Cancer Care Ontario
Action Cancer Ontario

Synoptic Radiology Report for Cancer Imaging

Establishing the minimum elements required for a quality synoptic report

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The Architecture of a Cancer Imaging Synoptic Report

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Introduction

The radiology report is an important communication tool between the radiologist, the referring physician and the patient. As the product of the radiology patient journey the report needs to contain accurate information, and needs to be presented in a format using language that is clear and understandable. The report needs to facilitate clinical decision making.

Since the discovery of x-rays in 1894 little change has occurred in the way the radiological examinations are reported. The generation of radiological reports has evolved from handwritten, transcribed to voice recognition with little change in content and structure. The earliest known x-ray report (1) could very easily be mistaken for a report created in 2014.

Modern medicine is constantly changing and evolving and the format of radiological reporting also needs to evolve to meet modern healthcare demands. Pathology reporting and surgical reporting are already undergoing similar changes (2) (3).

All radiologists wish to produce reports which accurately describe the findings, and provide information in a manner that facilitates effective clinical management of the patient. However, while radiologists will agree about what is important to include in a radiological report, a consensus about how the information should be presented has not yet been achieved. In fact, studies have shown considerable variability in the reporting styles of radiologists (4). This variability can lead to miscommunication of information, and suboptimal patient care.

Deficiencies in radiology reports have been identified and are attributable to the lack of:

- Organization
- Clarity
- succinctness
- completeness

Modern radiology reporting is adopting more structured organization and language lead by breast imaging reporting.

Breast imaging reporting quality has improved through the use of the Breast Imaging Reporting and Data Systems (BI-RADS) reporting format and lexicon (5).

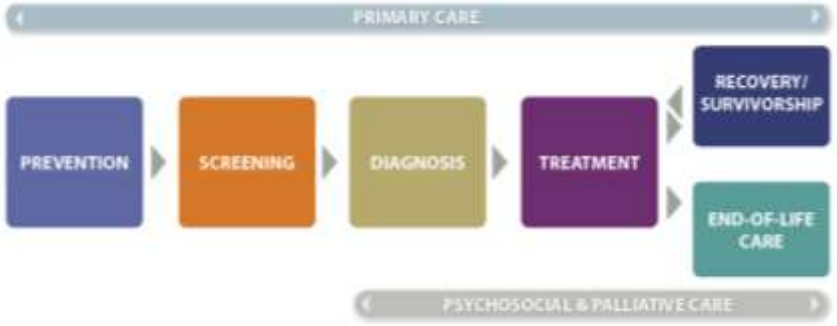
The need has come for improvement of the quality of all radiology examinations related to cancer patients.

This document is intended for template development for radiology synoptic reporting.

The Cancer Imaging Report

Medical imaging is involved with every aspect of the patient cancer journey from early detection through to staging, treatment and survivorship.

Figure 1: The Cancer Journey



The radiological report is the end product of the patient radiology journey. In attempts to improve the quality of radiological reports, various organizations have produced guidelines that outline the essential components of a good quality report (6) (7) (8)((9) (10) (11). Based on these guidelines, a list of report content items has been compiled, and grouped into four categories. These elements are common to all radiologist reports:

1. Demographics
2. Relevant clinical information
3. Body of the report
4. Impression (conclusion or diagnosis)

The report from a cancer imaging radiologic study contains all of the elements described above, but also requires explicit information in the body of the report section that is specific to cancer imaging and the phase of the patient journey.

For example, for patient staging the following are required in order to communicate the extent of disease to the referring physician:

- description of the primary lesion
- description of local spread
- description of distal spread

In conventional narrative-style radiology reports – for cancer or other indications – the reports are stored and viewed as free text. In free text format, the details of the report are hidden within the report, and can only be found by reading the report in its entirety. This makes extracting the necessary clinical information difficult and time consuming. In fact, referring physicians favor detailed reports that are in a tabulated format (4) (12).

Structured Reporting

To decrease the variability and improve the quality of the radiology reports, structured reporting is being advocated (13) (14). In a structured report, the details are presented in discrete fields in an organized format using a template or checklist (Appendix A). When creating the report, the radiologist is prompted to provide the necessary information to complete each of the discrete data fields. When all of the fields are completed a final report is generated. The referring physician reviewing structured reports knows that the information that is needed will be present in each report regardless of the reporting physician.

Synoptic Reporting

The terms structured and synoptic reporting have been used interchangeably. At Cancer Care Ontario, synoptic reporting as pertaining to pathology, is described as reporting that uses an "…electronic report in discrete data field format (i.e. each type of information has a specific place and format in the report) that allows for the standardized collection, transmission, storage, retrieval and sharing of data between clinical information systems." (2)

Benefits of Synoptic Reporting

Patients

- Facilitates decision-making for treatment
- Standardized format for discussion at multidisciplinary rounds

Radiologists

- Improves report completeness
- Easier to compare to previous reports
- Increases radiology efficiency by decreasing the frequency of interaction with referring physicians due to "missing information"

Referring Physician

- Facilitates decision making for treatment
- Standardized format for discussion at multidisciplinary case conferences
- Improves communication
- Quick and accurate review of clinical information

System

- Facilitates ease of identifying patterns of care and outcomes
- Reports are easier to decipher
- Secondary use of clinical data and data mining

Cancer Care Ontario's (CCO's) Role in Synoptic Radiology Reporting

In 2009, the Cancer Imaging Program (CIP) was established at Cancer Care Ontario (CCO) to improve the quality of Cancer Imaging. The opportunity to improve quality through improvements in reporting and communication by the use of synoptic radiology reports led to the addition of "Synoptic Radiology Reporting" as a Program priority.

To provide expert, interdisciplinary guidance regarding clinical content standards, the "Synoptic Radiology Reporting Clinical Advisory Panel" was established in 2013 at CCO. This panel determined the need for the creation of a document that would be used by disease-site and/or modality specific expert subcommittees to guide the creation of cancer imaging synoptic reports.

Throughout this initiative, CCO is also leveraging the knowledge gained through having led the development and implementation of provincial synoptic reporting for pathology (2), as well as the development of a synoptic report for pre-surgical staging of rectal cancer with MRI performed as a collaborative initiative between CCO and Canadian Cancer Society (15).

Purpose

This document provides recommendations on the minimum mandatory key elements for a cancer imaging radiologic report – containing key information required for decision support, specific to cancer but broadly applicable across disease-sites.

The purpose of this document is to guide the development of synoptic radiology reports for cancer-related studies. It is designed to assist expert panels in developing new clinical checklist content and criteria for reviewing existing reports.

Guiding Principles for Synoptic Cancer Imaging Report Development

On May 16, 2013 the synoptic reporting advisory panel had a face to face meeting. During this meeting the following guiding principles related to synoptic report development were endorsed:

Synoptic reports should:

1. Be created by multidisciplinary expert groups.
2. Have content informed by evidence where this evidence is available.
3. Be aligned with appropriate overall clinical practice, as identified in disease pathways where they exist. (e.g., CCO's Disease Pathways)
4. Contain minimum mandatory elements needed to support clinical decision making. Optional elements may also be recommended, but should be identified as such.
5. Be clear and usable, and consider cross-referencing of data elements where applicable (e.g., previous imaging studies or pathology synoptic reports).

When is a Synoptic Cancer Imaging Report Required?

Two main cancer imaging areas were identified that require priority synoptic reports:

1. New patients/ initial staging

Where patients are

- Highly suspicious for; or
- Have pathology proven disease

Disease-site groups should specify what 'highly suspicious' means in their clinical setting/scenario, and whether pathology should be required or not.

To Exclude clearly benign

2. Response

Two categories were identified:

- Local tumour follow-up
- Systemic follow-up

Key Elements of the Synoptic Report

When at all possible, report elements should be dichotomous, categorical or numeric.

A user guide must accompany a synoptic report, including definitions, staging system etc.

1. **Demographics** (information provided by RIS, part of the DICOM headers)
    a. Name of facility where examination provided
    b. Name of patient and local site/facility patient identifier.
    c. Patient gender
    d. Patient's date of birth or age.
    e. Name(s) of referring physician(s) or other health care provider(s).
    f. Name or type of examination.
    g. Date of the examination.
    h. Time of the examination
    i. Date of dictation.
    j. Date and time of transcription.

2. **Relevant clinical information**
    a. Previous cancer
    b. Previous surgery
    c. Previous radiation
    d. Previous chemotherapy
    e. Clinical symptoms
    f. Working diagnosis
    g. Most recent, pertinent lab tests
    h. Most recent, pertinent imaging tests

3. **Body of the report**
    a. Type of study- technical protocol
    b. Relevant study information by modality
    c. Contrast information
    d. Reactions and or complications
    e. Quality of examination- adequate inadequate for interpretation
    f. Artifacts
    g. Comparison to all previous
    h. Number of lesions
    i. Invasion/local extension
    j. Lateralization
    k. TNM description

- Primary Lesion[1] (this section should include key classification elements of T category)
    - Location
    - Focality (disease-site groups encouraged to provide suggestions on how to manage)
    - Size (disease-site groups should make recommendations on how measurement should be done)
    - Lesion characteristics (CT/MRI characteristics)
    - Critical structures
        - List, with involved/not-involved and distances
- Nodes[1]
    - Location
    - Size
    - Anatomical list of nodes
    - Level of suspicion
    - Characterization, if relevant

l. Organ specific findings. (Note that if appropriate for their clinical scenario, disease-site groups may wish to have a specific metastasis sub-section here. However, care should be taken that context/appropriateness is clear.)

- List of pertinent organs for comment
    - Location
    - Size
    - Level of suspicion
    - Characterization, if relevant

4. **Impression**
    a. Summarize findings (should guide management)
    b. Recommendations (subcategory check list of evidence-based next-steps recommended. E.g., other imaging, follow-up and interval, referral, biopsy, etc)

[1] Location information should include image series, image, and anatomic location

Further Information Regarding Synoptic Reporting

1. eImaging Readiness Assessment Options Available for Creating Synoptic Reporting Capabilities – Cancer Imaging in Ontario document completed April 23, 2012
2. Canada Health Infoway XDS/XDS-i Implementation Guide chapter on Synoptic Radiology (16)
3. MRI Synoptic Report: Rectal Cancer Staging: Surgeons, radiologists and pathologists can use these valid and reliable report templates and accompanying educational materials to improve consistency of imaging and specimen reporting across the province.
4. RSNA Reporting Initiative: The RSNA radiology reporting initiative is improving reporting practices by creating a library of clear and consistent report templates. These templates make it possible to integrate all of the evidence collected during the imaging procedure, including clinical data, coded terminology, technical parameters, measurements, annotations and key images. Twelve subcommittees of subspecialty experts have created a library of best-practices radiology report templates. They are free and not subject to license restrictions on their reuse. These report templates:
    - Adrenal MIBG
    - CT Adrenal Mass
    - CT Cervical Cancer Staging (ACRIN 6651)
    - CT Head and Neck Cancer Staging (ACRIN 6685)
    - CT Liver Surveillance
    - CT Lung Nodule
    - CT Onco Follow-up
    - CT Onco Lung Mass
    - CT Onco Primary Liver Mass
    - CT Onco Primary Pancreas Mass
    - CT Onco Renal Mass
    - CT Pancreas Cyst
    - CT Pancreatic Mass Staging
    - Digital Mammography (ACRIN 6652 / DMIST)
    - Lung Cancer Screening CT (ACRIN 6654 / NLST)
    - Melanoma Lymphoscintigraphy
    - MR Liver HCC
    - MR Onco Bone Mass
    - MR Onco Soft Tissue Mass
    - MR Rectal Tumour
    - MR Rectum Cancer
    - MR Renal Mass
    - Octreotide
    - PET Oncologic
    - PET-CT Oncologic
    - PET-NonDxCT Oncologic
    - Zevalin In-111 Imaging
    - Zevalin Y-90 Therapy

Existing Synoptic/Standardized Reports

Organizational

1. RSNA
2. BI RADS
3. LU RADS
4. LIV RADS
5. CCO+
6. Synoptic breast report Australia

Third party

1. AS Software
2. CAP (College of America Pathologists)
3. Clickview
4. MedQ Inc.
5. mTuitive
6. Nuance (Powerscribe)
7. RSNA Radiology Reporting Initiative
8. Synoptec (Softworks Group Inc.)

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Appendix A – Example of a Structured Radiology Report

Cancer Care Ontario
Action Cancer Ontario

Canadian Cancer Society / Société canadienne du cancer

This document was developed by Drs Eisar Al-Sukhni, Laurent Milot, Mark Fruitman, Gina Brown, Selina Schmocker and Erin Kennedy for the Cancer Services Innovation Partnership – a joint initiative of Cancer Care Ontario and the Canadian Cancer Society

1. MRI PROTOCOL

Overall image quality: ☐ Adequate ☐ Suboptimal ☐ Non-diagnostic

2. TUMOUR LOCATION

Tumour location (from anal verge): ☐ Low (0-5.0 cm)
☐ Mid (5.1-10.0 cm)
☐ High (10.1-15.0 cm)

Distance of the lowest extent of tumour from anal verge: _____ cm
Distance of lowest extent of tumour from top of the anal sphincter: _____ cm
Relationship to anterior peritoneal reflection: ☐ Above ☐ At or straddles ☐ Below ☐ Not able to assess

3. TUMOUR CHARACTERISTICS

Circumferential extent/location (clock face): _____
Craniocaudad extent: _____ cm
Mucinous: ☐ No ☐ Yes

4. T-CATEGORY

i) T-category:

☐ T1 or T2
☐ T2/early T3 [includes spiculation of the perirectal fat]
☐ T3
☐ T3/possible T4*
☐ T4*

*Please indicate structures with possible invasion: _____ (see list below)

GU	PELVIC SIDE WALL	BONE/VASCULAR	OTHER
bladder	Obturator internus	sacrum (specify level)	Anterior peritoneal reflection
left ureter; right ureter	Piriformis	left internal iliac vessels; right internal iliac vessels	
prostate		left external iliac vessels; right external iliac vessels	
uterus	LEVATOR ANI		
vagina	Pubococcygeus		
	Iliococcygeus		
	Coccygeus		

ii. *For low rectal tumours (0- 5 cm) only*:

Is the lower extent of the tumour at or below the top border of the puborectalis? ☐ No ☐ Yes*

*If yes, please complete the following section for the most penetrating component of the tumour below the top border of puborectalis:

☐ Possible confinement to the submucosa; no definite involvement of internal sphincter (suspected T1)
☐ Confined to the internal sphincter; no involvement of intersphincteric fat or external sphincter (early T2)
☐ Through the internal sphincter and intersphincteric fat; possible or definite involvement of the external sphincter (advanced T2)
☐ Through the external sphincter and into surrounding soft tissue; no organ involvement (T3)
☐ Through external sphincter and possible involvement of the adjacent organs (i.e., prostate, vagina) (T3/T4)
☐ Through external sphincter and definite involvement of adjacent organs (i.e., prostate, vagina) (T4)

5. **DISTANCE TO THE MRF AND EXTRAMURAL DEPTH OF INVASION (EMD)**

i) Shortest distance of the definitive tumour border to the MRF = _____ mm
[or ☐ unable to estimate or ☐ not applicable (involving the peritonealised portion of the rectum or T4a)]

ii) Extramural depth of invasion (EMD) at this level = _____ mm
[Record *0 mm for T1 and T2 tumours*]

iii) Are there any tumour spiculations closer to the MRF? ☐ No ☐ Yes*

*If yes, please specify distance = _____ mm and location _____ (on clock face)

iv) Is there any other component of the tumour (any T2-3) closer to the MRF? ☐ No ☐ Yes*

*If yes, please specify distance = _____ mm and location _____ (on clock face)

6. **EXTRAMURAL VASCULAR INVASION (EMVI)**

EMVI: ☐ Absent ☐ Equivocal ☐ Present

7. **MESORECTAL LYMPH NODES AND TUMOUR DEPOSITS**

Any suspicious mesorectal lymph nodes and/or tumour deposits? ☐ No ☐ Yes*
(suspicious = irregular border, mixed signal intensity and/or ≥ 8 mm)

*If yes: (please complete a and b)

(a) Shortest distance of any suspicious mesorectal lymph node/tumour deposit to MRF = _____
(b) Please indicate location of the lymph node/deposit closest to the MRF:

☐ At level of tumour; at _____ o'clock
☐ Above tumour; at _____ o'clock
☐ Below tumour; at _____ o'clock

8. **EXTRAMESORECTAL LYMPH NODES**

Any extramesorectal lymph node(s) with suspicious morphology or signal? ☐ No ☐ Yes*
(suspicious = irregular border, mixed signal intensity and/or ≥ 1 cm)

* If yes, please specific location (free text):

9. **FREE TEXT/ADDITIONAL COMMENTS**

Appendix B – Synoptic Radiology Clinical Checklist Development Working Group Terms of Reference

1.0 Background

Systematically developed clinical checklists for reporting a procedure have been shown to be superior to narrative reports in capturing and clearly communicating the key information that facilitates clinical decision making.

Well-developed clinical checklists will include key information of relevance to the treatment and downstream management of a patient. For many of these factors, evidence is derived from rigorous research that validates their importance. For other factors, the experience and opinions of experts is the best available source of information.

To decrease the variability and improve the quality of the radiology reports, structured and synoptic reporting is being advocated by Cancer Care Ontario (CCO). In 2013, the "Synoptic Radiology Reporting Clinical Advisory Panel" was established and determined the need for expert clinical checklist development working groups that will undergo the process of new clinical checklist creation.

2.0 Responsibilities and Deliverables

The main responsibilities of the Synoptic Radiology Clinical Checklist Development Working Group will be:

1. Development of a synoptic radiology report clinical checklist for the disease site and modality in question
2. Maintenance of clinical checklist including participation in the review cycle
3. Compliance with the procedures outlined in the Clinical Checklist Development Governance document.

The main deliverable of the Clinical Checklist Development Working group will be to produce the synoptic reporting checklist with approved, evidence-based clinical content.

Guiding Principles

- Use multidisciplinary approach for the creation of clinical checklists.
- Have content informed by evidence where this evidence is available.
- Be aligned with appropriate overall clinical practice, as identified in disease pathways where they exist. (e.g., CCO's Disease Pathways)
- Contain minimum mandatory elements needed to support clinical decision making. Optional elements may also be recommended, but should be identified as such.
- Be clear and usable, and consider cross-referencing of data elements where applicable (e.g., previous imaging studies, existing clinical checklists or pathology & surgical synoptic reports).

Clinical Checklist Development Working Groups will be expected to:

- Act as champions and spokespersons for synoptic reporting
- Agree upon clinical checklist content
- Agree on a standardized and common terminology/lexicon

Participation on the Clinical Checklist Development Working Group will include the following activities:

- Individually review documents, as circulated
- Individually seek out and review literature on synoptic reporting
- Actively participate in Clinical Checklist Development Working Group meetings to provide content, feedback and discuss plans and issues
- Individually review and provide comments on revised drafts of documents
- Recommend external reviewers to assess and evaluate draft documents

3.0 Membership

3.1 Sponsor

- Synoptic Radiology Advisory Panel

3.2 Proposed membership includes representation from key stakeholder groups, including but not exclusive to the following physician specialties:

- Medical Oncology
- Radiation Oncology
- Surgery
- Pathology
- Radiology

3.3 Activities of the team will be supported by the Cancer Imaging Program, CCO.

4.0 Meetings

Format

Clinical Checklist Development Working Group meetings will be held remotely via a CCO-supported online meeting and will not be longer than one hour in length. Face to face meetings may be required on occasion as work dictates. Every attempt will be made to find a common acceptable meeting time for the group in order to facilitate maximum attendance. Members may be asked to review and comment on relevant documents circulated electronically between meetings.

Administration

Meeting agendas will be prepared by the Cancer Imaging Program team and will be circulated ahead of time, along with any pre-reading materials. It is members' responsibility to review these materials prior to any meetings in order to facilitate a productive discussion.

5.0 Decision Making Process

All decisions made by the group require general consensus. If there are any issues on which consensus cannot be achieved, a formal consensus process may be implemented at the discretion of the Chair in consultation with the Project Sponsor.

6.0 Term

The Terms of Reference will be revisited and revised, if necessary, on an annual basis. The composition of the working group will be expected to evolve and change on an as-needed basis, in alignment with these provisions of this Terms of Reference.