



CODING TUMOUR MORPHOLOGY

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INTRODUCTION

The morphology describes the tissue of the tumour closest to 'normal' tissue

Well differentiated tumours are closest to 'normal'

Undifferentiated tumours show no resemblance to normal tissues.

Normal tissue	Cancer
epithelium	carcinoma
squamous cell epithelium	squamous cell carcinoma
fat tissue	liposarcoma (lipo- = fat)
blood vessel	angiosarcoma (angio- = vessel)



TECHNIQUES TO DETERMINE MORPHOLOGY

- 'Traditional' pathology: cytology, histology (descriptive)
- Immunohistochemistry (surface antigens)
- Cytogenetic tests (chromosomes)
- Molecular tests (DNA)
- Whole genome sequencing



WHY IS THE MORPHOLOGY IMPORTANT?

Epidemiological:

- Different morphologies may be related to different etiological factors

For example: squamous cell carcinoma and adenocarcinoma of the oesophagus

Therapeutical:

- Different morphologies may require different treatments

For example: small cell carcinoma and adenocarcinoma of the oesophagus, haematological malignancies



CARCINOMA OR SARCOMA

During embryogenesis three germ layers are formed:

- Endoderm (or entoderm)
- Mesoderm
- Ectoderm
- (Germ cells)



CARCINOMA OR SARCOMA

Germ layer	Organs formed from the germ layer	Predominant type of cancer
endoderm	Gastro-intestinal tract, pharynx, lungs, thyroid	<u>Adenocarcinoma</u>
mesoderm	Soft tissue, bone, cartilage, serous membranes (mesothelium), notochord, blood & lymphatic system, genito-urinary system	<u>Sarcoma</u> Mesothelioma Chordoma 'Lymphosarcoma'
ectoderm	Skin (epidermis), mouth, eye Skin appendices, breast neuro-ectoderm: Central nervous system, retina, melanocytes	<u>Squamous cell carcinoma</u> Adenocarcinoma <u>Glioma</u> Melanoma

GERM CELLS

Germ cells

- Germ cells are omnipotent (= all types of tissues can be formed)
- In an embryo germ cells are formed in the midline (from brain to sacrum)
- When the gonads are being formed, the germ cells migrate to the gonads (ovary, testis)
- Some germ cells do not migrate to the gonads and may in later life give rise to cancer outside the gonads



BENIGN OR MALIGNANT

What makes a tumour a malignant tumour?

The potency to metastasize via blood or lymph vessels

Carcinoma

- Invasion of the basal membrane (there are no blood or lymph vessels in the epithelium)
- /0 (benign), /2 (non-invasive) or /3 (invasive)

Sarcoma (non-carcinoma)

- Tumour characteristics (number of cell divisions, differentiation grade, cell atypia, etc.)
- The presence of metastases
- /0 (benign), /1 (borderline) or /3 (malignant)





ICD-O CODING RULES



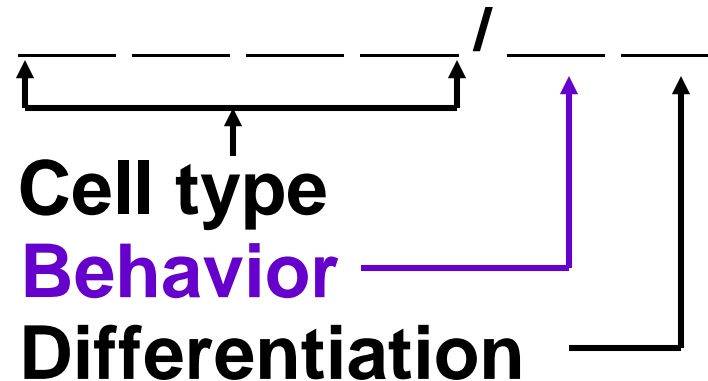
ICD-O-3 MORPHOLOGY CODING RULES

- Rule F. Behaviour code in morphology
- Rule G. Grading or differentiation code
- Rule H. Site-associated morphology terms
- Rule J. Compound morphology diagnoses
- Rule K. Coding multiple morphology terms



RULE F. BEHAVIOUR CODE IN MORPHOLOGY (THE “MATRIX PRINCIPLE”)

- “Use the appropriate 5th digit behaviour code even if the exact term is not listed in ICD-O.”



RULE F. BEHAVIOUR CODE IN MORPHOLOGY

- Behaviour of a tumour is the way it acts within the body

- Codes:

- **/0** – benign – the tumour grows in place without the potential for spread;

- **/1** – uncertain whether benign or malignant

- ➔ • **/2** – non-invasive or *in situ* – the tumour is malignant, but still growing in place (does not invade the basal membrane)

- ➔ • **/3** – malignant, primary site – the tumour invades surrounding tissues

- Pathologists may use also /6 (metastatic cancer) or /9 (uncertain whether or metastatic) → code as /3 in CR



RULE F. BEHAVIOUR CODE IN MORPHOLOGY

- The Matrix

8010/0_ Epithelial tumor, benign

8010/2_ Intraepithelial carcinoma, NOS

8010/3_ Epithelial tumor, malignant
(Carcinoma, NOS)

8800/0_ Soft tissue tumor, benign

8800/1_ Soft tissue tumor, borderline

8800/3_ Soft tissue tumor, malignant
(Sarcoma, NOS)



RULE F. BEHAVIOUR CODE IN MORPHOLOGY

- **Implied rule:** It is okay to change the behaviour code to accurately report what the pathologist said.
- **Example**
 - Pathology report states “*malignant* adenomyoepithelioma”
 - ICD-O-3 only lists 8983/0 Adenomyoepithelioma.
 - Code 8983/3 with behaviour code 3 to indicate that this tumour is malignant.

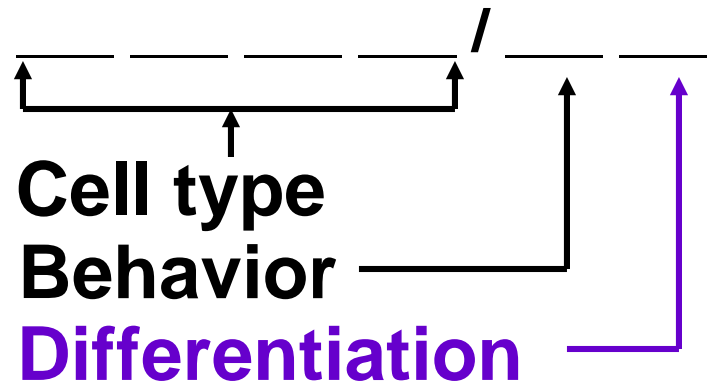


RULE F. BEHAVIOUR CODE IN MORPHOLOGY

- Most cancer registries collect only
 - /2 Carcinoma in situ; non-invasive; non-infiltrating; intraepithelial
 - /3 Malignant, primary site (invasive)
- If a diagnosis comes from a metastatic site, the cancer registry records the primary site and the morphology with behavior /3.
- Example: Pathology report says: “metastatic adenocarcinoma in lung biopsy.” Coded as C34.9 8140/6 on report.
 - Cancer registry reports case as unknown primary site, C80.9 8140/3

RULE G. GRADING OR DIFFERENTIATION CODE

- “Assign the highest grade or differentiation code described in the diagnostic statement.”



RULE G. GRADING OR DIFFERENTIATION CODE

- **Histological grading and differentiation for malignant tumors** – describes how much or how little a tumor resembles the normal tissue from which it arose (**codes 1 to 4 and 9**).
- **Cell origin/lineage** for leukemias and lymphomas (**codes 5 to 8 and 9**)
- Codes:
 - **1** – Grade I, well differentiated
 - **2** – Grade II, moderately differentiated
 - **3** – Grade III, poorly differentiated
 - **4** – Grade IV, undifferentiated, anaplastic
 - **5** – T-cell
 - **6** – B-cell
 - **(7** – Null cell, Non T-non B)
 - **8** – NK (natural killer) cell
 - **9** – grade, differentiation or cell type not determined, not stated or not applicable



RULE G. GRADING OR DIFFERENTIATION CODE OF SOLID CANCERS (EXCL. CNS)

- **Implied rule:** Code to the higher grade.
- **Example:** moderately to poorly differentiated adenocarcinoma of prostate
 - Moderately differentiated = grade 2
 - Poorly differentiated = grade 3
 - **Code diagnosis as 8140/33**



RULE G. GRADING OR DIFFERENTIATION CODE OF SOLID CANCERS (EXCL. CNS)

- Use the 6th digit grade or differentiation code as a ‘check’ where the terminology is included in the morphology term.
- **Implied rule:** “double code” any statement of grade in the diagnostic term.
 - Example: undifferentiated carcinoma
 - Undifferentiated carcinoma= 8020/3
 - Undifferentiated = 4
 - **Code diagnosis as 8020/34**



EXCEPTION: CNS TUMOURS

Central Nervous System tumours follow a slightly different system (table 27 in ICD-O)

- WHO Grade I (benign or borderline malignant)
- WHO Grade II ('low grade')
- WHO Grade III ('anaplastic')
- WHO Grade IV
 - Examples:
 - oligodendroglioma, NOS = 9450/32
 - anaplastic astrocytoma =9401/33
 - glioblastoma =9440/34



RULE G. CELL ORIGIN FOR LYMPHATIC MALIGNANCIES

- **Implied rule:** Never use the grade but always use the cell origin.
- **Example:** follicular B-cell lymphoma, grade 2
 - Follicular lymphoma, grade 2 = 9691/3
 - B-cell origin = code 6
 - **Code diagnosis as 9691/36**



RULE H. SITE-ASSOCIATED MORPHOLOGY TERMS

- “Use the topography code provided when a topographic site is not stated in the diagnosis.
- This topography code should be disregarded if the tumor is known to arise at another site.”
- Suggested site code
 - In parenthesis () after morphology term
 - Most common site associated with neoplasm
 - Examples
 - M-8330/3 Adenocarcinoma, follicular (C73.9 {thyroid})
 - M-9700/3 Mycosis fungoides (C44._ {skin})



RULE H. SITE-ASSOCIATED MORPHOLOGY TERMS

- Examples of terms that include a root word mentioning a site
 - Nephroblastoma, NOS (C64.9 – kidney)
 - Thymoma, NOS (C37.9 – thymus)
 - Cloacogenic carcinoma (C21.2 – cloacogenic zone of anal canal)
 - Bronchiolar carcinoma (C34.__ – bronchioles of lung)
 - Hepatocellular carcinoma (C22.0 – liver)
- No suggested site code is listed when malignancy could appear in many sites, such as adenocarcinoma, NOS



RULE H. SITE-ASSOCIATED MORPHOLOGY TERMS

- If a site is given that is different from the site indicated by the suggested site code, use the site code appropriate to the diagnosis.
 - Example: infiltrating duct carcinoma, head of pancreas
 - 8500/3 Infiltrating duct carcinoma (C50._) *Suggested site code is breast—ignore this based on diagnosis!*
 - Head of pancreas = C25.0
 - Code diagnosis as C25.0 8500/3



RULE H. SITE-ASSOCIATED MORPHOLOGY

TERMS

- **Implied rule:** Use the suggested site code as a guide to code the primary site. If the site stated in the pathology report is different, code what the pathology report states.



HETEROGENEITY WITHIN 1 TUMOUR

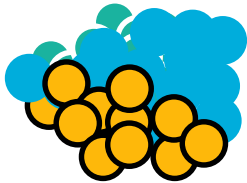
mutation



mutation



mutation



RULE J. COMPOUND MORPHOLOGY DIAGNOSES

- “Change the order of word roots in a compound term if the term is not listed in ICD-O-3.”
- Compound words have multiple root words

Myxofibrosarcoma – not in ICD-O-3

- *Break into word roots*

Myxo / fibro / sarcoma

- *Change around word roots, then look up new term*

Fibromyxosarcoma 8811/3

Chondro-osteosarcoma →

Osteochondrosarcoma 9180/3



RULE K. CODING MULTIPLE MORPHOLOGY TERMS

- “When no single code includes all diagnostic terms, use the numerically higher code number if the diagnosis of a single tumor includes two modifying adjectives with different code numbers.”
- **Implied rule:** Code to higher code number if there is no combination code.



RULE K. CODING MULTIPLE MORPHOLOGY TERMS

○ Examples

- “Basaloid squamous cell carcinoma, large cell”
 - No combination code
 - Squamous cell carcinoma, large cell 8072/3
 - Basaloid squamous cell carcinoma 8083/3
 - Code morphology to higher number 8083/3
- “Papillary and tubular adenocarcinoma”
 - Papillary adenocarcinoma 8260/3
 - Tubular adenocarcinoma 8211/3
 - Code morphology to 8255/3 (Adenocarcinoma with mixed subtypes)



RULE K. CODING MULTIPLE MORPHOLOGY TERMS

- Look for a code that represents the combined morphology. Common combinations may have a unique code.
- Usually say “mixed” or “combined” or “and”
 - Mixed embryonal carcinoma and teratoma = teratocarcinoma 9081/3
 - Ductal carcinoma and lobular carcinoma 8522/3
- Compound terms
 - Carcinosarcoma 8980/3
 - Adenocarcinoma and squamous carcinoma = adenosquamous carcinoma 8560/3
 - Small cell-large cell carcinoma 8045/3



HAEMATOLOGICAL MALIGNANCIES

- for solid tumours the topography is the most discriminative factor
 - breast, lung, skin
- for haematological malignancies the morphology is the most discriminative factor
 - Hodgkin lymphoma, mantle cell lymphoma, peripheral T-cell lymphoma



HAEMATOLOGICAL MALIGNANCIES

- Always code the most specific code (not necessarily the highest code)
- Take into account specific diagnostics, such as immunohistochemistry and cytogenetics



HOW TO CODE

- Break phrase into topography and morphology
- Look up morphology first
- Use up all the words in the phrase
- Add 5th and 6th digit codes
- Look up topography



CODING EXAMPLE 1

- Diagnosis: Poorly differentiated hepato-cellular carcinoma of right lobe of liver
- What is it (morphology)?
 - Hepatocellular carcinoma, NOS (C22.0): 8170/3
- Suggested site code is included in index
 - Liver, right lobe: C22.0 Liver, NOS
- What else do we know?
 - Poorly differentiated: /_3
- Complete codes: C22.0 8170/33



CODING EXAMPLE 2

- Diagnosis: Moderately differentiated adenocarcinoma of prostate
- What is it (morphology)?
 - Adenocarcinoma [not otherwise specified]: 8140/3
- What else do we know?
 - Moderately differentiated: /_2
- Where did it start (topography)?
 - Prostate: C61.9
- Complete codes: C61.9 8140/32

