

Appendix E

Disease Ascertainment Algorithms

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To evaluate the relationship of individual chronic diseases and disability, it was essential to ascertain the presence of each of the major chronic diseases and conditions in a uniform and rigorous manner. To accomplish this, state-of-the-art clinical and epidemiological criteria for determining the presence of diseases were selected. For certain diseases (e.g., rheumatoid arthritis and osteoarthritis), decision trees were available with explicit criteria for disease presence as well as level of certainty. For other diseases, the Disease Ascertainment Working Group developed decision algorithms that would use the data collected in the Women's Health and Aging Study (WHAS).

Algorithms are presented on the following pages for the 17 major chronic diseases and conditions ascertained in the WHAS (Figures E.1-E.17). The algorithms start with data from the baseline interview, the nurse's examination, and the participant's current medication list. For certain diseases, these data were insufficient and additional information was used to validate the presence of a disease. For a few diseases, additional evaluations, including radiographs of the hips or knees and blood tests (e.g., glycohemoglobin level for diabetes mellitus) were used to determine presence of disease. For many conditions, responses by the participant's primary care physician to a questionnaire were used to confirm the diagnoses (Appendix F). Surveillance procedures were used to obtain hospital or outpatient records when other data were not sufficient, and these were then reviewed by WHAS clinician-epidemiologist investigators to confirm the presence of disease (Appendix F).

A study was performed to evaluate the reliability of disease ascertainment algorithms. For each disease, participants' records were reviewed first by a medical abstractor using the disease algorithms. For each disease, 15 to 20 charts to be reviewed were chosen at random from three categories of disease (definite disease, possible disease, and no disease) by the medical records abstractor, based on the abstractor's initial classification. Three WHAS clinician-epidemiologists then independently applied the relevant data to the algorithm and classified the participants according to

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disease status. Kappa values were calculated to assess inter-rater reliability for each algorithm, and results for the 15 algorithms tested are shown in Table E.1. Where raters disagreed, the algorithms were modified appropriately and retested, resulting in complete agreement as to disease presence. Because of time constraints, algorithms for peripheral arterial disease (Figure E.4), and cancer (Figure E.17) had not been tested as of the time of publication.

Table E.1: Inter-Rater Reliability of Disease Algorithms

<u>Chronic disease</u>	<u>Kappa</u>	<u>Number of cases reviewed</u>		
		<u>Classification by first reviewer</u>		
		<u>Definite disease</u>	<u>Possible disease</u>	<u>No disease</u>
Angina pectoris	1.00	7	5	5
Myocardial infarction	1.00	5	5 ¹	5
Congestive heart failure	1.00	5	5	5
Hip fracture	1.00	5	0	5
Osteoporosis	1.00	5	5	5
Osteoarthritis of the knee	1.00	10 ²	0	5
Osteoarthritis of the hip	0.93	10 ²	5	5
Osteoarthritis of the hand	1.00	10 ²	5	5
Rheumatoid arthritis	0.90	5	5	5
Degenerative disc disease	1.00	5	5	5
Spinal stenosis	1.00	5	5	5
Stroke	1.00	1	5	5
Parkinson's disease	0.80	5	0	5
Pulmonary disease	0.93	13 ³	3	5
Diabetes mellitus	0.80	5	5	5

¹ Silent myocardial infarction, by ECG

² Five cases definite and symptomatic, 5 cases definite and asymptomatic

³ Including definite asthma, emphysema or bronchitis

How to read the algorithms

Each algorithm traces the decision pathways in the explicit criteria for disease presence and level of certainty. The data elements and their sources are specified, indicated in the algorithms as follows:

Boldface type: These elements come from the participant, either from the screener or baseline questionnaire (Appendix B). The question number is usually presented in the box and the required response or value indicated in the pathway.

Double outlined box: These elements come from the nurse's examination (Appendix D) or additional evaluations such as blood tests and hip and knee radiographs (Appendix F).

Italics: These elements come from surveillance, including the physician questionnaire ("*MD Questionnaire*") and medical record abstraction (Appendix F). Question numbers appearing in the surveillance boxes refer to items in the baseline questionnaire that asked the participant to name a doctor or hospital where a diagnosis was made or treatment was received.

Medications box: If medication use was considered in the algorithm, the medications of interest are specified separately in a box.

References: Algorithms that were derived from existing criteria are referenced on the algorithm, with the full citations given below.

Abbreviations:

DK: The source (e.g., the participant or physician) does not know whether something occurred or had been diagnosed.

NA, Not Avail: The item could not be located, for example the record could not be found or the physician questionnaire was not completed.

References Cited in Algorithms

Acheson RM, Collart AB, Greenberg RH, Clemett AR. (1969). New Haven Survey of Joint Disease: Photograph and other variables in screening for arthritis of the hands. *Am J Epidemiol* 90:224-235.

Altman RD. (1991). Classification of disease: Osteoarthritis. *Sem Arthritis Rheum* 20(Suppl. 2):40-47.

Arnett FC, Edworthy SM, Bloch DA, McShane DJ, Fries JF, Cooper NS, Healey LA, et al. (1988). The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. *Arthritis Rheum* 31:315-324.

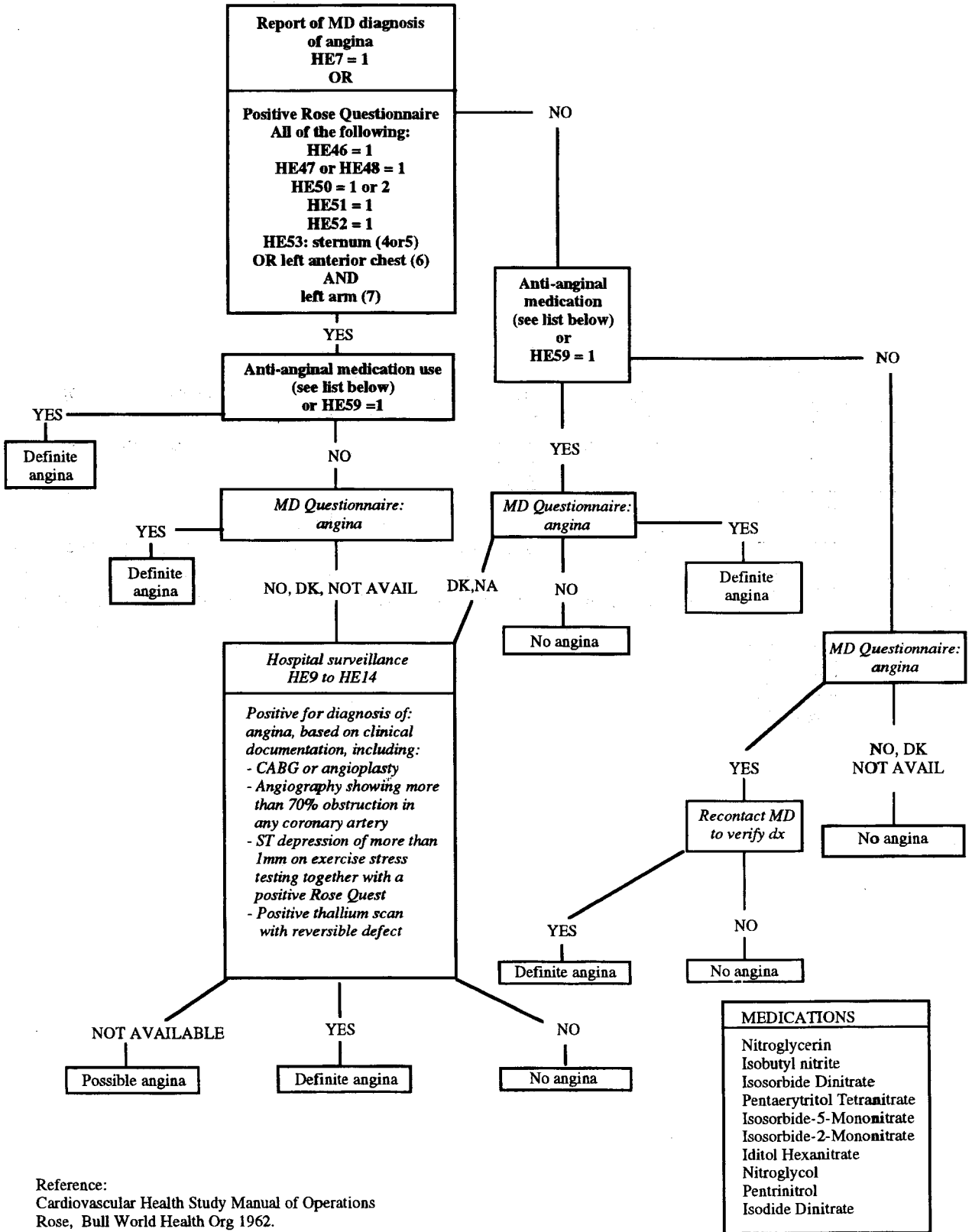
Cardiovascular Health Study. (1990). Manual of Operations. Vol. 1 protocol. CHS Coordinating Center, University of Washington, JD-30, 1107 NE 45th Street, Suite 530, Seattle, WA 98105.

Ferris BG Jr. (1978). Epidemiology Standardization Project (American Thoracic Society). *Am Rev Respir Dis* 118(Suppl.):1-120.

National Center for Health Statistics. (1994). Plan and operation of the Third National Health and Nutrition Examination Survey, 1988-94. *Vital Health Stat*, series 1, no. 32.

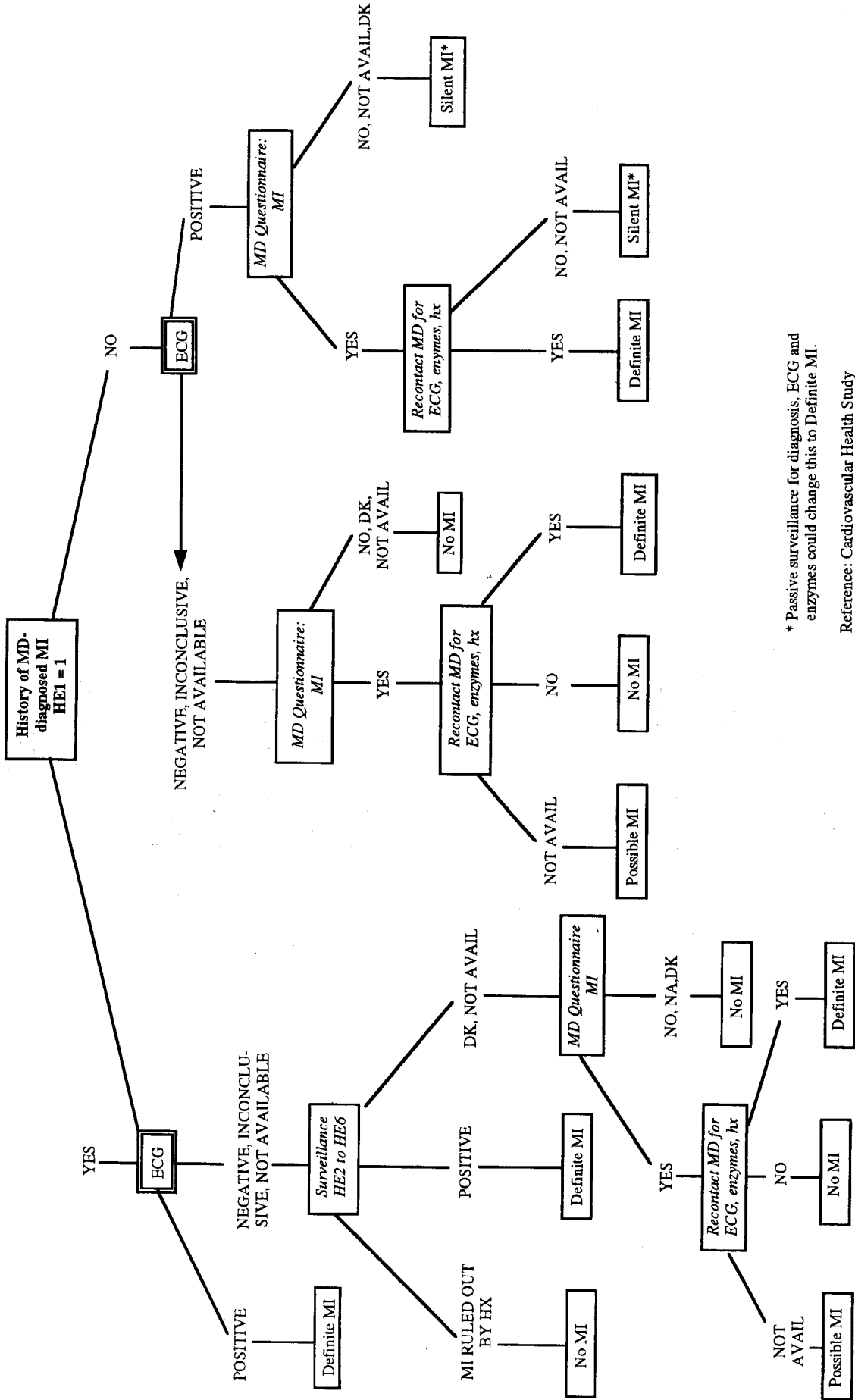
Rose G. (1962). The diagnosis of ischaemic heart pain and intermittent claudication in field surveys. *Bull WHO* 27:645-658.

Figure E.1: PREVALENT AND INCIDENT ANGINA



Reference:
Cardiovascular Health Study Manual of Operations
Rose, Bull World Health Org 1962.

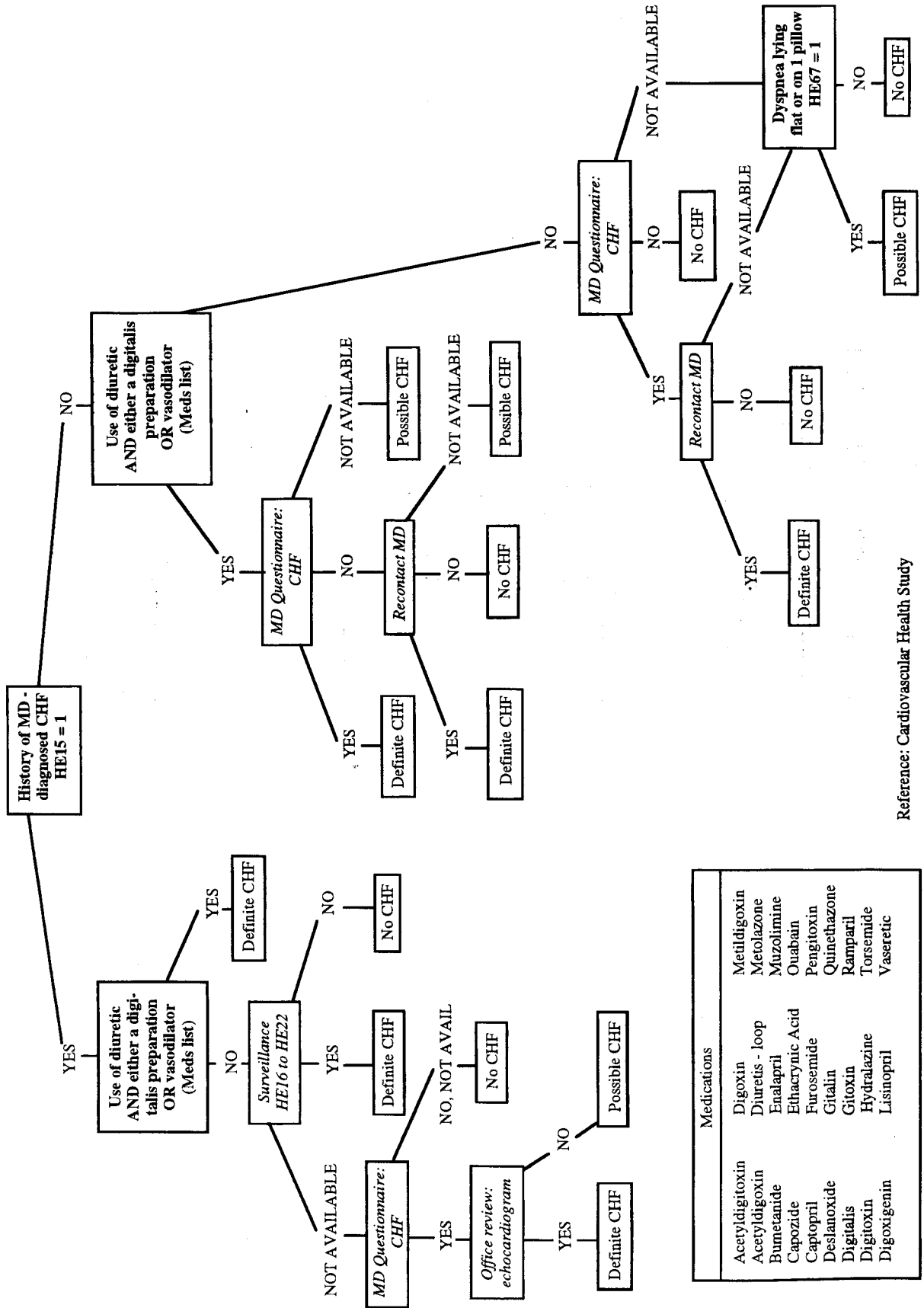
Figure E.2: PREVALENT MYOCARDIAL INFARCTION



* Passive surveillance for diagnosis, ECG and enzymes could change this to Definite MI.

Reference: Cardiovascular Health Study

Figure E.3: PREVALENT CONGESTIVE HEART FAILURE



Reference: Cardiovascular Health Study

Medications	
Acetyldigitoxin	Metildigoxin
Acetyldigoxin	Metolazone
Bumetanide	Muzolimine
Capozide	Ouabain
Captopril	Pengitoxin
Deslanoxide	Quinethazone
Digitalis	Ramipril
Digitoxin	Torsemide
Digoxigenin	Vaseretic
Digoxin	
Diuretic - loop	
Enalapril	
Ethacrynic Acid	
Furosemide	
Gitalin	
Gitoxin	
Hydralazine	
Lisinopril	

Figure E.4: PREVALENT PERIPHERAL ARTERIAL DISEASE

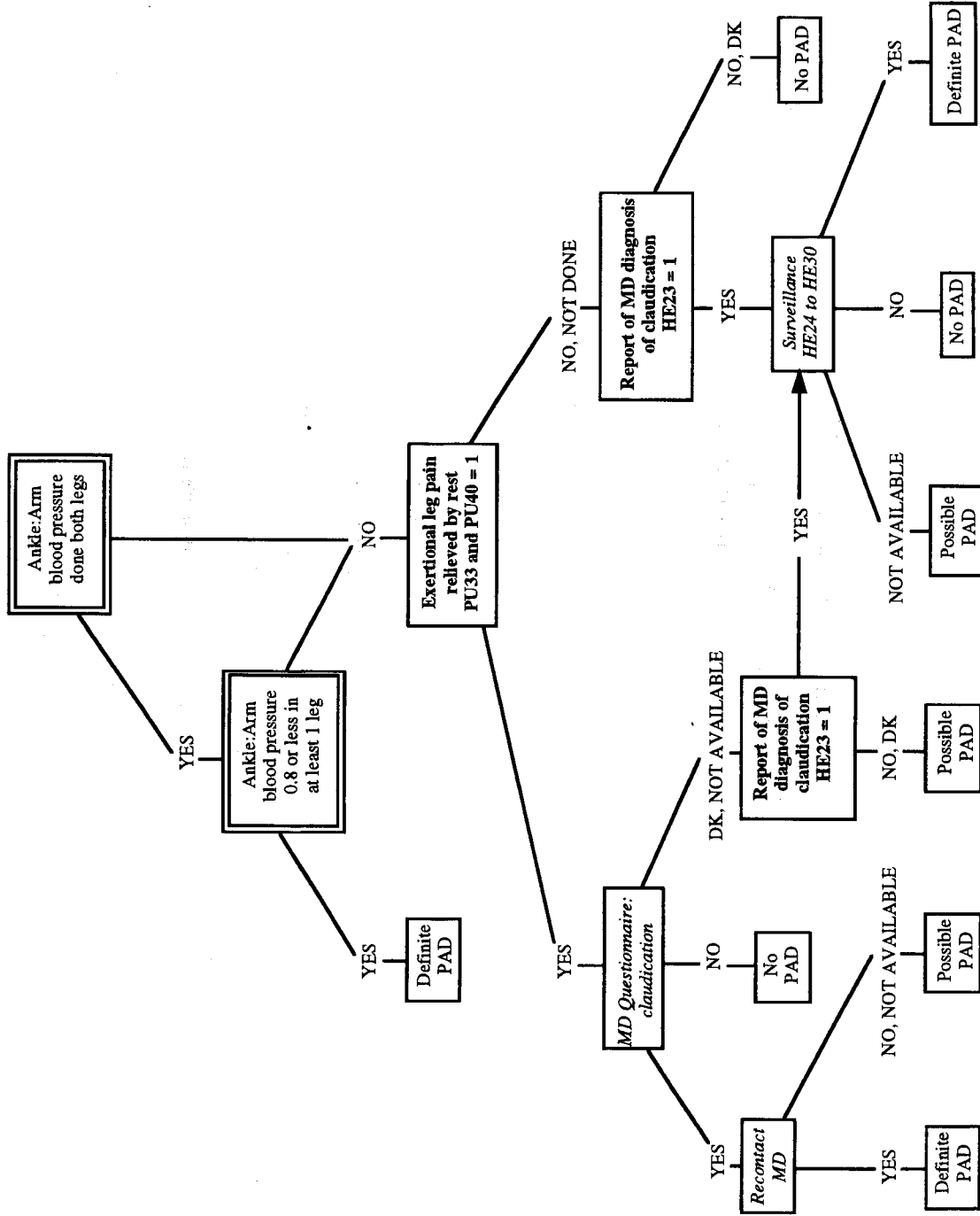


Figure E.5: HIP FRACTURES

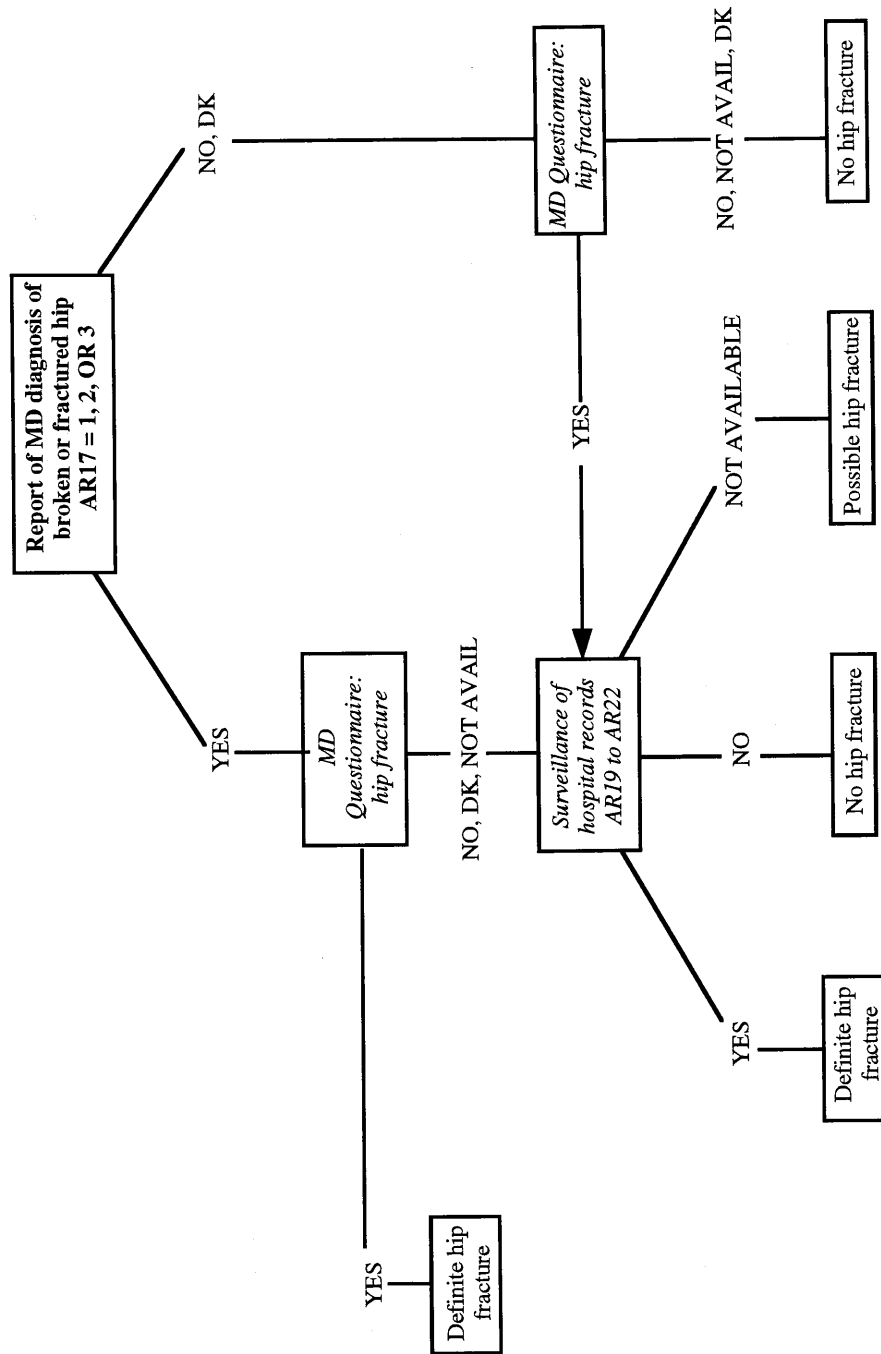
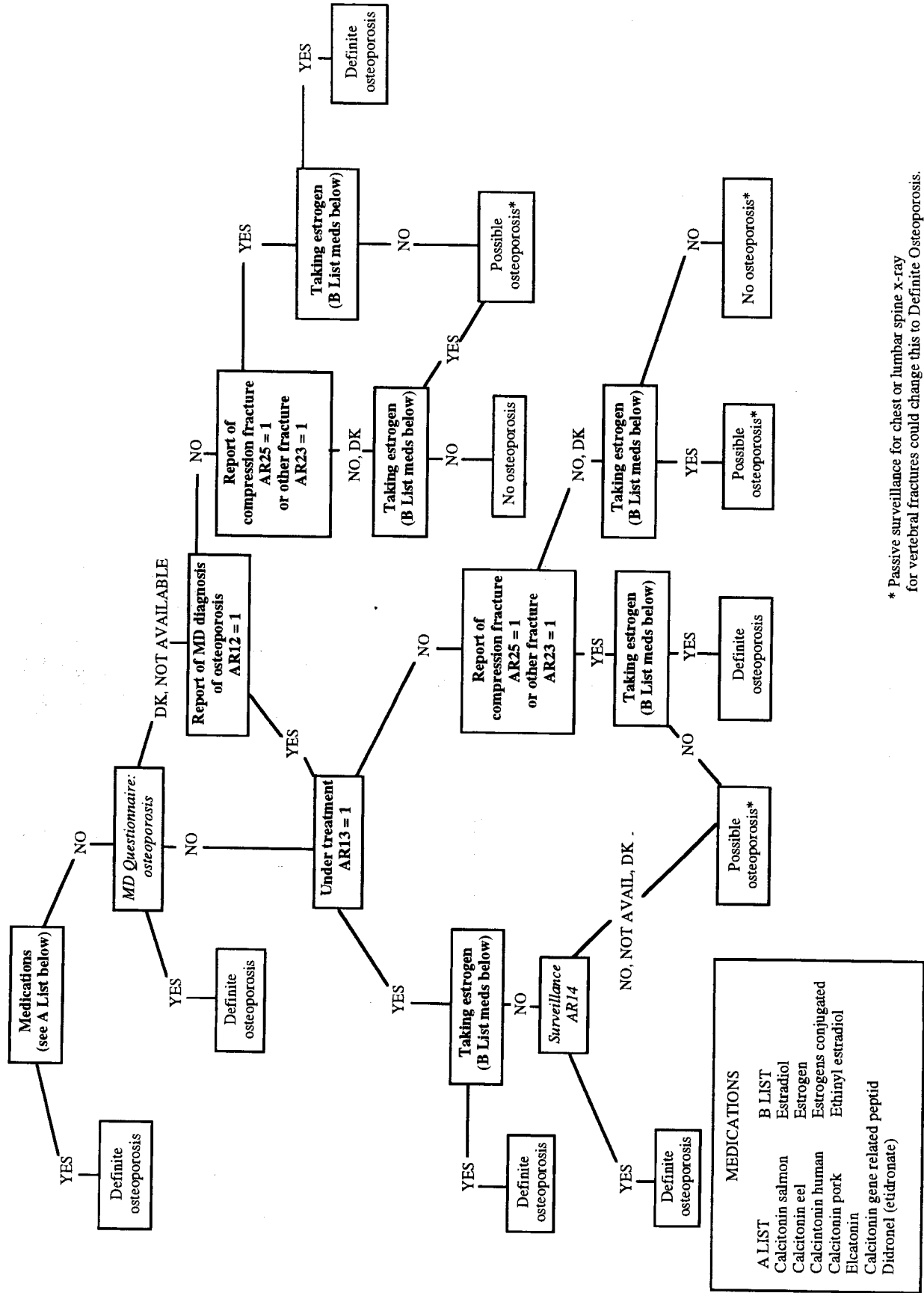
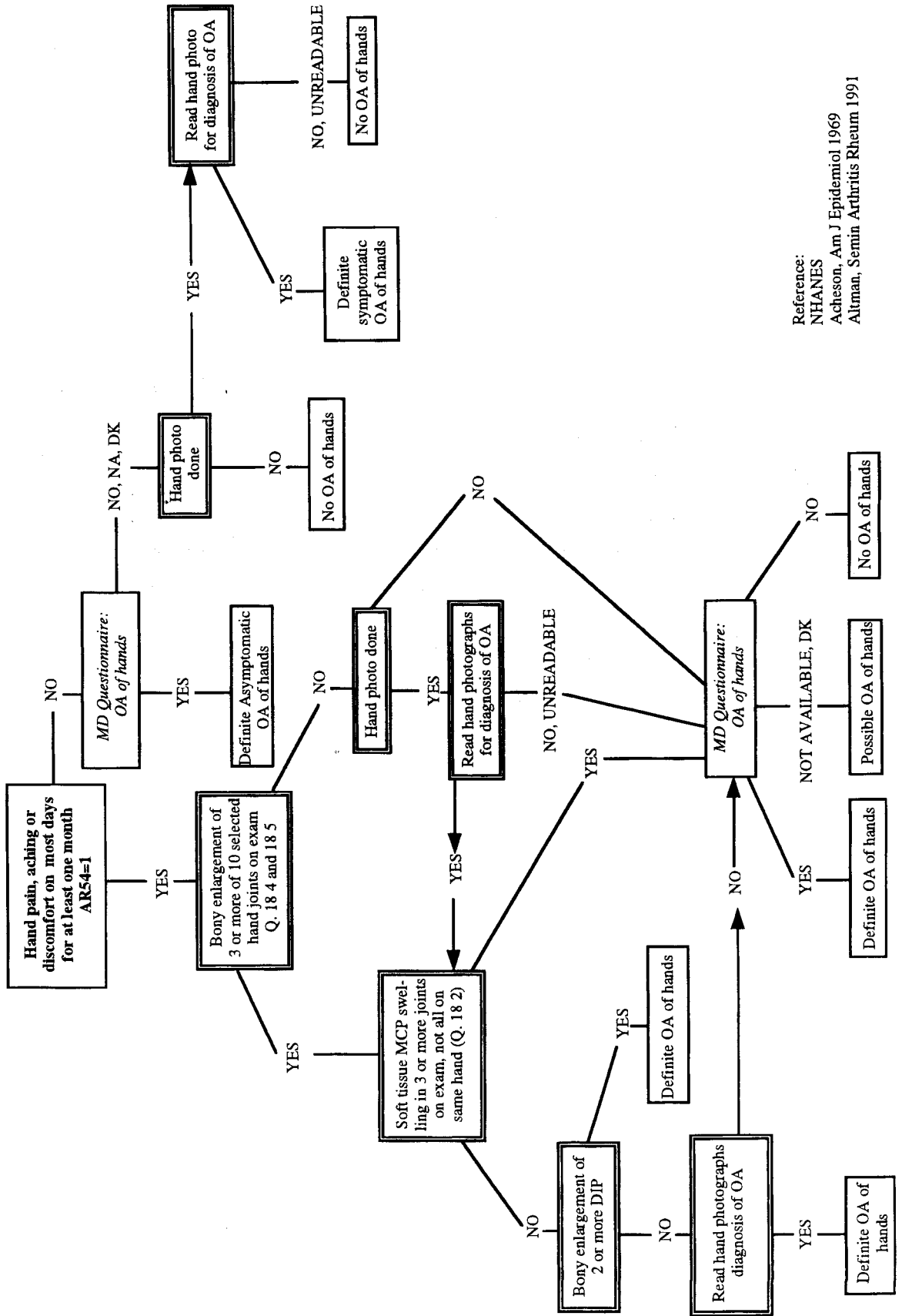


Figure E.6: PREVALENT OSTEOPOROSIS



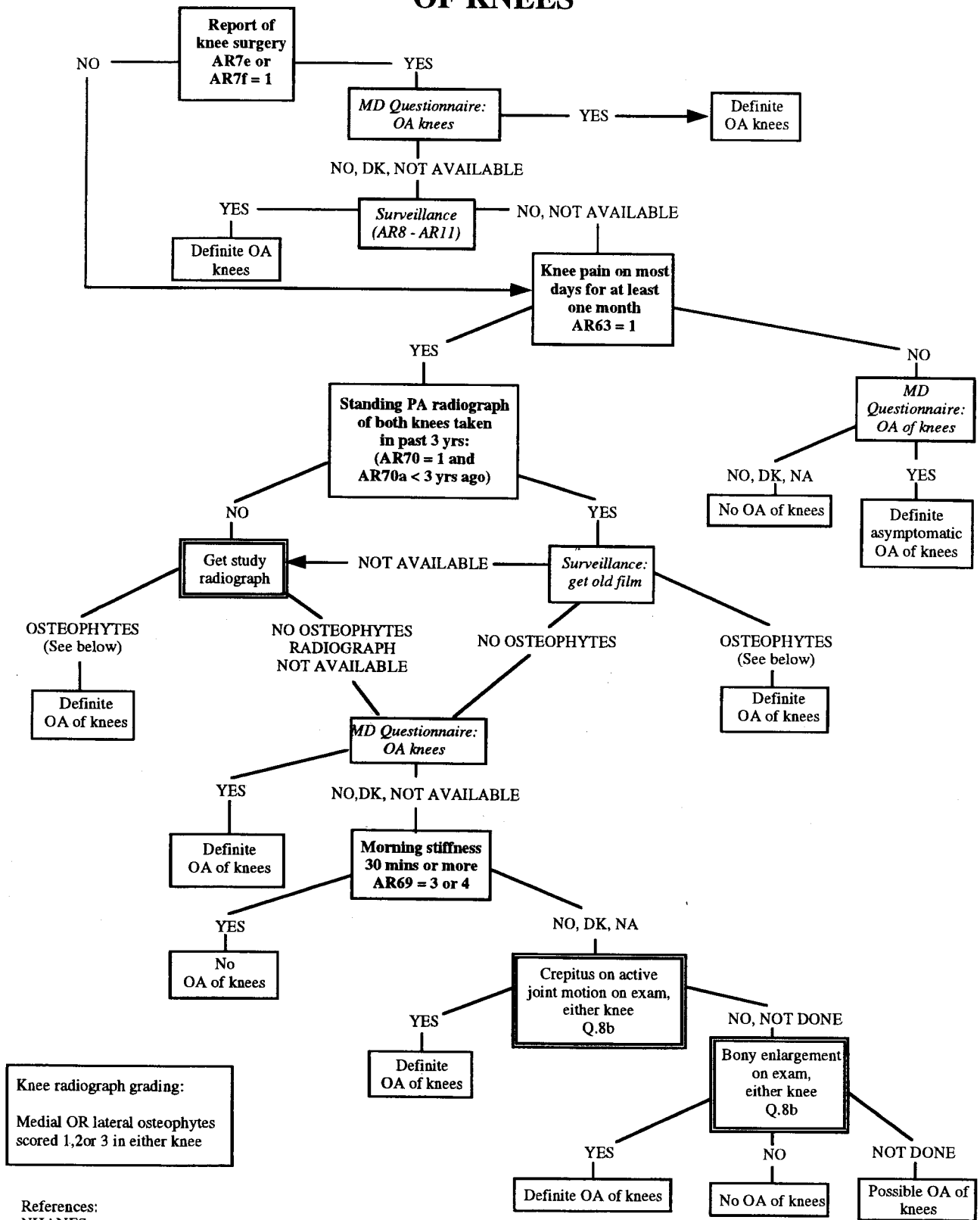
* Passive surveillance for chest or lumbar spine x-ray for vertebral fractures could change this to Definite Osteoporosis.

Figure E.7: PREVALENT SYMPTOMATIC OSTEOARTHRITIS OF HANDS



Reference:
 NHANES
 Acheson, Am. J Epidemiol 1969
 Altman, Semin Arthritis Rheum 1991

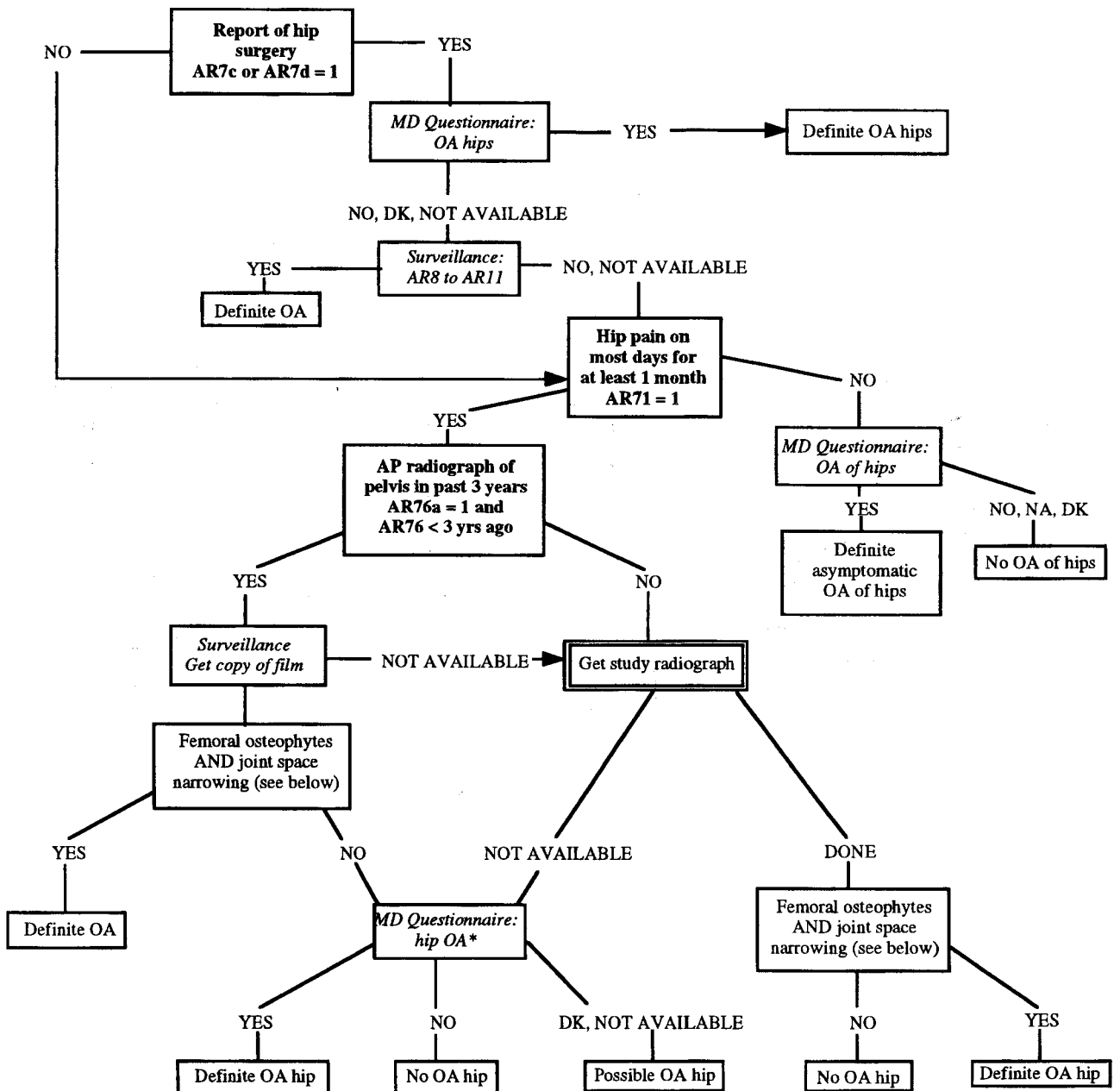
Figure E.8: PREVALENT SYMPTOMATIC OSTEOARTHRITIS OF KNEES



Knee radiograph grading:
Medial OR lateral osteophytes scored 1,2or 3 in either knee

References:
NHANES
Altman, Semin Arthritis Rheum 1991

Figure E.9: PREVALENT SYMPTOMATIC OSTEOARTHRITIS OF HIPS

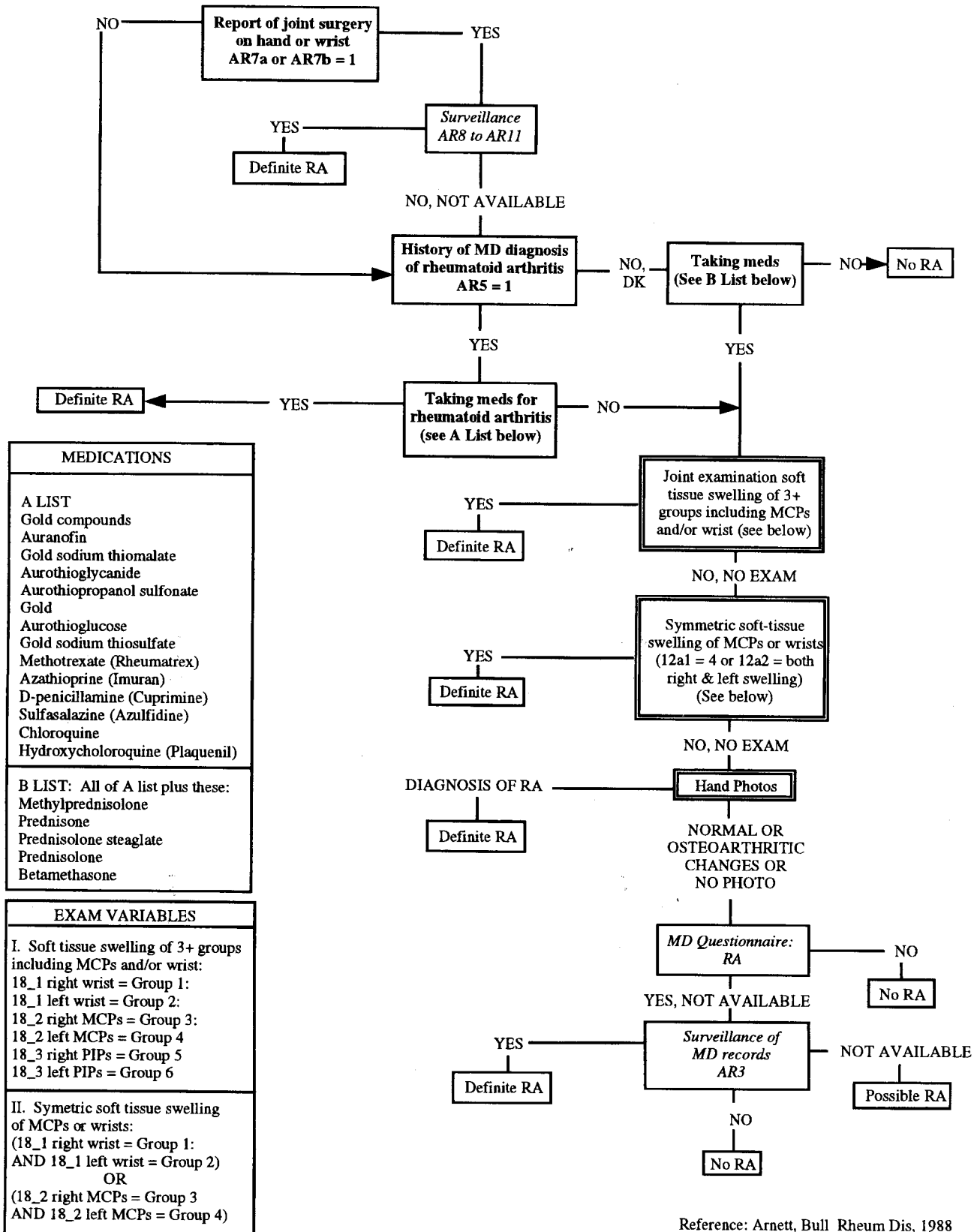


Hip radiograph scoring:
 (Femoral osteophytes scored 1,2 or 3) AND
 (Medial narrowing OR superior narrowing scored 1,2 or 3)
 These must occur on the same side.

* MD questionnaire takes precedence, recognizing that subjects could have developed OA since surveillance x-ray was obtained.

Reference:
 NHANES
 Altman, Semin Arthritis Rheu, 1991

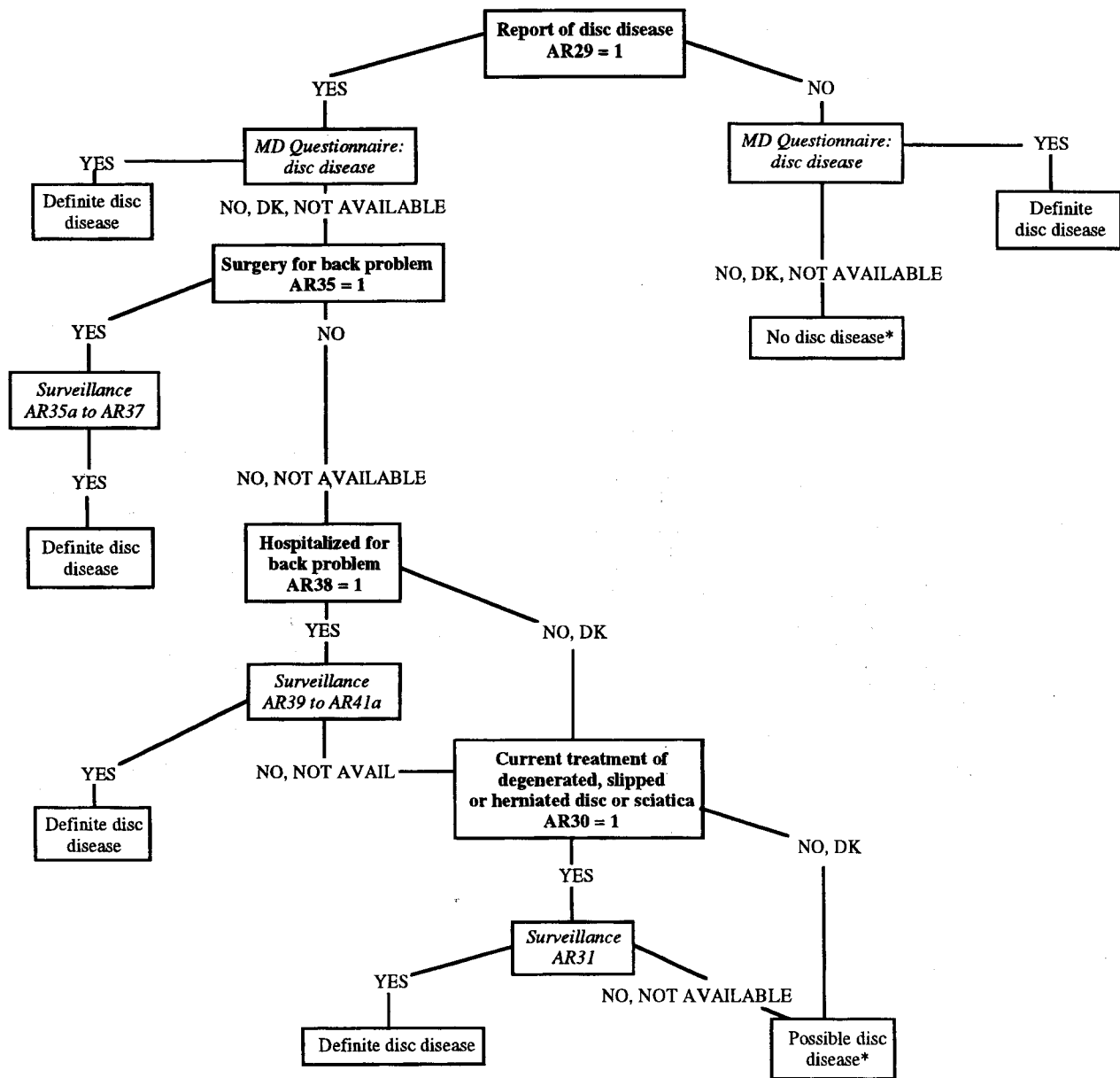
Figure E.10: PREVALENT RHEUMATOID ARTHRITIS



MEDICATIONS
A LIST
Gold compounds
Auranofin
Gold sodium thiomalate
Aurothioglycanide
Aurothiopropanol sulfonate
Gold
Aurothioglucose
Gold sodium thiosulfate
Methotrexate (Rheumatrex)
Azathioprine (Imuran)
D-penicillamine (Cuprimine)
Sulfasalazine (Azulfidine)
Chloroquine
Hydroxychloroquine (Plaquenil)
B LIST: All of A list plus these:
Methylprednisolone
Prednisone
Prednisolone steaglate
Prednisolone
Betamethasone

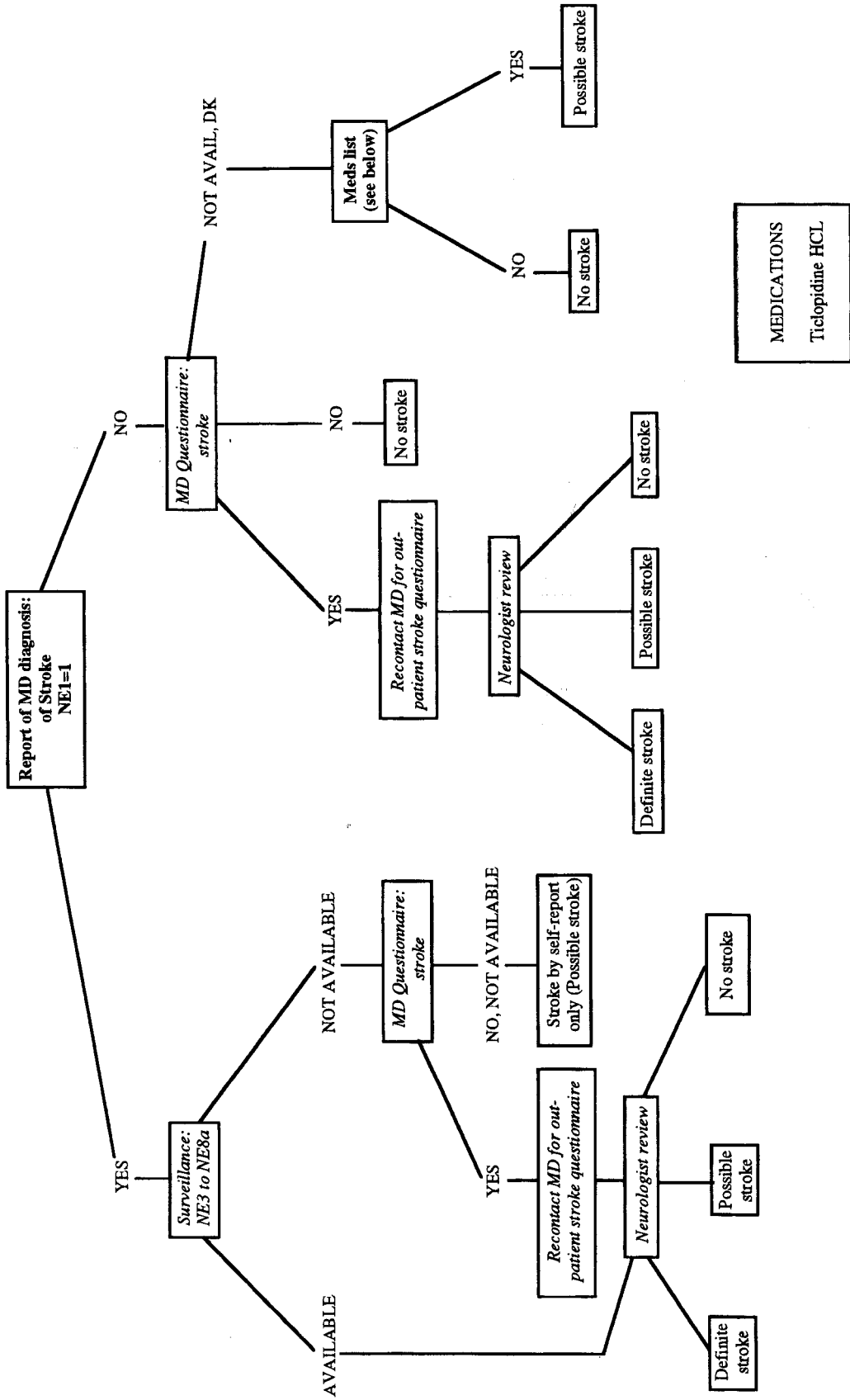
EXAM VARIABLES
I. Soft tissue swelling of 3+ groups including MCPs and/or wrist:
18_1 right wrist = Group 1:
18_1 left wrist = Group 2:
18_2 right MCPs = Group 3:
18_2 left MCPs = Group 4
18_3 right PIPs = Group 5
18_3 left PIPs = Group 6
II. Symetric soft tissue swelling of MCPs or wrists:
(18_1 right wrist = Group 1: AND 18_1 left wrist = Group 2)
OR
(18_2 right MCPs = Group 3 AND 18_2 left MCPs = Group 4)

Figure E.11: PREVALENT DISC DISEASE



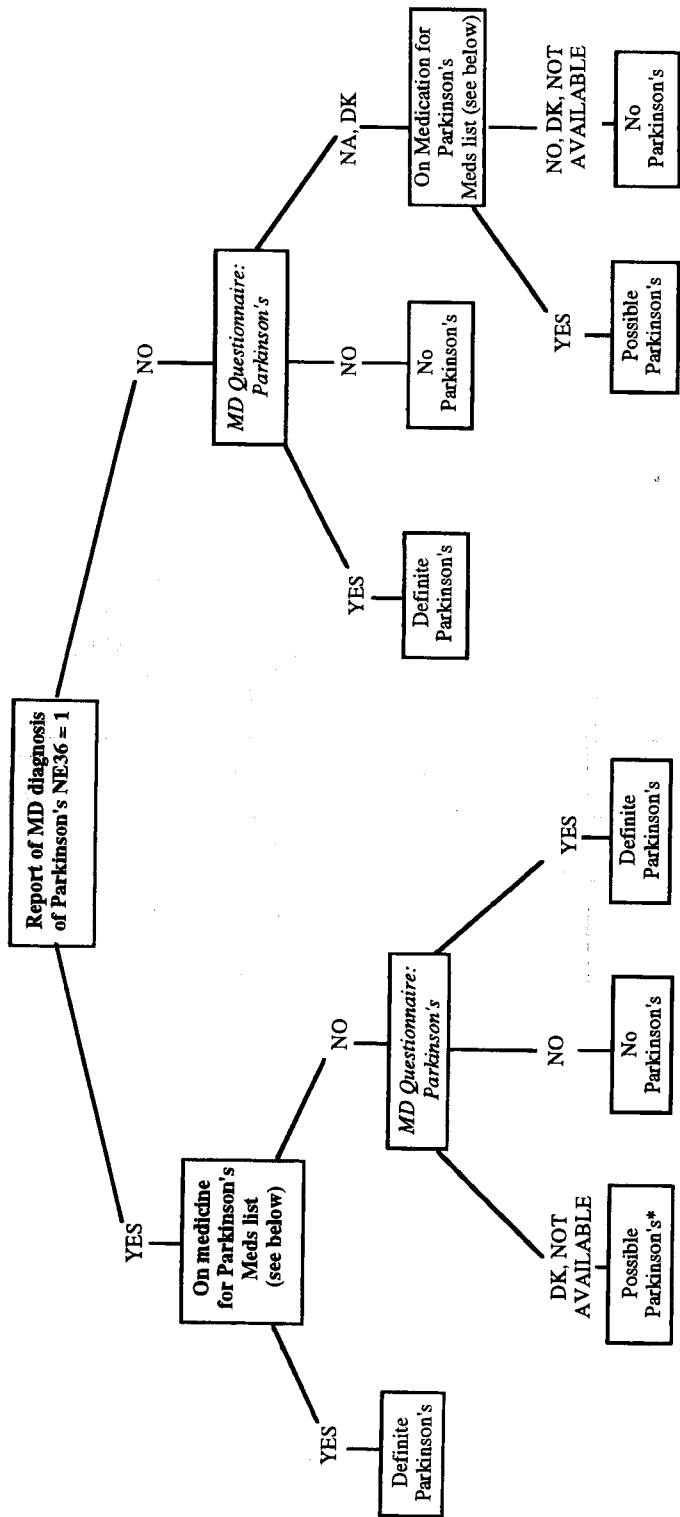
* Passive surveillance may change this to Definite Disc Disease.

Figure E.13: PREVALENT STROKE



MEDICATIONS
Ticlopidine HCL

Figure E.14: PARKINSON'S DISEASE



MEDICATIONS
Selegiline (Bidepryl)
Levodopa (Larodopa)
Pergolide mesylate (Permax)
Carbidopa/Levodopa (Sinemet)
Levodopa (Dopax)

*Passive surveillance may change this to Definite Parkinson's Disease

Figure E.15: PREVALENT DIABETES MELLITUS

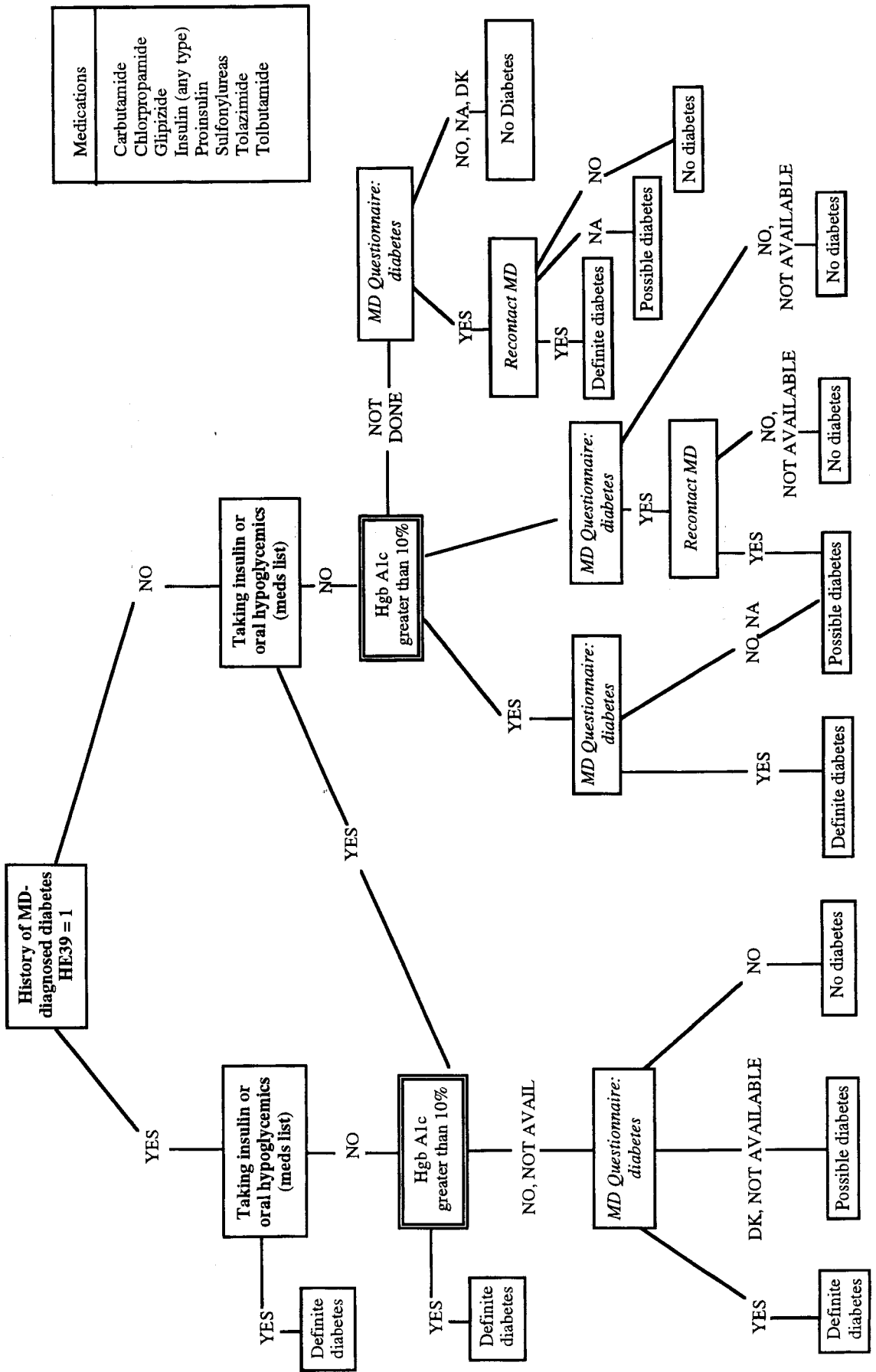


Figure E.16: PULMONARY DISEASE (page 1 of 2)

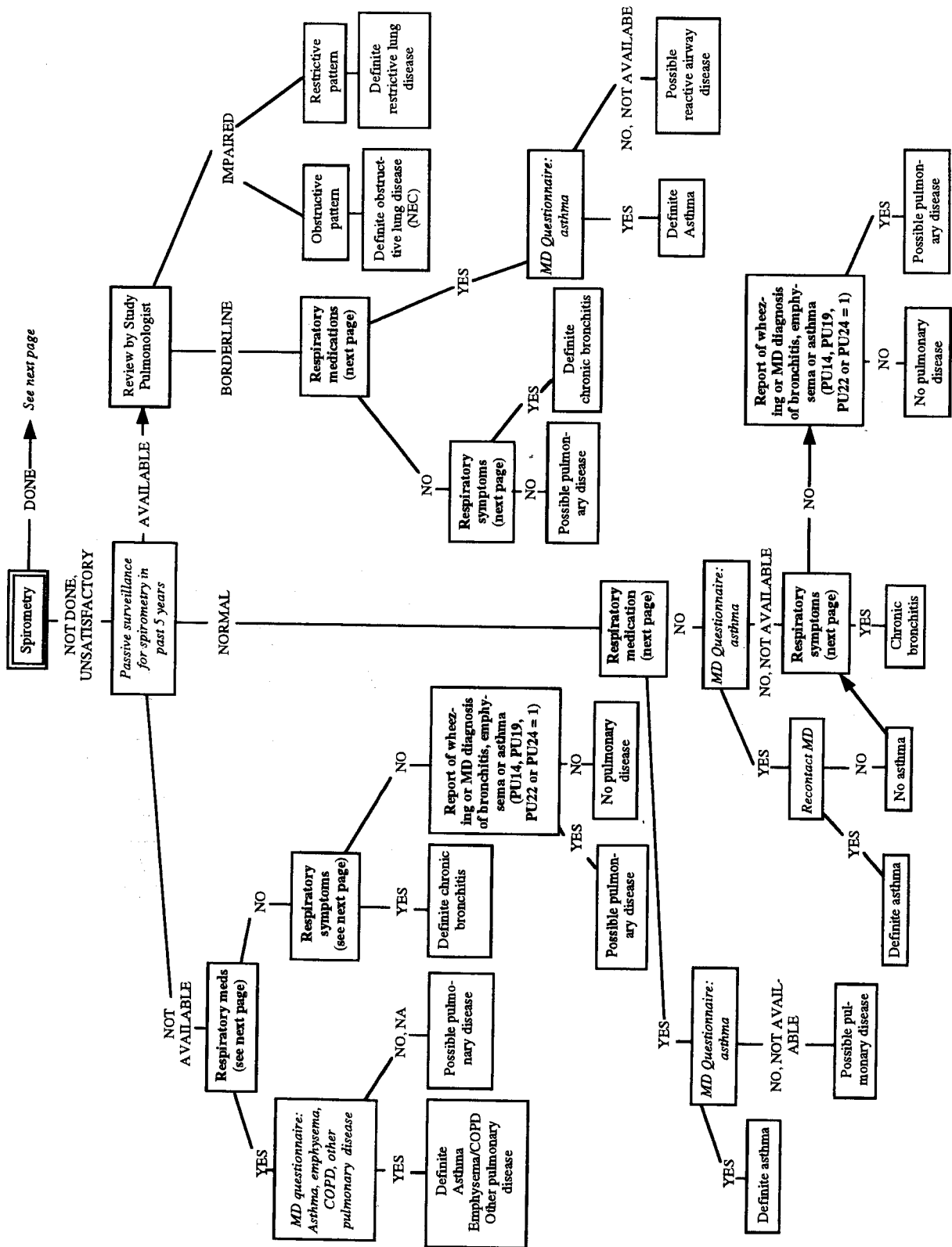
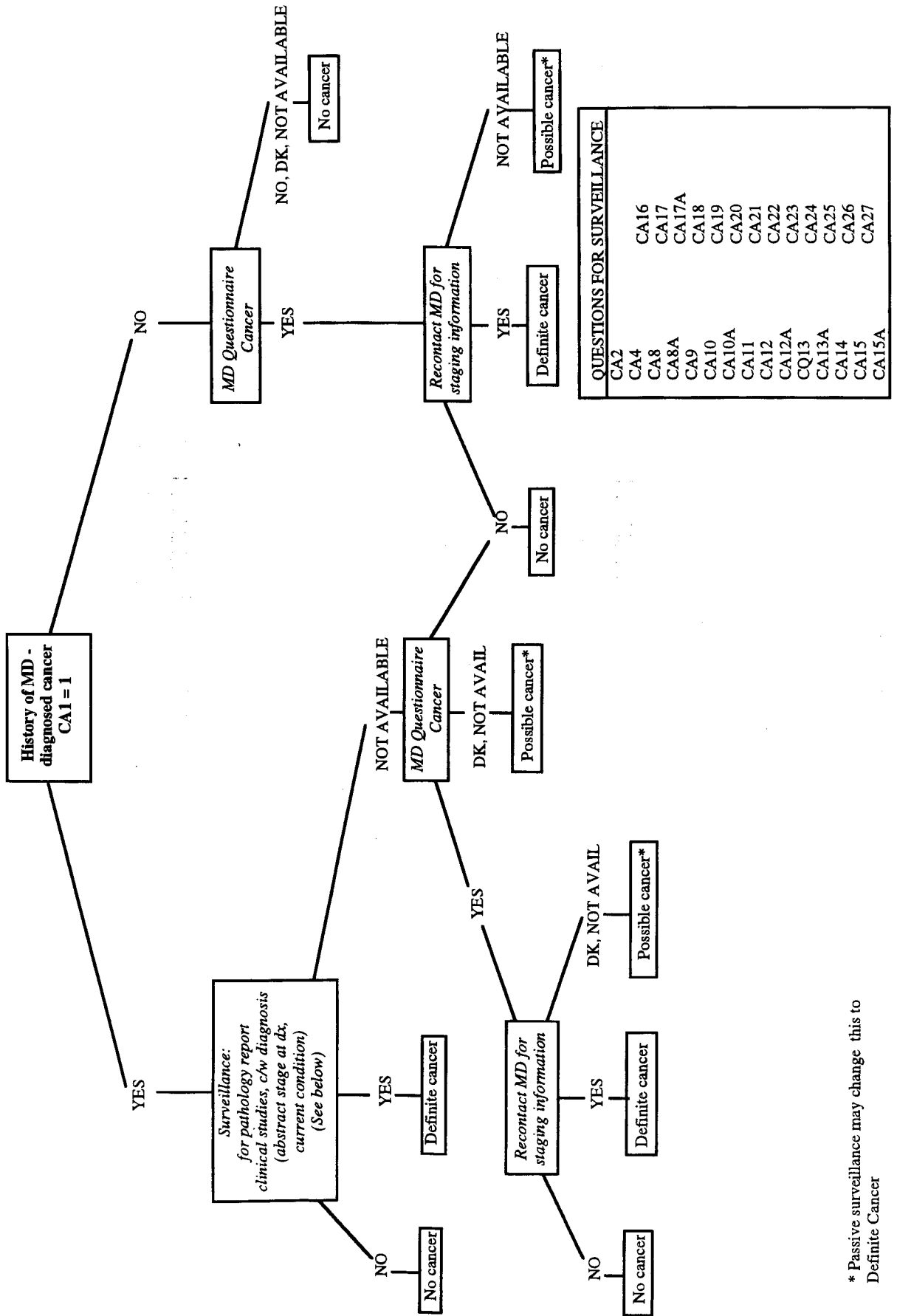


Figure E.17: PREVALENT CANCER



* Passive surveillance may change this to Definite Cancer