the templates highlighted in YELLOW should particularly be reviewed for any modifications needed for the particular event.

TEMPLATES INCLUDED:

- Boil Water Advisory for *Giardia*
- Boil Water Advisory for *Cryptosporidium*
- Precautionary Drinking Water Advisory for Immunocompromised Patients
- Boil Water Advisory Ended

BOIL WATER ADVISORY for *Giardia*

For *New York City/Location* as of *date*

BOIL YOUR WATER BEFORE DRINKING & OTHER USES NOTED BELOW

Where: *Affected Area; presumably will be Citywide*

Issue: Recent water samples taken by NYCDEP from a key water supply reservoir (Hillview) have shown an increase in *Giardia* cyst levels. Whether this poses a health risk is uncertain, due to limitations in laboratory methods and other factors (for example, it is uncertain if these cysts are viable/infectious). However, as a precaution, until further notice, all persons are advised that water used for drinking, baby formula, cooking and certain other uses, should be boiled, filtered, or bottled water should be used. See additional instructions below.

What should you do? Until further notice, NYC water *note area if relevant* used for: drinking, making baby formula, making ice, brushing teeth, food preparation, and giving to pets, should be: (a) boiled (a full boil for one minute, then cooled and stored in clean container); or (b) filtered (filter with ≤ one micron pore size; includes filters certified by NSF, standard #53 for cyst reduction); or (c) bottled water certified by NYSDOH for sale in NY (check label) should be used. Further details on water safety are on reverse side of this advisory, and via information sources noted below.

Giardia is a microorganism that can cause diarrhea, gas, cramps, nausea, dehydration, or other symptoms. Those at higher risk for dehydration from diarrhea may include infants, the elderly, pregnant women, and those with certain underlying medical conditions. Thus for these groups, special attention should be paid to insure adequate hydration during illness. If you experience any of the above symptoms, and they persist, you should seek medical advice. Symptoms of giardiasis typically last 2 to 6 weeks in otherwise healthy people. Many prescription medications are available to treat giardiasis. Note the above symptoms can also be caused by many sources other than waterborne microbes.

What is The City doing to resolve the issue? NYCDOHMH and NYCDEP are actively reviewing water quality, water operations, public health surveillance, and other data to assess and resolve the situation. *Expedited monitoring is being undertaken; and modified water supply operations, including increased chlorination, are being implemented to enhance microbial protection.* NYSDOH and USEPA have been notified.

How will you know when the water is safe to drink? An "End of Boil Water Advisory" will be issued. Also, check the NYC web links listed below or call 311 for updates.

Please share this information with others who drink NYC water and who may not have seen this notice.

For further information, see www.nyc.gov/dep , www.nyc.gov/health, or call 311. See reverse side for water usage and treatment tips. General info about *Giardia* and giardiasis is also available at: www.cdc.gov, www.usepa.gov/safe water.

ADDITIONAL TIPS FOR A *GIARDIA* BOIL WATER ALERT

A) WATER USAGE TIPS

For greatest risk reduction during a Boil Water Alert, water usage precautions should be taken at all locations supplied by the affected water source -- at home, work, school, and other.

Use Boiled/Filtered/Bottled Water (per below) for:	OK to use Tap Water for:	Use Caution:
• Drinking • Brushing Teeth • Washing fruits and vegetables • Preparing food (unless well cooked) • Mixing baby formula • Making ice • Giving water to pets	• Washing clothes • Bathing (but caution not to swallow) • Flushing toilets • Washing dishes (as long as they dried well before being used) • Cooking (if water will be boiled for 1 minute or longer)	• Water/soda/coffee/ice machines may use tap water • Not all home filters remove *Giardia* (see below)

B) WATER TREATMENT TIPS

BOILING WATER

- Bring tap water to a full boil. Boil for one minute.
- Allow water to cool before pouring, to avoid burn injury
- Pour cooled water into a clean and dry container with a cover for storage

FILTERING WATER

- In-home filters with an absolute pore size of ≤ 1 micron will remove *Giardia*
- This would include, but is not limited to, filters that are certified by the National Sanitation Foundation (NSF) for "absolute cyst removal of particles ≤ one micron", or Standard #53 (cyst reduction). The certification seal can be found on the filter
- Filters labeled "Reverse Osmosis" will also remove *Giardia*
- Follow manufacturer's directions for routine maintenance and replace filters according to schedule.
- Filters commonly used for chlorine and metals removal (e.g., Brita® brand) filter are not NSF-certified for cyst reduction or removal.

BOTTLED WATER

- Bottled water is not necessarily free of *Giardia*
- Bottled water certified by the NYS Department of Health for sale in NY should be considered safe
  Look for the NYSDOH certification identifier on the label (NYSHD Cert. # XXX). A list of certified bottled waters for sale in NY, along with their sources, can be obtained from the NYSDOH at 1-800-458-1158
- Bottled water holds the same risk of *Giardia* exposure as tap water from the same source unless additional treatment is provided. Bottled water can be considered *Giardia*-free if it has been treated by submicron filtration (≤ 1 micron), reverse osmosis, or distillation. Bottled water from deep ground water sources (deep well water) is more likely to be free of *Giardia* than bottled water from surface water sources, assuming the same level of water treatment.

BOIL WATER ADVISORY for Cryptosporidium

For *New York City/Location* as of *date*

BOIL YOUR WATER BEFORE DRINKING & OTHER USES NOTED BELOW

Where: *Affected Area; presumably will be Citywide*

Issue: Recent water samples taken by NYCDEP at a key water supply reservoir (Hillview) have shown an increase in *Cryptosporidium* oocyst levels. Whether this poses a health risk is uncertain, due to limitations in laboratory methods and other factors (for example, it is uncertain if these oocysts are viable/infectious). However as a precaution, until further notice, all persons are advised that water used for drinking, baby formula, cooking, and certain other uses, should be boiled or filtered, or bottled water should be used. See additional instructions below. *Cryptosporidium* poses highest risk to immunocompromised patients, especially persons living with HIV/AIDS and CD4 <200 cells/mm^3.

What should you do? Until further notice, NYC water *note area if relevant* used for drinking, making baby formula, making ice, brushing teeth, food preparation, and giving to pets should be: (a) boiled (a full boil for one minute, then cooled and stored in clean container); or (b) filtered (filter with ≤ one micron pore size; includes filters certified by NSF, standard #53 for oocyst reduction); or (c) bottled water certified by NYSDOH for sale in NY (check label) should be used instead. Further details on water safety are on reverse side of this advisory, and via information sources noted below.

Cryptosporidium is a microorganism that can cause diarrhea (typically, profuse watery diarrhea), cramps, nausea, headaches, or other symptoms. *Cryptosporidium* poses a special health risk for immunocompromised patients, especially persons living with HIV/AIDS and CD4 counts <200 cells/mm^3. Infants, the elderly, and others with undeveloped or weakened immune systems may also be at increased risk for severe illness. If you experience any of these symptoms, and they persist, you should seek medical advice. Also, those at increased risk for dehydration, including infants, should be provided adequate hydration during illness. *Cryptosporidium* infections are typically self-limiting in persons with a healthy immune system. Note the above symptoms can also be caused by many sources other than waterborne microbes.

What is The City doing to resolve the issue? NYCDOHMH and NYCDEP are actively reviewing water quality, water operations, public health surveillance, and other data to assess and resolve the situation. *Expedited monitoring is being undertaken; and modified water supply operations are being implemented as appropriate to enhance microbial protection.* NYSDOH and USEPA have been notified.

How will you know when the water is safe to drink? An "End of Boil Water Advisory" will be issued. Also, check the NYC web links listed below or call 311 for updates.

Please share this information with others who drink NYC water and who may not have seen this notice.

For further information, see www.nyc.gov/dep , www.nyc.gov/health, or call 311. See reverse side for water usage and treatment tips. General info about *Cryptosporidium* is also available at: www.cdc.gov, www.usepa.gov/safewater.

ADDITIONAL TIPS FOR A *CRYPTOSPORIDIUM* BOIL WATER ALERT

A) WATER USAGE TIPS

For greatest risk reduction during a Boil Water Alert, water usage precautions should be taken at all locations supplied by the affected water source -- at home, work, school, and other.

Use Boiled/Filtered/Bottled Water (per below) for:	OK to use Tap Water for:	Use Caution:
• Drinking • Brushing Teeth • Washing fruits and vegetables • Preparing food (unless well cooked) • Mixing baby formula • Making ice • Giving water to pets	• Washing clothes • Bathing (but caution not to swallow) • Flushing toilets • Washing dishes (as long as they are dried well before being used) • Cooking (if water will be boiled for 1 minute or longer)	• Water/soda/coffee/ice machines may use tap water • Not all home filters remove *Cryptosporidium* (see below) • Special degree of caution for immunocompromised persons, especially with HIV/AIDS and CD4 counts <200 cells/mm^3

B) WATER TREATMENT TIPS

BOILING WATER

- Bring tap water to a full boil. Boil for one minute.
- Allow water to cool before pouring, to avoid burn injury.
- Pour cooled water into a clean and dry container with a cover for storage.

FILTERING WATER

- In-home filters with an absolute pore size of ≤ 1 micron will remove *Cryptosporidium.*
- This would include, but is not limited to, filters that are certified by the National Sanitation Foundation (NSF) for "absolute cyst removal of particles ≤ one micron", or Standard #53 (oocyst reduction). The certification seal can be found on the filter.
- Filters labeled "Reverse Osmosis" will also remove *Cryptosporidium.*
- Follow manufacturer's directions for routine maintenance and replace filters according to schedule.
- Filters commonly used for chlorine and metals removal (e.g., Brita® brand) filter are NOT NSF-certified for oocyst reduction or removal.

BOTTLED WATER

- Bottled water is not necessarily free of *Cryptosporidium.*
- Bottled water certified by the NYS Department of Health for sale in NY should be considered safe.
- Look for the NYSDOH certification identifier on the label (NYSHD Cert. # XXX). A list of certified bottled waters for sale in NY, along with their sources, can be obtained from the NYSDOH at 1-800-458-1158.
- Bottled water holds the same risk of *Cryptosporidium* exposure as tap water from the same source unless additional treatment is provided. Bottled water can be considered *Cryptosporidium*-free if it has been treated by submicron filtration (≤ 1 micron), reverse osmosis, or distillation. Bottled water from deep ground water sources (well water) is more likely to be free of *Cryptosporidium* than bottled water from surface water sources, assuming the same level of water treatment.

Precautionary Drinking Water Advisory for Immunocompromised Patients

For *New York City/Location* as of *date*

BOIL WATER SUGGESTIONS FOR DRINKING & OTHER USES NOTED BELOW

Who: This advisory is to immunocompromised patients, especially persons with HIV/AIDS and CD4 <200 cells/mm^3.

Where: *Affected Area; presumably will be Citywide*

Issue: Recent water samples taken by NYCDEP from a key water supply reservoir (Hillview) have shown an increase in *Cryptosporidium* oocyst levels. Whether this poses a health risk is uncertain, due to limitations in laboratory methods and other factors (for example, it is uncertain if these oocysts are viable/infectious). However as a precaution, until further notice, all persons at heightened risk of *Cryptosporidium* infection – e.g., immunocompromised persons, especially persons living with HIV/AIDs and CD 4 counts <200 -- are advised to take certain precautions with regard to tap water usage.

What should you do? Until further notice, persons at heightened risk of *Cryptosporidium* infection, and who use tap water, are advised to take precautions when using water for: drinking, making ice, brushing teeth, food preparation, making baby formula, and giving to pets. Tap water used for such purposes should be boiled or filtered, or bottled water should be used, at this time, per instructions on reverse side of this sheet. Also further information is available via sources noted below.

Cryptosporidium is a microorganism that can cause diarrhea (typically, profuse watery diarrhea), cramps, nausea, headaches, or other symptoms. *Cryptosporidium* poses a special health risk for immunocompromised patients, especially persons living with HIV/AIDS and CD4 counts <200 cells/mm^3. If you experience any of these symptoms, you should consult with your doctor. *Cryptosporidium* infections are typically self-limiting in persons with a healthy immune system. Infants, the elderly, and others with undeveloped or weakened immune systems may be at increased risk for prolonged or heightened symptoms, including dehydration. Water precautions are advised at this time, per above. However, for general health protection, note that *Cryptosporidium* exposure can also be via: travel, certain high-risk sexual practices, contact with ill humans or pets, contaminated food or water and recreational water contact.

What is The City doing to resolve the issue? NYCDOHMH and NYCDEP are actively reviewing water quality, water operations, public health surveillance, and other data to assess and resolve the situation. *Expedited monitoring is being undertaken; and modified water supply operations are being implemented as appropriate to enhance microbial protection.* NYSDOH and USEPA have been notified.

How will you know when the water is safe to drink? An "End of Boil Water Advisory" notice will be issued. Also, check the NYC web links listed below or call 311 for updates.

Please share this information with persons at heightened risk – i.e., immunocompromised persons, particularly people living with HIV/AIDs and CD4 counts <200 cells/mm^3.

For further info, see www.nyc.gov/dep, www.nyc.gov/health, or call 311. See reverse side for water usage & treatment tips. General *Cryptosporidium* info also at: www.cdc.gov, www.usepa.gov/safe water.

ADDITIONAL TIPS FOR A *CRYPTOSPORIDIUM* BOIL WATER ALERT

A) WATER USAGE TIPS

For greatest risk reduction during a Boil Water Alert, water usage precautions should be taken at all locations supplied by the affected water source -- at home, work, school, and other.

Use Boiled/Filtered/Bottled Water (per below) for:	OK to use Tap Water for:	Use Caution:
• Drinking • Brushing Teeth • Washing fruits and vegetables • Preparing food (unless well cooked) • Mixing baby formula • Making ice • Giving water to pets	• Washing clothes • Bathing (but caution not to swallow) • Flushing toilets • Washing dishes (as long as they are dried well before being used) • Cooking (if water will be boiled for 1 minute or longer)	• Water/soda/coffee/ice machines may use tap water • Not all home filters remove *Cryptosporidium* (see below) • Special degree of caution for immunocompromised persons, especially with HIV/AIDS and CD4 counts <200 cells/mm^3

B) WATER TREATMENT TIPS

BOILING WATER

- Bring tap water to a full boil. Boil for one minute.
- Allow water to cool before pouring, to avoid burn injury.
- Pour cooled water into a clean and dry container with a cover for storage.

FILTERING WATER

- In-home filters with an absolute pore size of ≤ 1 micron will remove *Cryptosporidium.*
- This would include, but is not limited to, filters that are certified by the National Sanitation Foundation (NSF) for "absolute cyst removal of particles ≤ one micron", or Standard #53 (cyst reduction). The certification seal can be found on the filter.
- Filters labeled "Reverse Osmosis" will also remove *Cryptosporidium.*
- Follow manufacturer's directions for routine maintenance and replace filters according to schedule.
- Filters commonly used for chlorine and metals removal (e.g., Brita® brand) filter are NOT NSF-certified for cyst reduction or removal.

BOTTLED WATER

- Bottled water is not necessarily free of *Cryptosporidium.*
- Bottled water certified by the NYS Department of Health for sale in NY should be considered safe.
- Look for the NYSDOH certification identifier on the label (NYSHD Cert. # XXX). A list of certified bottled waters for sale in NY, along with their sources, can be obtained from the NYSDOH at 1-800-458-1158.
- Bottled water holds the same risk of *Cryptosporidium* exposure as tap water from the same source unless additional treatment is provided. Bottled water can be considered *Cryptosporidium*-free if it has been treated by submicron filtration (≤ 1 micron), reverse osmosis, or distillation. Bottled water from deep ground water sources (well water) is more likely to be free of *Cryptosporidium* than bottled water from surface water sources, assuming the same level of water treatment.

NEW YORK CITY DEPARTMENT OF
HEALTH AND MENTAL HYGIENE
Mary T. Bassett, MD, MPH
Commissioner

2017 Alert XX

Boil Water Advisory Ended

- Recent water samples at NYC's reservoirs have shown undetectable levels of *Cryptosporidium* oocysts and all persons may resume consuming water as previously
  - City water undergoes UV treatment and is felt to be safe, however patients with CD4 counts <200 cells/mm^3 may always wish to take precautions when consuming tap water
- DOHMH requests increased testing for *Cryptosporidium* over the next 3 weeks (until date) in patients presenting with prolonged watery diarrhea.
  - Tests for *Cryptosporidium* are not included in standard ova and parasite (O&P) testing and must be specifically requested [further details below]
- If you observe increase number of patients with watery diarrhea, please contact the New York City Department of Health and Mental Hygiene (1-866-692-3641)

Please Share this Alert with All Primary Care, Family Medicine, Emergency Medicine, Internal Medicine, Pediatrics, Infectious Disease, Laboratory Medicine, Pathology, Critical Care and Infection Control Staff in Your Facility

DATE

Recent water samples at New York City's reservoirs have shown undetectable levels of *Cryptosporidium* oocysts following an initial detection on DATE. The City Department of Health and Mental Hygiene (DOHMH) and Department of Environmental Protection (DEP) are assessing water quality data, water operations and disease surveillance information to continue monitoring the situation. New Yorkers can now use tap water for drinking, brushing teeth and making ice. Please share this information with your patients.

Other water testing parameters, including fecal coliforms, are within acceptable levels. Disease surveillance data do not show any evidence of an increase in gastrointestinal illness at this time. Given the incubation period for *Cryptosporidium* incubation (1-12 days, average 7 days), it is too early to see a concerning increase in gastrointestinal illness reports. *Cryptosporidium* is reportable to the DOHMH under the New York City Health Code.

City water undergoes UV treatment. However, severely immunocompromised patients including those with CD4 counts <200 cells/mm^3 may wish to always use precautions with tap water generally. This would include boiling for one minute, using approved filtration devices or using bottled water.

In an effort to monitor early increases in diarrheal illness, the DOHMH has several other surveillance systems in place. The DOHMH monitors the sales of over-the-counter antidiarrheal medications at designated pharmacies, tracks the total number of stool submissions to designated clinical laboratories for bacterial culture and sensitivity and ova and parasite testing, tracks the daily number of emergency department visits for diarrheal illness and monitors gastro-intestinal outbreaks among residents in nursing homes. The DOHMH will continue to monitor these systems closely.

While the health risk to the general population is unknown, certain populations including those with immunocompromising conditions such as *patients with HIV/AIDS and especially those with CD4 counts less than 200 cells/mm^3,* are especially vulnerable to infection with *Cryptosporidium*. Treatment may be indicated in certain persons. Although nitazoxanide may be used, for HIV/AIDS patients with CD4 counts less than 200 cells/mm^3, its efficacy has not been proven in this population; boosting of immune status through treatment with HAART will provide the most benefit.

The DOHMH requests that providers increase testing for *Cryptosporidium* in patients presenting with severe diarrhea over the next 3 weeks (until date) and report any increase or clustering in diarrheal disease to the DOHMH. Most clinical laboratories do not perform *Cryptosporidium* testing as part of a routine ova and parasite examination so you must specifically request testing for *Cryptosporidium* (e.g., modified acid fast staining, immunofluorescent antibody staining, ELISA or PCR tests such as BioFire) as well as ova and parasite testing and bacterial culture and sensitivity. All positive tests should be reported routinely to the DOHMH. If you observe an increased number of patients presenting with watery diarrhea or diagnosed with cryptosporidiosis, please contact DOHMH immediately:

Provider Access Line: 1-866-NYC-DOH1 (1-866-692-3641)
Poison Control Center: 1-800-222-1222

APPENDIX - VI

ADDITIONAL RESOURCES

- NYC Drinking Water *E. coli* Action Plan*
- NYCDEP Water Supply System Emergency Response Plan*
- NYCDEP Crisis and Consequence Management Plan*
- NYCDEP BWS Incident Management Team*
- NYCDEP BWS Communications Plan*
- NYCDEP *"Contamination Warning System Demonstration Pilot Project"* / Operational Strategy (2012) (EPA grant funded project)
- *"Drinking Water Advisory Communication Toolbox"* (by CDC, USEPA, AWWA, and DHHS) (includes: "Comprehensive List of Q&A's for Boil Water Advisories", sample communication/notification templates, and other). Updated 2016 (*https://www.cdc.gov/healthywater/emergency/dwa-comm-toolbox/index.html*)
- *"Revised Public Notification Handbook",* USEPA, March 2010, and related documents at: https://www.epa.gov/dwreginfo/public-notification-rule-compliance-help-water-system-owners-and operators
- www/cdc.gov
- www/usepa.gov (e.g., https://www.epa.gov/waterqualitysurveillance)

** These plans have restricted distribution and are available to authorized individuals on NYCDEP BWS Emergency Planning SharePoint Site. (DEP staff can contact P. Bennett of BWS/Emergency Planning about access to these plans).*