Protocolised Patient Management within the ICTPH Health Systems Model

Jin Jun, Vijayanand Rajendran, A.R. Selva Swetha

IKP Centre for Technologies in Public Health (ICTPH)
Chennai, India.
www.ictph.org.in
This is a time of epidemiological transition world-over, and the recent decade has witnessed a paradigm shift towards Evidence-Based Medicine (EBM). It is now, more than ever that standardised guidelines and protocols have a greater role to play in clinical settings, and even more a pivotal role in the ICTPH Health Systems Design for Primary Healthcare. This paper sets forth the rationale for protocols, and describes the development and implementation of patient interaction protocols, and clinical practice protocols, within the larger framework of community outreach, preventive and curative healthcare at the Rural Micro Health Centres (RMHCs).

**Introduction**

This period of global demographic and developmental transition has seen significant behaviour and lifestyle changes, and the next two decades of epidemiological transition pose a grave challenge, with dramatic shifts expected in the world’s health needs (Disease Control Priorities in Developing Countries, 2006). Major non-communicable and chronic diseases are fast replacing the traditional scourges of infectious diseases and malnutrition as the leading causes of death and disability. By 2020, non-communicable diseases are expected to account for 7 out of every 10 deaths in the developing regions, compared with less than half today (WHO - Health Transition, 2011).

India is no exception to this global trend. The current two top causes of pre-mature mortality are CVDs (24.5%) and COPD/Asthma (10.2%) and the highest burden of disease measured in terms of Disease Adjusted Life Years (DALYs) is Unipolar Depression (9.17%) followed by Ischemic Heart Disease (5.80%), and these numbers are only expected to increase. The WHO has computed the disease burden projections for India from the 1990 data, and assuming that the trends in epidemiological transition achieved by countries during the previous two decades will occur in India, infectious diseases are projected to account for less than a quarter of the country’s disease burden in 2020. The increase in the proportion of non-communicable diseases, to become the principal burden of disease and disability in India creates the pressing need to provide for universal annual screening of every individual using standardised screening protocols and to give primary care, integrated within a protocolised framework, a much higher degree of importance relative to secondary and tertiary care.

It was in the 1990s that the movement towards Evidence-Based Medicine came to the fore, and has since gathered ground as a new international health care paradigm, with the emergence of national and international healthcare organisations whose driving force is EBM. Evidence-based medicine is “the integration of best research evidence with clinical expertise and patient values” (Sackett, 2000). In the Evidence-Based approach there is great emphasis on the use of most up-to-date “best” scientific research evidence as the basis for clinical decision making, which includes research on the efficacy of various drugs, the effects of particular agents, the accuracy of diagnostic tests and the predictive power of prognostic factors (Sackett, 1996). EBM seeks to address the problem of variation in clinical practice and overcome the widespread errors of omission and commission by providing a strong scientific foundation for clinical work to ensure quality and consistency in healthcare.

One implementation of EBM is the use of guidelines, based on standardised best practice, called ‘Clinical Practice Guidelines’. Clinical Practice Guidelines are defined as “systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances” (Field & Lohr, 1992). Some of the organisations that have designed Clinical Practice Guidelines (CPG) development handbooks include:
Guidelines are complementary in character - they are evidence-based recommendations on the appropriate treatment and care of patients with specific diseases and conditions, but are not intended to replace the knowledge and skills of experienced healthcare professionals. Variations from the guideline may be appropriate in certain cases, taking into account individual circumstances, clinical judgement and patient choice.

Clinical protocols, on the other hand, “provide a specific framework with specific criteria for providing an aspect of patient care. Unlike a guideline, they are less flexible” (Institute of Medicine, 1992). Protocols are underpinned by the guidance of validated clinical guidelines (NICE, WHO, etc.), and provide precise, detailed descriptions on the steps to deliver care.

Local protocols are multi-disciplinary, and reflect local services and resources. They include patient group directions and referral advice and usually include decision-support systems. They are designed at a local level to implement national standards or, where national standards are not available, to determine care provision by using best available evidence. Local protocols provide detailed descriptions of the steps taken to deliver specific care or treatment to patients in a given setting (NHS, 2010). As such they reflect local services, resources and staffing, and integrate the care provided by multidisciplinary teams.

Evidence suggests that adherence to guidelines is weak, and that a more expansive, multifaceted approach to protocol implementation, one that engages with multiple local stakeholders affected by the guideline works best (Timmermans & Mauck, 2005). This sets out the need for protocolising, not just the healthcare provider’s clinical decisions, but each of the interactions at the clinic.

ICTPH Health System Approach

IKP Centre for Technologies in Public Health (ICTPH) is a not-for-profit research organisation with its mission to design inclusive health-systems for remote rural populations, ensuring accessibility and affordability to all members of the rural community. ICTPH is piloting a nurse-managed, physician-supervised, technology-enabled comprehensive primary healthcare delivery model in rural Thanjavur in Tamil Nadu.

There are four components to the Health System Design (Johar, ICTPH Health System Approach, 2010):

1. Human Resources Design
   In addition to the doctors, nurses, administrators who are an integral part of the human resource design, ICTPH is experimenting with various models of health extension workers, coined as ‘Guides’
within the ICTPH model (Lakshmanan, 2010), and the role of a qualified nurse under the supervision of a medical doctor.

2. Infrastructure Design
This includes diagnostics, the RMHC design and the Health Management Information System (HMIS). Currently, the diagnostic tests available at an RMHC include haematological and biochemical tests - Complete Blood Count, blood glucose, urea, creatinine, uric acid, Lipid Profile, Liver Function Test, along with strip-based analysis for malaria, pregnancy, and urine. The RMHC design consists of a ‘hub-and-spoke’ model of Rural Micro Health Centres (RMHCs). The hub is represented by a district-level administrative centre that also serves as a distribution node for drugs and inventory. A group of RMHCs managed by the hub cater to the primary health care needs of populations of about 10,000 people each. A set of RMHCs are serviced by a geo-optimally located diagnostic centre. Technology is a pivotal tool in the design, and a customised management information system, called the ICTPH Health Management Information System integrates the management of the various components of the health system (Rajanna & Kapila, 2011).

3. Intervention Design
There are broadly three levels of intervention: The Screening element comprises of a Population-level Individual Screening Protocol (PISP) is being administered at the household level, by the Guides, to all members in the RMHC catchment area (Johar, ICTPH Population based Individual Screening Protocol, 2011). This has been developed based on international guidelines, and is now being implemented in the catchment area of the RMHC at Karambayam. The PISP tool screens for parameters which have significant predictive value and thus allows for the risk profiling of the population. The Curative component consists of the Consultative services and Procedures at the RMHC. The diagnosis and treatment of the various diseases is governed by standardised clinical protocols. The Healthcare element would include interventions at the community level as well as in the RMHCs – e.g. The proposed iron supplementation in infants through Sprinkles intervention (Peugh, 2010)

4. Financing Design- including the member-based services and the provision of ‘managed care’.

Patient Visit Protocol

In order to optimise patient experience across the RMHCs, a detailed end-to-end patient visit protocol has been developed. Figure 1 gives an overview of the protocol governing a visit.

The purpose of a patient’s visit to the RMHC might be one of three- consultation with the healthcare provider, diagnostic tests, procedures (nebulisation, suture, suture removal, dressing, injection and intravenous fluids). Before branching out onto one of the above three pathways, the patient interaction follows two set protocols namely, the Pre-Consultation Protocol and the Nurse-Patient Protocol, that precede the clinical disease protocols at Consultation. In the Karambayam RMHC model, the health extension worker (Guide) spends 15% of her time in-clinic, providing clinical assistance, and it is she who administers the Pre-Consultation Protocol. Following the Nurse-Patient Protocol, and then Diagnostics/Consultation/Procedures, the patient would proceed to billing and check-out.
The only exception to the Pre-Consultation Protocol would be pregnant women, who would directly interact with the nurse in accordance with the Nurse-Patient Protocol. Emergency cases would also be exempt from the Patient Visit Protocols.

**Figure 1**: Overview protocol laying out the end-to-end patient interactions at the clinic. Charts A and B are given in Figures 1.1 and 1.2 respectively.

For every patient walking into the RMHC the first interaction is given by the Pre-Consultation Protocol (Figure 1.1). A set of simple anthropometric measures are taken: height & weight for all (to compute Body-Mass Index), waist circumference & hip circumference in adults (to compute Waist-Hip Ratio), and
in the case of infants, head and mid-upper arm circumference. The rationale behind the measurement of these parameters is that these anthropometric measures have predictive value for multiple disorders, two prime examples being diabetes and the risk of cardio-vascular disease.

**Figure 1.1:** Upon the patient’s arrival, this Pre-Consultation Protocol is followed, measuring a simple set of anthropometric measures, before being led onto the Nurse-Patient Protocol.

Following the Pre-Consultation Protocol, the patient is then led onto the Nurse-Patient Protocol (Figure 1.2), where the individual is identified on the Health Management Information Systems (HMIS) that
contains the patient’s Electronic Health Record. The patient’s complaints are heard and recorded, and a set of Vital Signs and Auscultations are checked.

The patient visit would then branch into three different pathways depending on whether the purpose of visit was Consultation, Diagnostics, or Procedures. These pre-consultation protocols would then lead onto the clinical disease protocols at Consultation, where diagnosis and treatment would follow the widely accepted SOAP methodology. (See Section on ‘Designing of Protocols’.)

**Figure 1.2:** Protocol detailing the initial nurse-patient interaction, which every patient goes through before going down one of the three pathways – Diagnostic tests, Consultation or Procedures.

**Designing of protocols**

The need for standardised clinical protocols development is pressed for by the lack of consistency in primary health care management by different health providers. The fundamental strategy of this development process is to prioritize evidence based clinical practice in our RMHCs. This is achieved in
partnership with the School of Nursing, University of Pennsylvania with the application of SOAP (Subjective, Objective, Assessment, Plan) Methodology – a widely accepted method for designing health care delivery based on Subjective data obtained from the patient or family, Objective data acquired by observation, inspection or testing, Assessment of patient’s past, present and future prognosis that contributes to the actual patient care Plan.

The central elements for the evidence-based CPG development process as described by the organisations mentioned in the earlier section are establishment of a multidisciplinary guideline development group, identification of clinical questions or problems, systematic searches for and appraisal of research evidence, a process for drafting recommendations, consultation with others beyond the guideline development group, and ongoing review and updating of the CPG (Turner, 2008). Our strategy focussed on more practical details and simpler approach (SOAP) without ignoring the key elements prescribed by these guidelines in order to establish an approach that integrates standardized guidelines into the local health care delivery processes. These protocols encompass algorithms and clinical pathways to make them more prescriptive and evidence based. Because protocols need to be based on the best available evidence, they should be reviewed regularly and modified where necessary to take into account new research, new technologies, and the results of evaluation of protocol outcomes.

Systems Approach

The basic approach to the development of protocols is by the organ systems approach starting from the respiratory system all the way to the musculoskeletal system with intent to standardise the primary care visits. To classify the purpose of every patient visit to a particular disease in an organ system is restrictive. This leads to the decision of starting the protocol development with the diseases of organ systems and then gradually extending to a common symptom based approach that culminates in differential diagnosis. Systematic literature review is undertaken to establish the benefits and harms of possible interventions so that evidence based critical clinical decision can be channelized. The review of systems from head to toe during physical assessment has been adopted from (Bickley, 2009). The recommended treatments on the protocols are based on recent evidence-based research studies and reputed guidelines such as Agency for Healthcare Research and Quality (AHRQ).

The diseases selected for protocol development are based on disease burden in the community, proven effectiveness by early diagnosis and intervention and areas of clinical uncertainty as evidenced by wide variation in practice or outcomes.

The protocols are broadly classified and coded based on the affected organ systems as detailed in Figure 2.b., and a protocol coding example is given in Figure 2.a. The symptom-based protocols that cannot be grouped under an organ class are labelled with a code “SY”.

Figure 2.a.

Protocol Coding Example:

RT – Name of the Organ System: Respiratory Tract
01 – Number of protocol (1st protocol)
### Table 2.b: System-wise classification of clinical protocols

<table>
<thead>
<tr>
<th>ORGAN SYSTEM</th>
<th>DISEASES/SYMPTOMS</th>
<th>PROTOCOL CODE</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Respiratory Tract (RT)</strong></td>
<td>Allergic Rhinitis (URTI)</td>
<td>RT01</td>
<td>Appendix 1</td>
</tr>
<tr>
<td></td>
<td>Otitis media (URTI)</td>
<td>RT02</td>
<td>Appendix 2</td>
</tr>
<tr>
<td></td>
<td>Pharyngitis (URTI)</td>
<td>RT03</td>
<td>Appendix 3</td>
</tr>
<tr>
<td></td>
<td>Laryngitis (URTI)</td>
<td>RT04</td>
<td>Appendix 4</td>
</tr>
<tr>
<td></td>
<td>Sinusitis (URTI)</td>
<td>RT05</td>
<td>Appendix 5</td>
</tr>
<tr>
<td></td>
<td>Viral URI (URTI)</td>
<td>RT06</td>
<td>Appendix 6</td>
</tr>
<tr>
<td></td>
<td>Bronchitis (LRTI)</td>
<td>RT07</td>
<td>Appendix 7</td>
</tr>
<tr>
<td></td>
<td>Pneumonia (LRTI)</td>
<td>RT08</td>
<td>Appendix 8</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis (LRTI)</td>
<td>RT09</td>
<td>Appendix 9</td>
</tr>
<tr>
<td></td>
<td>Bronchial Asthma</td>
<td>RT10</td>
<td>Under development</td>
</tr>
<tr>
<td><strong>2. Endocrinal/Metabolic (EN)</strong></td>
<td>Type II Diabetes Mellitus</td>
<td>EN01</td>
<td>Appendix 10</td>
</tr>
<tr>
<td><strong>3. Cardiovascular system (CV)</strong></td>
<td>Hypertension</td>
<td>CV01</td>
<td>Appendix 11</td>
</tr>
<tr>
<td><strong>4. Gastrointestinal system (GI)</strong></td>
<td>Acid Peptic Disease (APD)</td>
<td>GI01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gastroenteritis</td>
<td>GI02</td>
<td></td>
</tr>
<tr>
<td><strong>5. Genitourinary system (GU)</strong></td>
<td>Urinary Tract Infection (UTI)</td>
<td>GU01</td>
<td></td>
</tr>
<tr>
<td><strong>6. Musculo-Skeletal system (MS)</strong></td>
<td>Osteoarthritis</td>
<td>MS01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Myalgia</td>
<td>MS02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Back pain</td>
<td>MS03</td>
<td>Under development</td>
</tr>
<tr>
<td><strong>7. Skin (SK)</strong></td>
<td>Rashes</td>
<td>SK01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cellulitis</td>
<td>SK02</td>
<td></td>
</tr>
<tr>
<td><strong>8. Dental (DE)</strong></td>
<td>Gingivitis</td>
<td>DE01</td>
<td></td>
</tr>
<tr>
<td><strong>9. Others (SY)</strong></td>
<td>Anaemia</td>
<td>SY01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fever of unknown origin</td>
<td>SY02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Headache</td>
<td>SY03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-grievous injuries</td>
<td>SY04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foreign Body-Ear, nose &amp; throat</td>
<td>SY05</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 2.b: System-wise classification of clinical protocols – This is not an exhaustive list, and will organically evolve based on the RMHC patient feedback loop.*

Till date, the protocols pertaining to Respiratory Tract (RT), Endocrinal (EN), and Cardio Vascular (CV) (Appendices 1 to 11) are complete and have been reviewed internally. For other conditions, evidence-based protocol designing is ongoing and will soon be reviewed for implementation.

This list is not conclusive and will be updated based on the need and experience in primary health care setting so that it gets comprehensive and flexible enough to allow adaptation to the diverse settings and circumstances of day-to-day clinical practice.
Illustrative example

Protocol for Diabetes Mellitus (DM) Type II (Protocol EN01, Appendix 10)

Diabetes has significant associated morbidity. Screening, prevention and treatment of DM have the potential to improve the quality of life and life expectancy. In the ICTPH model, screening is carried out in community level by means of the PISP screening tool, among the population greater than 18 years of age, who are evaluated for a set of risk parameters, which comprise of, among others:

- Age & Gender
- Family history
- Personal history
- Body-Mass Index
- Waist Circumference
- Blood Pressure

The high risk individuals as determined by the criteria described in Figure 3 below, are made to undertake diagnostic Oral Glucose Tolerance Test (OGTT) at the clinic.

<table>
<thead>
<tr>
<th>Type 2 Diabetes Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screening for Asymptomatic patients</strong></td>
</tr>
<tr>
<td>✓ Anyone with BMI&gt;23kg/m2 and have any of additional risk factors as below</td>
</tr>
<tr>
<td>✓ If no risk factors, screening should be done for anyone &gt;40yrs old of age</td>
</tr>
<tr>
<td>✓ If results normal, testing should be repeated at least 2 years intervals or more frequent interval if any risk factors present</td>
</tr>
<tr>
<td>✓ Age &gt; 40</td>
</tr>
<tr>
<td>✓ Hypertension (&gt;140/90)</td>
</tr>
<tr>
<td>✓ + Family history (first degree relative)</td>
</tr>
<tr>
<td>✓ Physical inactivity</td>
</tr>
<tr>
<td>✓ Increased waist circumference (&gt;90cm in women, &gt;100cm in men)</td>
</tr>
<tr>
<td>✓ Abnormal Cholesterol or Triglycerides</td>
</tr>
<tr>
<td>✓ Women with polycystic ovary syndrome</td>
</tr>
<tr>
<td>✓ History of gestational DM</td>
</tr>
<tr>
<td>✓ History of giving birth of baby weighing &gt; 4 kg</td>
</tr>
<tr>
<td>✓ History of CVD</td>
</tr>
</tbody>
</table>

**Diagnostic test**

1. Oral Glucose Tolerance Test (OGTT) OR
2. 2 Fasting glucose tests (2 separate occasions)

Figure 3: Snapshot of risk factors evaluation: screening of DM

The prevention of DM among the pre-diabetic population (as determined by the diagnostic test values) is based on Lifestyle Modification (LSM) and scheduled re-check. A patient presenting to the RMHC with anyone of the following signs and symptoms is undertaken for DM diagnostic tests.

Presenting complaints in DM:

- Unexplained weight loss or gain
- Vision changes
- Non-healing wounds
- Frequent skin or vaginal infections
- Numbness or tingling of feet or hands
- Polyuria, polydipsia, polyphagia

This subjective data leads to an objective risk parameters evaluation and physical examination (Based on Bates’ guide to Physical examination), which is followed by diagnostic assessment tests. Based on the glucose levels in diagnostic tests, the subjects are classified as Normal, Pre-diabetic or diabetic. The treatment is planned depending on these criteria with the goal to prevent cardiovascular and micro/macro vascular complications, both pharmacological (Biguanides and Sulfonyl ureas) and non-pharmacological (LSM) interventions are incorporated to the treatment plan based on medical evidence. The strategy for protocolised DM management at Sughavazhvu RMHC can be summarised as shown in the chart below.

Figure 4: SOAP methodology for DM management

Further, the protocol details the criteria for monitoring and follow-up visits of the diagnosed pre-diabetic and diabetics. Non-compliance or failed response with the prescribed pharmacological agents leads to channelized referral to a secondary centre for further management.

Most importantly, these evidence-based protocols advocate the rational use of drug within ICTPH (Pichaivel & Johar, 2011) by generating an Essential Drug List which is an adaption of the ATC/DDD classification methodology, wherein the drugs are categorized based on their target system. The
evolution of protocols will be aided by inclusion of recommended drugs to the currently existing ICTPH essential drug list.

**Implementation of protocols**

Successful delivery of the knowledge incorporated into guidelines requires a systemic approach which integrates knowledge with workflow using existing clinical information systems (Entwistle, 2005). Implementing the clinical protocols benefits all - patients, carers and the public. The protocols are developed to be disseminated and implemented in such a way that the health provider in RMHC become aware of them and use them. This will involve identifying potential obstacles to implementation and tailoring implementation strategies to the particular contexts in which the protocols are to be introduced. There is also evidence that the most effective implementation strategies are those that have a direct effect on consultation between patient and health care professional (NHMRC, 1998).

The integration of these protocols with the Health Management Information Systems (Rajanna & Kapila, 2011) consisting of supportive tools such as an Electronic Health Record, which allows the primary care provider to record each and every interaction with the patient, can help with integration with higher levels of care as well in auditing the quality of care being provided to the patient. There is strong evidence that computer-based clinical decision–support systems can enhance clinicians’ performance (Johnston, 1994). The evolution of the HMIS towards a decision support system, which will contain more comprehensively codified protocols and where the entire process of patient consultation is prompted step-by-step will enable the greater adherence to standard protocols and lower diagnosis errors.

**Conclusion**

Such protocolisation at the RMHCs clarifies the role of each of the stakeholders, promotes high quality, improves safety and consistency, streamlines patient care and facilitates audit and record keeping. However, as Field & Lohr (1992) make the important point, ‘guidelines do not implement themselves’. Protocol development is not a meaningful end in itself without their effective dissemination and implementation. The way forward is integrating these protocols into the Health Management Information Systems, which will evolve towards a clinical decision support system, ensuring better adherence and improving health outcomes.
Bibliography


Allergic Rhinitis Signs and Symptoms

Common Signs and symptoms
- Sneezing
- Itchy and/or watery eyes
- Nasal congestion
- Post nasal drip
- Sore throat
- Headache


History

- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?
- Past Medical history
  - Do you have any respiratory illness such as asthma, chronic bronchitis, or any recent URTI?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?
  - Do your symptoms get worse during certain weather or time of the year?
- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?
  - What kind of work do you do? Coir, cotton mills, silicon, glass or marble factory, any exposure to asbestos or brucellosis?
- Review of System
  - Review the pt’s symptoms from head to toe, if more information needed (Shah & Pawankar, 2009)

Diagnostic tests are not required

*Allergic Rhinitis is not an infection, rather an inflammation of nasal mucosa*
# APPENDIX 1: Allergic Rhinitis RT01

## Focused Physical Assessment

<table>
<thead>
<tr>
<th></th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Survey</strong></td>
<td>General Appearance</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• What is the general state of health for this pt?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• How does the pt look? Does the pt look acutely ill?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Is the pt in acute distress?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Eye</strong></td>
<td>• Does the pt have dark circles around the eyes</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• Are the eyes teary?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nose/Sinus</strong></td>
<td>• Are there any transverse creases across the bridge of nose?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Visualize the nasal mucosa with an otoscope for bluish/pale nasal mucosa with clear discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Palpate along the frontal and maxillary sinus for any tenderness</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Throat</strong></td>
<td>• Visualize the pharynx with a tongue depressor and light for pink or slightly red pharynx</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Neck</strong></td>
<td>• Are there any visible abnormalities such as swollen areas?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Palpate along the neck for any cervical lymph node adenopathy</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lungs</strong></td>
<td>• Is the thorax symmetry with each breath?</td>
<td>None</td>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>• What are the rates, rhythm and the effort of the pt’s breathing? Is the pt breathing between 12 and 20, Are they any increased efforts with breathing?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Any wheezing or stridor?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Bickley, 2007)

## Allergic rhinitis

Differential diagnosis (includes but not exclusive)

- Viral Upper Respiratory Infection (common cold)
- Nasal Polyps
- Anatomical abnormality
- Ciliary dysfunction syndrome

Notify physicians

- Immediately if the pt is having a difficulty breathing
- Immediately if the pt is in acute distress
- If the pt has failed to respond to the treatments

Consider a referral to allergy specialist if the pt has severe or recurrent allergies

APPENDIX 1: Allergic Rhinitis RT01

PDYRN

Pediatrics

Antihistamine
1. Cetrizine
   - 6 months –2 yr: 2.5 mg once daily
   - 2–5 yr: 2.5–5 mg once daily
   - <6 yr: 5–10 mg once daily
2. Levocetrizine
   - >6yr: 5mg once daily

Decongestion
- Phenylephrine
  - >= 2 years to < 6 years: 3.75 mg three times a day as needed
    (not to exceed 15 mg daily)
  - >= 6 years to < 12 years: 10 mg three times a day as needed
  - >= 12 years: 10 to 20 mg three times a day as needed

(Levocetrizine: 5-10mg once daily
- Cetrizine: 10mg once daily
- Pheniramone: 12.5 or 25mg twice a day (may cause drowsiness)

Decongestion
- Phenylephrine: 10-20mg three times a day as needed

Special population

Pregnancy
- Pheniramone is pregnancy category A
- Cetrizine and Levocetrizine are Pregnancy Category B
- Oral decongestants should be avoided during the first trimester

(Ferrer, 2010); (Weber, 2008); (Slow, 2010); (American Academy of Allergy, Asthma and Immunology, 2008); (Krouse, 2008)

FDA Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Adequate studies in pregnant women have not demonstrated a risk to the fetus in the first trimester of pregnancy, and there is no evidence of risk in later trimesters.</td>
</tr>
<tr>
<td>B</td>
<td>Animal studies have not demonstrated a risk to the fetus, but there are no adequate studies in pregnant women; or animal studies have shown an adverse effect, but adequate studies in pregnant women have not demonstrated a risk to the fetus during the first trimester of pregnancy, and there is no evidence of risk in later trimesters</td>
</tr>
<tr>
<td>C</td>
<td>Animal studies have shown an adverse effect on the fetus, but there are no adequate studies in humans; or there are no animal reproduction studies and no adequate studies in humans</td>
</tr>
<tr>
<td>D</td>
<td>There is evidence of human fetal risk, but the potential benefits from the use of the drug in pregnant women may be acceptable despite its potential risks.</td>
</tr>
<tr>
<td>X</td>
<td>Studies in animals or humans demonstrate fetal abnormalities or adverse reaction; reports indicate evidence of fetal risk. The risk of use in pregnant women clearly outweighs any possible benefit.</td>
</tr>
</tbody>
</table>

(The Harriet Lane Handbook - Drug doses IV. Explanation of pregnancy categories)
APPENDIX 1: Allergic Rhinitis RT01

Bibliography

American Academy of Allergy, Asthma and Immunology. (2008). *The Diagnosis and Management of Rhinitis: An Updated Practice Parameter*.


Acute Otitis Media

Classic signs and symptoms

Acute Otitis Media is most common in children between age 3 months and 3 years old.

- Acute onset of otalgia (ear pain) or ear pulling in children
- Otorrhea
- Fever
- Irritability (crankiness/difficulty with sleeping in infants) >4 days of illness

Other Common symptoms

- Myalgia, headache, diarrhea, vomiting, listless, rhinitis, anorexia

(Ramakrishnan, 2007); (Ely, 2008); (AAFP, 2004)

History

- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5 days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- Past Medical history
  - Do you have any dental problems or recent dental procedures?
  - Do you have any respiratory illness such as asthma, chronic bronchitis, or any recent URTI?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?
  - Have you or the child gone swimming recently?

- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?

- Review of System
  - Review the pt’s symptoms from head to toe, if more information needed

Diagnostics: mostly clinical diagnosis

Cultures are not recommended unless chronic otitis media is suspected

### Focused Physical Assessment

#### General Survey

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Appearance</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>• What is the general state of health for this pt?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• How does the pt look? Does the pt look healthy or malnourished?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Is the pt in acute distress?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Ear

*Painful ear should be assessed the last*

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visualize the middle ear with an otoscope for any fluid or erythema</td>
<td></td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>• Visualize the tympanic membrane for any bulging or convex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Press firmly behind the ear for any tenderness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Is one ear tenderer when the auricle is moved up and down?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Does the pt have pain when tragus is pressed?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Nose

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visualize the nasal mucosa with an otoscope for any redness on nasal mucosa with or without clear or yellow discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Palpate along the frontal and maxillary sinus for any tenderness</td>
<td>None</td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

#### Throat

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visualize the pharynx with a tongue depressor and light, is it red with or without white patches (exudates). If any exudates present, please refer to pharyngitis protocol</td>
<td>None</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>• What are the lung sounds like?</td>
<td></td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>• Any wheezing or stridor?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Neck

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Are there any visible abnormalities such as any swollen areas?</td>
<td></td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>• Palpate along the neck for any cervical lymph node adenopathy</td>
<td>None</td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

#### Lungs

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Is the thorax symmetry with each breath?</td>
<td>None</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>• What are the rates, rhythm and the effort of the pt’s breathing? Are they normal or any increased efforts with breathing?</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The what are the lung sounds like?</td>
<td></td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>• Any wheezing or stridor?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Bickley, 2009)
Acute Otitis Media

Differential diagnosis (includes but not exclusive)

- Otitis Externa
- Acute mastoiditis
- Eustachian tube dysfunction
- Chronic otitis media
- Labyrinthitis
- Otic barotraumas

Notify the physician

- Immediately if the pt has a high fever, >102F
- Immediately if the pt is in an acute distress or having a difficulty breathing
- If the pt has been treated with antibiotics for the last month,
- If the pt has been treated with antibiotics in the last week and is not improving

Infants <6months

- Amoxicillin 90mg/kg/day divided to three times a day for 10days
- If Penicillin allergy, Azithromycin 10mg/kg/d for one day, then 5mg/kg/d for 4 additional days

Children between ages of 6months and 12 years

- Paracetamol 10mg/kg every 6hrs as needed for pain and fever management
- Observe for 3 days if symptoms are not severe
- Amoxicillin 90mg/kg/day divided to three times a day for 10days if the symptoms are severe
- If Penicillin allergy, Azithromycin 10mg/kg/d for one day, then 5mg/kg/d for 4 additional days

Children >12yrs

- Paracetamol 500mg three times a day or as needed for pain and fever management
- Observe for 3 days if symptoms are not severe
- Amoxicillin 500mg three times a day for 10days if severe symptoms
- If Penicillin allergy, Azithromycin 500mg once a day for 5 days

Refer to an ENT specialist if the otitis media occurs more than 3 times in 6 months

(Ramakrishnan, 2007); (Morris, 2009); (Ely, 2008); (Alberta Medical Association, 2008) (Bhetwal, 2007)
Bibliography


Acute Pharyngitis Symptoms and Signs

- Specific symptoms: must be present at least 3 out of 5 symptoms for antibiotic therapy (Choby, 2009); (Gerber, 2005); (Ebell M. H., 2003)
  - No Cough,
  - Fever >100.4F,
  - Sore throat with different degree of severity,
  - tender and enlarged cervical lymph nodes, Redness of Pharynx with or without exudates,
  - Rash (scarlet sign)
- Other common symptoms therapy (Choby, 2009); (Gerber, 2005); (Ebell M. H., 2003)
  - malaise, chills, headache, earache, fatigue, generalized body ache,

History

- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?
- Past Medical history
  - Do you have any respiratory illness such as asthma, chronic bronchitis, or any recent URTI?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?
- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?
  - What kind of work do you do? Coir, cotton mills, silicon, glass or marble factory, any exposure to asbestos or brucellosis?
- Review of System
  - Review the pt’s symptoms from head to toe, if more information needed (Alcaide, 2007); (Armstrong, 2010); (Ebell M. , 2009); (Bickley, 2009)
### Diagnostic studies:
Group A Strep Rapid antigen detection test not recommended (Matthys, 2007) (Sarikaya, 2010)

No x-ray required

<table>
<thead>
<tr>
<th>Focused Physical Assessment</th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Survey</td>
<td>General Appearance&lt;br&gt;- What is the general state of health for this pt?&lt;br&gt;- How does the pt look?&lt;br&gt;- Is the pt in acute distress?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Nose/Sinus</td>
<td>Visualize the nasal mucosa with an otoscope for any redness on nasal mucosa with or without clear or yellow discharge</td>
<td>Palpate along the frontal and maxillary sinus for any tenderness</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Throat</td>
<td>Visualize the pharynx with a tongue depressor and light, is it red with or without white patches (exudates)</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Neck</td>
<td>Are there any visible abnormalities?</td>
<td>Palpate along the neck for any cervical lymph node adenopathy</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Lungs</td>
<td>Is the thorax symmetry with each breath?&lt;br&gt;What are the rates, rhythm and the effort of the pt's breathing?</td>
<td>None</td>
<td>What are the lung sounds like?&lt;br&gt;Any wheezing or stridor?</td>
<td>Normal</td>
</tr>
</tbody>
</table>

(Bickley, 2009)
Diagnosis: Acute Bacterial Pharyngitis

Other differential diagnosis (includes but not exclusive)

- Viral pharygitis
- Epiglottis in children
- Meningitis if stiff neck or severe headache
- Abscess if sudden and severe symptoms
- Mononucleosis, especially in young adults

Notify the physician

- immediately if the pt is in distress or having a difficulty breathing
- if the pt has been treated recently with antibiotics but not improving in his symptoms
- multi symptoms and when diagnosis is not clear

(Choby, 2009); (Gerber, 2005); (Ebell M. H., 2003); (Ebell M., 2009); (Mostov, 2007)

Infants (<3months): Refer

Children (<13years)

1. Paracetamol 500mg three times a day or as needed for fever and pain
2. Amoxicillin 40mg/kg/d divided to twice a day for 10 days.
   If pt has Penicillin allergy, Azithromycin 12mg/kg/d once a day for 5 days
   (Alcaide, 2007) (Armstrong, 2010); (Bharti, 2010); (Zuckerman, 2009)

Adult

1. Paracetamol 500mg three times a day or as needed for fever and pain
2. Amoxicillin 500mg twice a day for 10 days. If pt has penicillin allergy, Azithromycin 500mg once a day for 5 days
   (Alcaide, 2007), (Armstrong, 2010) (Ebell M., 2009); (Matthys, 2007); (Zuckerman, 2009)

Pregnant women

- Same treatment
- Paracetamol, Amoxicillin and Azithromycin are pregnancy category B. However Vitamin C is not recommended during pregnancy
  (Zuckerman, 2009)
APPENDIX 3: Pharyngitis RT03

FDA Category

<table>
<thead>
<tr>
<th></th>
<th>Adequate studies in pregnant women have not demonstrated a risk to the fetus in the first trimester of pregnancy, and there is no evidence of risk in later trimesters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Animal studies have not demonstrated a risk to the fetus, but there are no adequate studies in pregnant women; or animal studies have shown an adverse effect, but adequate studies in pregnant women have not demonstrated a risk to the fetus during the first trimester of pregnancy, and there is no evidence of risk in later trimesters</td>
</tr>
<tr>
<td>C</td>
<td>Animal studies have shown an adverse effect on the fetus, but there are no adequate studies in humans; or there are no animal reproduction studies and no adequate studies in humans</td>
</tr>
<tr>
<td>D</td>
<td>There is evidence of human fetal risk, but the potential benefits from the use of the drug in pregnant women may be acceptable despite its potential risks.</td>
</tr>
<tr>
<td>X</td>
<td>Studies in animals or humans demonstrate fetal abnormalities or adverse reaction; reports indicate evidence of fetal risk. The risk of use in pregnant women clearly outweighs any possible benefit.</td>
</tr>
</tbody>
</table>

(The Harriet Lane Handbook - Drug doses IV. Explanation of pregnancy categories)
APPENDIX 3: Pharyngitis RT03

Bibliography


Laryngitis Symptoms

Specific symptoms
- Hoarse voice
- Weakness or loss of voice

Common symptoms
- Low grade fever <100.4°F
- Chills
- Malaise
- Generalized bodyache
- Fatigue
- Headache

(Dworkin, 2008); (Mandell., 2009); (National Institute of Health, 2010); (Schwartz, 2009)

History

- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- Past Medical History
  - Do you have any respiratory illness such as asthma, chronic bronchitis, or any recent URTI?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?

- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?
  - What kind of work do you do? Coir, cotton mills, silicon, glass or marble factory, any exposure to asbestos or brucellosis?

- Review of System
  - Review the pt’s symptoms from head to toe, if more information needed

(Bickely, 2007); (Dworkin, 2008); (National Institute of Health, 2010); (Schwartz, 2009)


**Diagnostic tests** are not required, mostly clinical diagnosis

<table>
<thead>
<tr>
<th>Focused Physical Assessment</th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
</table>
| General Survey             | General Appearance  
- What is the general state of health for this pt?  
- How does the pt look?  
- Is the pt in acute distress?  

Nose/Sinus  
- Visualize the nasal mucosa with an otoscope for any redness on nasal mucosa with or without clear or yellow discharge  
- Palpate along the frontal and maxillary sinus for any tenderness |
| Throat  
- Visualize the pharynx with a tongue depressor and light, is it red with or without white patches (exudates)  

Neck  
- Are there any visible abnormalities?  
- Palpate along the neck for any cervical lymph node adenopathy |
| Lungs  
- Is the thorax symmetry with each breath?  
- What are the rates, rhythm and the effort of the pt’s breathing?  
- What are the lung sounds like?  
- Any wheezing or stridor?  

(Bickely, 2007)
**Diagnosis: Laryngitis**

Other differential diagnosis (includes but not exclusive) (Merati, 2008; Schwartz, 2009)

- Allergic rhinitis
- Viral URTI (common cold)
- Pharyngitis
- Gastroesophageal reflux disease
- Vocal cord paralysis
- Vocal cord nodule

**Notify the physician**

- immediately if the pt is in distress or having a difficulty breathing
- if the pt has been treated recently with antibiotics or other medication but not improving in his symptoms
- multi symptoms and when diagnosis is not clear

**Infants (<3months): REFER**

**Children**

- Laryngitis is not common in children. They should be evaluated for pharyngitis or epiglottis (Mandell., 2009)
- If the pt has a fever with other symptoms,
  i. Amoxicillin 20mg/kg twice a day for 10days, If Penicillin allergy, Azithromycin 12mg/kg/day once a day for 5days
  ii. Paracetamol 500mg as needed

**Adults**

- Most of laryngitis is self limited without any antibiotic therapy (Reveiz, 2007); (Schwartz, 2009)
- If pt has fever with other signs or symptoms of Pharyngitis
  i. Amoxicillin 500mg twice a day
  ii. If penicillin allergy, Azithromycin 500mg once a day for 5days
  iii. Paracetamol 500mg twice a day or as needed for 3-5days

**Pregnant women**

- Most cases of laryngitis is self limited without any antibiotics (Reveiz, 2007); (Schwartz, 2009)
- If pt has fever with other signs/symptoms of pharyngitis,
  i. Amoxicillin 500mg twice a day
  ii. If penicillin allergy, Azithromycin 500mg once a day for 5days
Bibliography


Acute Sinusitis Signs and Symptoms

- Purulent nasal discharges (yellow or greenish discharge) >7-10 days
- Facial or dental pain/tenderness
- Fever >101F
- Poor response to nasal decongestants

Interpretation
Positive if 2 or more criteria positive (Berg Prediction Rule)
Efficacy if symptoms present >7-10 days (Positive Predictive Value: 80%, Negative Predictive Value: 6%)

Other Common signs and symptoms
- fever, cough, fatigue, hyposomina, anosmia (decreased smell), ear fullness or pressure, dental pain

(Berg, 19880; (Leung, 2008); (Rosenfeld, 2007); (Slavin, 2005)

History

- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5 days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- Past Medical history
  - Do you have any respiratory illness such as allergic rhinitis, asthma, chronic bronchitis, or any recent URTI?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?

- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?
  - What kind of work do you do? Coir, cotton mills, silicon, glass or marble factory, any exposure to asbestos or brucellosis?

- Review of System
  - Review the pt’s symptoms from head to toe, if more information needed (Rosenfeld, 2007); (Slavin, 2005)
### Focused Physical Assessment

<table>
<thead>
<tr>
<th></th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Survey</strong></td>
<td>General Appearance</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>- What is the general state of health for this pt?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- How does the pt look? Does the pt look acutely ill?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Is the pt in acute distress?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nose/Sinus</strong></td>
<td>- Visualize the nasal mucosa with an nasal speculum for any redness on nasal mucosa with any yellow or greenish discharge</td>
<td>- Palpate along the frontal and maxillary sinus for any tenderness</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Throat</strong></td>
<td>- Visualize the pharynx with a tongue depressor and light, is it red? Are they any exudates? If so, proceed with pharyngitis protocol.</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Neck</strong></td>
<td>- Are there any visible abnormalities such as swollen areas?</td>
<td>- Palpate along the neck for any cervical lymph node adenopathy</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Lungs</strong></td>
<td>- Is the thorax symmetry with each breath?</td>
<td>None</td>
<td>- What are the lung sounds like?</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>- What are the rates, rhythm and the effort of the pt’s breathing? Is the pt breathing between 12 and 20, Are they any increased efforts with breathing?</td>
<td></td>
<td>- Any wheezing or stridor?</td>
<td></td>
</tr>
</tbody>
</table>

Diagnostics: none necessary, but x-ray or CT scan is required if obstruction is suspected (Arrieta, 2008); (Rosenfeld, 2007)
**Children (between 3 months to 13yrs)**
- Paracetamol 15mg/kg every 6hrs or as needed for fever and bodyache
- Treat with antibiotics if the pt has had symptoms for more than 5days
- Amoxicillin 90mg/kg/day divided into BID for 10days
- If the pt has penicillin allergy, Azithromycin 12mg/kg/day for 5 days

Infants<3 months: REFER
(Wu, 2009); (Rosenfeld, 2007)

**Adults**
- Paracetamol 500mg TID or as needed for 5 days for fever and pain
- Amoxicillin 500mg BID for 10days
- If the pt has penicillin allergy or has been treated recently(less than 1 month) with Amoxicillin, Ofloxacin 400mg BID for 10days,
(Dykewicz, 2010); (Falagas, 2008); (Rosenfeld, 2007); (Wong, 2006)

**Diagnosis: Acute Sinusitis**
Other differential diagnosis (includes but not exclusive)
- Fungal Sinusitis
- Abscess
- Allergic Rhinitis
- Orbital abscess
- Meningitis

Notify the physician
- Immediately If the pt has a high fever >102F
- Immediately If the pt is in acute distress
- Immediately If the pt has other serious symptoms such as rigid neck or neurological changes
- If the pt has been treated in the past 4weeks and has not improved
(Scheid, 2004); (Rosenfeld, 2007)

**Chronic Sinusitis**
- Duration of illness is >8weeks
- Need referral for further work-up
Bibliography


Cleveland Clinic: Current Clinical Medicine, 2nd ed, Sinusitis; Treatment of Allergic Fungal Sinusitis

Dykewicz, M. S. (2010). Rhinitis and Sinusitis, *Journal of Allergy and Clinical Immunology*, 125 (Supp 2), S103-S115.


Slavin, R. (2005). The diagnosis and management of Sinusitis; A Practice parameter update, *Journal of Allergy and Clinical Immunology*, 116(6), S13-S47.


Signs and Symptoms of Viral Upper Respiratory Tract Infection (Viral URTI)

- Runny nose
- Malaise
- low grade temperature <100.4°F)
- Chills
- Bodyache
- Headache
- Cough
- Nasal congestion
- Chills
- Itchy eyes
- Sore throat
- Decreased appetite
- Decreased smell

(Morris, 2009); (Pratter, 2006)

History

- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- Past Medical history
  - Do you have any respiratory illness such as asthma, chronic bronchitis, or any recent URTI?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?

- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?

- Review of System
  - Review the pt’s symptoms from head to toe, if more information needed

(Morris, 2009); (Kilgore, 2010)
### Focused Physical Assessment

<table>
<thead>
<tr>
<th>Focused Physical Assessment</th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
</table>
| General Survey             | General Appearance  
  - What is the general state of health for this pt?  
  - How does the pt look? Does the pt look healthy or malnourished?  
  - Is the pt in acute distress? | None | None | None |
| Nose/Sinus                 | Visualize the nasal mucosa with an otoscope for any redness on nasal mucosa with or without clear or yellow discharge | Palpate along the frontal and maxillary sinus for any tenderness | None | None |
| Throat                     | Visualize the pharynx with a tongue depressor and light, is it pink or slightly red with clear mucus? | None | None | None |
| Neck                       | Are there any visible abnormalities such as any swollen areas?  
  - Palpate along the neck for any cervical lymph node adenopathy | None | None | None |
| Lungs                      | Is the thorax symmetry with each breath?  
  - What are the rates, rhythm and the effort of the pt’s breathing? Are they normal or any increased efforts with breathing? | None | What are the lung sounds like?  
  - Any wheezing or stridor? | Normal |

(Bickely, 2007)

No diagnostic test is indicated
Diagnosis: Viral Upper Respiratory Tract Infection (Viral URTI)

Differential diagnosis (includes but not exclusive)
- Pharyngitis
- Allergic rhinitis
- Sinusitis
- Laryngitis

Notify the physician
- If the pt is in acute distress

(Mostov, 2007); (Kilgore, 2010); (Proud, 2008)

Children and Adults

- Antibiotics are not indicated
- Rest
- Hydration
- Gargling with salt water for sore throat
- Paracetamol as needed for symptom management, usually resolved in <7-10days

(Kilgore, 2010); (Morris, 2009); (Mostov, 2007); (Proud, 2008); (Al-Khudari, 2010)
Bibliography


*Murray and Nadel’s Textbook of Respiratory Medicine, 5th ed. The common cold*. Mason.


Signs and Symptoms of Acute Bronchitis
- Cough with or without sputum production lasting 1-3 weeks (cardinal sign)
- Low grade fever
- Fatigue
- Bodyache
- Malaise

Signs and Symptoms of Chronic Bronchitis
- Cough with or without sputum production lasting longer than 8 weeks (cardinal sign)
- Dyspnea
- Sputum production
- Wheezing

(Martinez, 2005) (Anish, 2004)

History
- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5 days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?
- Past Medical history
  - Do you have any respiratory illness such as allergic rhinitis, asthma, chronic bronchitis, or any recent URTI?
  - Do you have any other medical conditions?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?
- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?
  - What kind of work do you do? Coir, cotton mills, silicon, glass or marble factory, any exposure to asbestos or brucellosis?
- Review of System
  - Review the patient’s symptoms from head to toe, if more information needed
<table>
<thead>
<tr>
<th>Focused Physical Assessment</th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Survey</td>
<td>General Appearance</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• What is the general state of health for this pt?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• How does the pt look? Does the pt appear to be sick or in general poor health?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Is the pt in acute distress?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin</td>
<td>Are the mucosa membranes in the mouth dry?</td>
<td>How’s the skin turgor?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lungs</td>
<td>Is the chest rising and falling effortlessly?</td>
<td>None</td>
<td>What are the lung sounds like? Any crackles, rhonchi or rhales?</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Is the thorax symmetry with each breath?</td>
<td></td>
<td>Any wheezing or stridor?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What are the rates, rhythm and the effort of the pt’s breathing?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart</td>
<td>Inspect the anterior chest for movement, is it symmetric?</td>
<td>Palpate anterior chest for heaves, lifts and chills</td>
<td>Listen for the heart sounds at Right and left 2nd intercostal space, epigastric areas, L sterna boarder and apex areas.</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feel for a right ventricular impulse over the apex region</td>
<td>What are the heart sounds, do you hear S1S2? Is there any murmur present?</td>
<td></td>
</tr>
</tbody>
</table>

(Bickley, 2009)

**Diagnostic Study**

Diagnostic study is not routinely required, however, chest x-ray recommended if the patient has any s/s of pneumonia or any other lower respiratory tract infection.

**Acute Bronchitis**

Differential diagnosis (inclusive but not exclusive)
- Asthma
- Chronic Obstructive Pulmonary Disease
- Viral URTI
- Pertussis (whooping cough)
- Gastroesophagus reflux disease (GERD)

Notify Physician
- If the pt is in acute distress
- If the pt is having a high fever
- If the pt has been treated recently but has not improved or worsened

**Children**

No antibiotics are recommended for acute bronchitis. Cough suppressants can be given for symptom relief if cough is interfering for the patient.

If the signs and symptoms persist for more than a week, consider further referral for diagnostic test and management.

(Wong, 2006) (Madison, 2010)

**Adults**

No antibiotics are recommended for acute bronchitis. Cough suppressants can be given for symptom relief if cough is interfering for the patient.

If the signs and symptoms persist for more than 14 days, consider referral for further diagnostic tests and management.


**Chronic Bronchitis**

Differential diagnosis
- Tuberculosis
- Lung malignancy
- Lung abscess
- GERD

Notify Physician if the pt is suspected to have chronic bronchitis.

Patient with suspected chronic bronchitis need further referral for diagnosis and management.
Bibliography


Walsh, E. (2009). Acute Bronchitis, Section C. In Pleuropulmonary and bronchial infections, Mandell: Mandell, Douglas, and Bennett’s Principles and Practice of Infectious Diseases (7 ed.)

**Signs and symptoms of Pneumonia in Adults**

- Fever
- Pleural rub, bronchial breath sounds
- Fatigue
- Cough, can be productive or non-productive
- Chills
- Chest pain/pleuritic pain
- Body ache
- Shortness of breath

**Severe and later signs**
- Tachypnea, cyanosis, mental status change(confusion), hypotension and/or pallor in later stage in Pneumonia

(Bansal, 2004); (Bedi, 2006); (File, 2004); (Arora, 2010); (Bickley, 2009)

**History**

- History of Present illness
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- Past Medical history
  - Do you have any recent respiratory illness such as allergic rhinitis, asthma, chronic bronchitis, or any URTI?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?
  - Risk factors: older than >40yr age, younger than <5yr, history of smoking, COPD, heart disease and/or diabetes

- Social history
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?
  - What kind of work do you do? Coir, cotton mills, silicon, glass or marble factory, any exposure to asbestos or brucellosis?

- Review of System
  - Review the pt’s symptoms from head to toe, if more information needed

(Arora, 2010); (Mandell, 2007); (Lutfiyya, 2006); (Restrepo, 2009)
## Focused Physical Assessment

<table>
<thead>
<tr>
<th>General Survey</th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Appearance</td>
<td>What is the general state of health for this pt?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>How does the pt look? Does the pt appear to be sick or in general poor health?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Is the pt in acute distress?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

| Skin            | Are the mucosa membranes in the mouth dry? | Life a fold of skin and note the ease with it lifts up and returns how's the skin turgor? Poor turgor can indicate dehydration | None | None |

<table>
<thead>
<tr>
<th>Lungs</th>
<th>Is the chest rising and falling effortlessly? Is the pt using the accessory muscles with breathing?</th>
<th>Place hands on posterior chest &amp; confirm symmetrical chest expansion with inhalation.</th>
<th>What are the lung sounds like? Any crackles, rhonchi or rhales?</th>
<th>Are there any areas of dullness or hyperresonance?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is the thorax symmetry with each breath?</td>
<td>Is the trachea midline?</td>
<td>Any wheezing or stridor?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What are the rates, rhythm and the effort of the pt’s breathing?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Heart           | Inspect the anterior chest for movement, is it | Palpate anterior chest for heaves, lifts and chills | Listen for the heart sounds at Right and left 2nd intercoastal | None |

Jun 2011
symmetric?

<table>
<thead>
<tr>
<th>Feel for a right ventricular impulse over the apex region</th>
<th>space, epigastric areas, L sterna boarder and apex areas.</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
</tbody>
</table>

(Bickley, 2009)

If Pneumonia is suspected, chest x-ray must be done to confirm the diagnosis
(Bedi, 2006); (Goldman & Ausiello, 2007); (Lutfiyya, 2006); (Mandell, 2007)

Community Acquired Pneumonia

Differential Diagnosis (Includes but not exclusive)
- Acute Bronchitis
- Tuberculosis
- Severe Acute Respiratory Syndrome (SARS)
- Acute Respiratory distress syndrome (ARDS)
- Sepsis

Call Physician or immediate referral
- If the pt has any of the late signs of pneumonia
- If the pt is in acute distress
- If the pt has been treated for any recent respiratory disease

(WHO , 2003); (Arora, 2010); (Bedi, 2006); (Bansal, 2004)

Adults
- Levofloxacin 750mg one tablet or Moxifloxacin 400mg one tablet should be given at RMHC, then refer to the hospital for further diagnosis including chest x-ray, observation and management

If the pt is in acute distress or has later signs of pneumonia, refer immediately.
(Mandell, 2007); (Restrepo, 2009); (Bedi, 2006)
APPENDIX 8: Pneumonia RT08

Bibliography


Cincinnati Children’s Hospital Medical Center. (2006). *Evidence-based care guideline for community acquired pneumonia in children 60 days through 17 years of age*.


APPENDIX 8: Pneumonia RT08

## Signs and Symptoms of Pulmonary Tuberculosis

- Weight loss
- Night sweat
- Cough, non-productive or productive
- Fatigue
- Fever
- Hemoptysis

Patients may not have obvious signs and symptoms, it is important to get a thorough history


## History

- **History of Present illness**
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- **Past Medical history**
  - Do you have any respiratory illness such as tuberculosis, allergic rhinitis, asthma, chronic bronchitis, or any recent URTI?
  - Do you have any chronic disease? Diabetes, Cancer, HIV or any other disease that can lower immunity?
  - Do you take any medications including herbal supplement? Have you taken any recent antibiotics?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?

- **Social history**
  - Have you recently been exposed to anyone with similar symptoms? Do you live in a crowded place?
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Is there anyone in your household with similar or recent illness?
  - What kind of work do you do? Coir, cotton mills, silicon, glass or marble factory, any exposure to asbestos or brucellosis?

- **Review of System**
  - Review the pt’s symptoms from head to toe, if more information needed

<table>
<thead>
<tr>
<th><strong>Focused Physical Assessment</strong></th>
<th><strong>Inspection</strong></th>
<th><strong>Palpation</strong></th>
<th><strong>Auscultation</strong></th>
<th><strong>Percussion</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Survey</strong></td>
<td>General Appearance</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• What is the general state of health for this pt?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• How does the pt look? Does the pt appear to be sick or in general poor health?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• Is the pt in acute distress?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Skin</strong></td>
<td>Are the mucosa membranes in the mouth dry?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Lungs</strong></td>
<td>Is the chest rising and falling effortlessly? Is the pt using the accessory muscles with breathing?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Is the thorax symmetry with each breath?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>What are the rates, rhythm and the effort of the pt’s breathing?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Heart</strong></td>
<td>Inspect the anterior chest for movement, is it</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Lungs</strong></td>
<td>Place hands on posterior chest &amp; confirm symmetrical chest expansion with inhalation.</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• Is the trachea midline?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Lungs</strong></td>
<td>What are the lung sounds like? Any crackles, rhonchi or rales?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Any wheezing or stridor?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Are there any areas of dullness or hyperresonance?</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>


**Symmetric?**
- Feel for a right ventricular impulse over the apex region
- Space, epigastric areas, L sterna border and apex areas.
- What are the heart sounds, do you hear S1S2? Is there any murmur present?

*(Bickley, 2009)*

**Diagnostics**

Diagnostics studies are required for suspected tuberculosis, testing must be referred to a designated DOTS center
- Sputum AFB
- Chest X-ray


**Pulmonary Tuberculosis**

Differential diagnosis (includes but not exclusive)
- Chronic bronchitis
- Pneumonia
- Lung abscess
- Pneumonia
- Lung malignancy

Call Physician
- If the pt has any signs of pneumonia
- If the pt is in acute distress
- If the pt has been treated for any recent respiratory disease


**Treatment for Adults and Children**

Must be refer to the closest available DOTS designated centers for further diagnostic testing, treatment and management
Bibliography


Goal of treatment
1. Reduce or prevent micro/macrovascular complications
2. Reduce or prevent cardiovascular events
Type 2 Diabetes Protocol

Screening for Asymptomatic patients

- Anyone with BMI>23kg/m² and have any of additional risk factors as below
- If no risk factors, screening should be done for anyone >40yrs old of age
- If results normal, testing should be repeated at least 2 years intervals or more frequent interval if any risk factors present

- Age > 40
- Hypertension (>140/90)
- + Family history (first degree relative)
- Physical inactivity
- Increased waist circumference (>90cm in women, >100cm in men)
- Abnormal Cholesterol or Triglycerides
- Women with polycystic ovary syndrome
- History of gestational DM
- History of giving birth of baby weighing > 4 kg
- History of CVD

Symptoms/Signs of Diabetes Type 2

- Anyone with signs and symptoms of possible Diabetes should be screened

- Unexplained weight loss or gain
- Vision changes
- Non-healing wounds
- Frequent skin or vaginal infections
- Numbness or tingling of feet or hands
- Polyuria, polydipsia, polyphagia

Diagnostic test

1. Oral Glucose Tolerance Test (OGTT)
OR
2. 2 Fasting glucose tests (2 separate occasions)
History

- History of Present illness, if a pt has signs/symptoms
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5 days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- Past Medical history/Review of System
  - Do you get frequent infection?
  - Do you have any numbness or tingling on your hands or feet?
  - Do you have non-healing wounds?
  - Do you have any blurriness with your vision?
  - Do you often feel thirsty? Or do you drink excessive amount of water?
  - Do you have frequent urination, including at bedtime?
  - Are you losing or gaining weight without trying?
  - Do you take any medications including herbal supplement?
  - Have you ever had any difficulties with pregnancy or deliver?
  - Have you been told you had diabetes when pregnant?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?

- Family and Social history
  - Does anyone in your family have diabetes? For example, your mother or sister?
  - Smoking: do you smoke or does anyone else in your house smoke?
  - Drinking: do you drink? How often and how much do you drink?

(Bickley, 2009) (American Diabetes Association, 2010)
**Diagnosis of Diabetes**

1. Oral Glucose Tolerance Test
   - Initially measure fasting serum glucose test*, take 75gm of oral glucose. Measure serum glucose 2 hours after the oral intake
   - Interpretation
     | 2-hr serum glucose (mg/dl) | Diagnosis                      |
     |---------------------------|-------------------------------|
     | Below 139                 | Normal                        |
     | Between 140 and 199        | Pre-diabetes (impaired glucose tolerance) |
     | Above 200                 | Diabetes                      |

2. Fasting Serum Glucose Test
   - 8-hr fasting plasma glucose* on 2 separate occasions
   - Interpretation
     | Fasting Serum Glucose (mg/dl) | Diagnosis                                           |
     |-------------------------------|-----------------------------------------------------|
     | Below 99                      | Normal                                              |
     | Between 100 and 125           | Pre-diabetes                                        |
     | Above 126                     | Diabetes (Must be confirmed with a second fasting test) |

*8-hr fasting glucose serum test is recommended at least 8-hr overnight fasting

**Objective Data**

<table>
<thead>
<tr>
<th>Objective data</th>
<th>Body Mass Index (BMI)</th>
<th>Waist circumference</th>
<th>Hip-to-waist ratio</th>
<th>Blood pressure</th>
<th>Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal range</td>
<td>Between 18 and 23 kg/m²</td>
<td>Men: &lt;90cm</td>
<td>Men: &lt;0.95</td>
<td>&lt;130/80</td>
<td>Between 60-100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Women: &lt;80cm</td>
<td>Women: &lt;0.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(World Health Organisation, 2006); (American Diabetes Association, 2010); (U.S. Preventive Services Task Force, 2008); (Fonseca, 2007)
# Physical Assessment

<table>
<thead>
<tr>
<th>Physical Assessment</th>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
</table>
| General Survey      | General Appearance  
- What is the general state of health for this pt?  
- How does the pt look? Does the pt appear to be sick or in general poor health?  
- Is the pt in acute distress? | None | None | None |
| Skin                | General inspection for any wounds  
- If any wound present, document location, size, discharges, and odor | Lift a fold of skin and note the ease with it lifts up and returns. How’s the skin turgor? Poor turgor can indicate dehydration | None | None |
| Eyes                | Inspect the eyelids, conjunctiva and sclera for any abnormality or inflammation  
- Measure visual acuity using a Snellen eye chart  
- Check the reactivity of each pupils using a light  
- Check for extraocular movement | None | None | None |
| Ears                | Visualize the middle ear with an otoscope for any abnormality or fluid  
- Visualize the tympanic | Press firmly behind the ear for any tenderness  
- Is one ear tenderer when the auricle is moved up | None | None |
<table>
<thead>
<tr>
<th>Appendix 10: Diabetes Mellitus (Type II) EN01</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>membrane for any bulging or convex and down?</strong></td>
</tr>
<tr>
<td>• Does the pt have pain when tragus is pressed?</td>
</tr>
<tr>
<td><strong>Nose</strong></td>
</tr>
<tr>
<td>• Visualize the nasal mucosa with an otoscope for any redness on nasal mucosa discharge</td>
</tr>
<tr>
<td>• Palpate along the frontal and maxillary sinus for any tenderness</td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td><strong>Throat</strong></td>
</tr>
<tr>
<td>• Visualize the pharynx with a tongue depressor and light for any inflammation or abnormality</td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td><strong>Neck</strong></td>
</tr>
<tr>
<td>• Are there any visible abnormalities such as any swollen areas?</td>
</tr>
<tr>
<td>• Palpate for enlarged thyroid</td>
</tr>
<tr>
<td>• Palpate along the neck for any cervical lymph node adenopathy</td>
</tr>
<tr>
<td>• Auscultate carotid for bruit or thrill</td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td><strong>Lungs</strong></td>
</tr>
<tr>
<td>• Is the chest rising and falling effortlessly? Is the pt using the accessory muscles with breathing?</td>
</tr>
<tr>
<td>• Is the thorax symmetry with each breath?</td>
</tr>
<tr>
<td>• What are the rates, rhythm and the effort of the pt’s breathing?</td>
</tr>
<tr>
<td>• Place hands on posterior chest &amp; confirm symmetrical chest expansion with inhalation.</td>
</tr>
<tr>
<td>• Is the trachea midline?</td>
</tr>
<tr>
<td>• What are the lung sounds like? Any crackles, rhonchi or rhales?</td>
</tr>
<tr>
<td>• Any wheezing or stridor?</td>
</tr>
<tr>
<td>• Are there any areas of dullness or hyperresonnace?</td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td><strong>Heart</strong></td>
</tr>
<tr>
<td>• Inspect the anterior chest for movement, is it symmetric?</td>
</tr>
<tr>
<td>• Palpate anterior chest for heaves, lifts and chills</td>
</tr>
<tr>
<td>• Feel for a right ventricular impulse over the apex region</td>
</tr>
<tr>
<td>• Listen for the heart sounds at Right and left 2nd intercostal space, epigastric areas, L sterna boarder and apex areas.</td>
</tr>
<tr>
<td>• What are the heart sounds?</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td><strong>Abdomen</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Extremities</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Neurological</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

(Bickley, 2009)
Treatment for Diabetes
(American Diabetes Association, 2010); (Fonseca, 2007); (Institute for Clinical Systems Improvement, 2010); (India Council of Medical Research, 2005); (National Diabetes Information Clearinghouse, 2008)

Treatment for diabetes should be a combination of non-pharmacology and pharmacology therapies

<table>
<thead>
<tr>
<th>Name</th>
<th>Class</th>
<th>Mechanism of Action</th>
<th>Dose</th>
<th>Side effects and contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td>Biguanide</td>
<td>Suppression of hepatic glucose production, increases insulin sensitivity, decreases absorption of glucose from the gastrointestinal tract</td>
<td>500 or 1000mg</td>
<td>Contraindicated if renal impairment = creat &gt; 1.5 in men or &gt; 1.4 women or GFR &lt; 60. Other contraindications = alcohol abuse or dependence, liver disease, history of lactic acidosis, hypoxic cardio respiratory disease, pregnancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Once or twice a day</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Max: 2000mg/day</td>
<td>Common SE: diarrhea, nausea, vomiting,</td>
</tr>
</tbody>
</table>

Pharmacology therapy should be initiated and titrated by a RMHC physician after a thorough evaluation

First line of treatment: Metformin
Begin Metformin 500mg once a day, Start titrating by 500mg, up to maximum 1000mg twice a day over 1-2 weeks until the blood glucose is controlled

Second line of treatment: Metformin + Sulfonylurea (Glimepiride or Glibenclamide)
Add Sulfonylurea at lower dose, If blood glucose is not controlled on Metformin at maximum dose. Then slowly titrate sulfonylurea every 1-2 weeks until blood glucose is controlled

When for Referral to Endocrinologist or DM specialist
If blood glucose is not controlled on two medication combo or any signs of target organ damage, consider referral to a diabetes specialist

- Physical Activity
  - 150 minutes a week moderate intensity activity (30 minutes a day for 4-5 days)

- Diet
  - Balanced diet, consisting of protein, carbohydrate, fiber, low-fat and low-sodium
  - Reduce or cease alcohol consumption

- Weight reduction
  - Combination of increased physical activities and balanced diet can aid weight reduction

Non-pharmacology therapy

Diet

- Balanced diet, consisting of protein, carbohydrate, fiber, low-fat and low-sodium
- Reduce or cease alcohol consumption

Physical Activity

- 150 minutes a week moderate intensity activity (30 minutes a day for 4-5 days)

Weight reduction

- Combination of increased physical activities and balanced diet can aid weight reduction
## Monitoring and Follow-ups

**Target Glycemic control goals:** HgB A1C < 7%, Fasting glucose 90-130mg/dl or 2-hr post prandial glucose < 160mg/dl

- If started on a new medication, must have a follow-up within 1-2 weeks and check blood glucose
- Hgb A1c is an indicator for the three months of diabetes control, recommended to have Hgb A1C checked every 3-6months
  - Monitor Renal function while on pharmacologic therapy
  - Control blood pressure, goal blood pressure <130/80
- Continue to assess for any wounds on feet, educate the pt to monitor themselves
  - Recommended to have ophthalmology check-up annually
- Periodic BUN/Creat, Liver function test, Microalbumin on Urinalysis, CBC, Lipid profile, and annual EKG

### Hypoglycemia

Lower than normal blood sugar is one of the most common complications of diabetes treatment. Level of blood glucose producing s/s of hypoglycemia differs between each patient but usually <50-55mg/dl

- Signs and symptoms: shaky, sweaty, palpitation, pallor, clammy, anxiety, irritability, headache. In severe cases, seizures, confusion and even death
- When starting on pharmacotherapy, it is very important to educate the pts on s/s of hypoglycemia and when to drink about 100ml of apple or orange juice or 1 ounce of starchy food or honey

### Pharmacological Therapy

<table>
<thead>
<tr>
<th>Drug</th>
<th>Type</th>
<th>Actions</th>
<th>Dose</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glimepiride</td>
<td>Sulfonlurea</td>
<td>Stimulating the release of insulin from functioning pancreatic beta cells and increase sensitivity of peripheral tissues to insulin</td>
<td>1 or 2mg/once a day with first meal of the day Max: 8mg/day</td>
<td>Hypoglycemia, Jaundice, cholestasis, nausea, weight gain Caution with Sulfa Allergy</td>
</tr>
<tr>
<td>Glibenclamide</td>
<td>Sulfonlurea</td>
<td>Stimulating the release of insulin from functioning pancreatic beta cells and increase sensitivity of peripheral tissues to insulin</td>
<td>1.5, 2.5 or 5mg/once a day with first meal of the day Max: 20mg/day</td>
<td>Hypoglycemia, Jaundice, cholestasis, nausea, weight gain Caution with Sulfa allergy</td>
</tr>
</tbody>
</table>
Bibliography


Algorithm A

Every person above the age of 30 must have their blood pressure checked at least once a year

- Normal < 120/80
  - Healthy lifestyle should be educated
  - Annual Recheck

- Pre-hypertensive (120-139/80-89)
  - Recheck every 3-6 months
  - Lifestyle Modification should be initiated

- Hypertensive > 140/90
  - Recheck in 1-2 weeks
  - Treatment Algorithm B
Hypertension Treatment
Goal: Keep BP less than 140/90 (<130/80 if DM or CVD pts)

- Assessing for Cardiovascular disease risk factors
- Obtaining complete medical history

Physical Exam
Vital signs
BMI, WC, Hip to waist ratio

Laboratory Tests
- Fasting Serum Glucose
- Fasting Lipid Profile
- Chemistry (BUN/Creat, K+)
- Urinalysis (microalbumin)
- EKG

Treatment

Pharmacology
- Thiazide (HCTZ)
- Beta blocker (Atenolol)
- Angiotensin receptor blocker (Losartan)
- Calcium channel blocker (Amlodipine)

Lifestyle modification
- DASH diet
- Sodium Reduction
- Weight reduction
- Increase physical Activity
- Moderate alcohol consumption

- High Fasting Glucose → Diabetes Protocol
- High LDL → Hyperlipidemia Protocol
- Elevated BUN/Creat and/or elevated microalbumin → Repeat BUN/Creat if still high, referral to specialist
- Abnormal EKG → repeat → if cont to be abnormal →
Screening for Hypertension (HTN)

✓ All adult population older than 30yrs old at the clinic should have their blood pressure measured

Signs and Symptoms

Most of patients with hypertension do not have any signs and symptoms. Rare signs and symptoms are

- Headache
- Blurry vision
- Nose bleed
- Fatigue
- Confusion
- Chest Tightness

(U.S. Preventive Services Task Force, 2007); (WHO & International Society of Hypertension, 2003)

History

General CVD Risk

- Age (>40 years)
- Diabetes
- Smoking
- Elevated Systolic blood pressure (>140/90 untreated, >120/80 treated)
- Elevated total cholesterol or low HDL
- BMI>25

- History of Present illness, if a pt has any signs/symptoms
  - Onset: when did this illness start?
  - Location: where does it hurt the most? Where are your symptoms?
  - Duration: how long has this been going on? >3-5days?
  - Characteristics: Describe the illness, what other symptoms do you have?
  - Aggravating factors: does anything make your symptoms worse?
  - Relieving factors: does anything make your symptoms better?
  - Tried therapy: Did you try any medications or therapy? If so, did they make it better?

- Past Medical history
  - Do you have any blurry vision?
  - Do you have frequent headache?
  - Do you have any chest pain, palpitation, or chest tightness?
  - Have you been told you had high blood pressure?
  - Do you have any allergies to any medicine, environment or food? If yes, what are they? What kind of reaction did you get?
  - Do you have any physical complaints?

- Family and Social history
  - Does anyone in your family have hypertension or diabetes? For example, your mother or sister?
  - Smoking/Tobacco: do you smoke or does anyone else in your house smoke? If yes, how many cigarettes do you smoke? Do you chew tobacco?
  - Drinking: do you drink? How often and how much do you drink?

(Bickley, 2009); (Framingham Heart Study, 2011)
**Diagnosis**

Measure blood pressure using the correct method at least on 2 visits over 1-3 weeks

<table>
<thead>
<tr>
<th>Normal</th>
<th>Pre-hypertensive</th>
<th>Hypertension, stage I</th>
<th>Hypertension, stage II</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP &lt; 120</td>
<td>SBP 120-139</td>
<td>SBP 140-159</td>
<td>SBP &gt;160</td>
</tr>
<tr>
<td>DBP &lt;80</td>
<td>DBP 80-89</td>
<td>DBP &gt;90</td>
<td>DBP&gt;100</td>
</tr>
</tbody>
</table>

Correct method of measuring blood pressure
- Seated comfortably, back supported, bared upper arm, legs uncrossed
- Arm should be at heart level
- Use the correct size of cuff: Cuff length/width should be 80%/40% of arm circumference
- Cuff should be deflated at 2-3mmHg per second
- First audible Korotkoff sound is systolic pressure; last sound is diastolic pressure
- No talking between the pt and the observer during the measurement
- Measure both arms on the first visit

Laboratory Studies
- Fasting Serum Glucose (if necessary, Oral glucose tolerance test)
- Fasting lipid profile
- Chemistry panel (BUN/Creat, K+)
- Hgb/Hct
- Urinalysis (microalbumin)
- EKG

<table>
<thead>
<tr>
<th>Objective data</th>
<th>Body Mass Index (BMI)</th>
<th>Waist circumference</th>
<th>Hip-to-waist ratio</th>
<th>Blood pressure</th>
<th>Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal range</td>
<td>Between 18 and 23 kg/m2</td>
<td>Men: &lt;100cm Women: &lt;90cm</td>
<td>Men: &lt;0.95 Women: &lt;0.80</td>
<td>&lt;130/80</td>
<td>Between 60-100</td>
</tr>
</tbody>
</table>

(European Society of Hypertension, 2007); (U.S. Preventive Services Task Force, 2007)

**Complete Physical Assessment** (Bickley, 2009)

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Palpation</th>
<th>Auscultation</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Appearance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- What is the general state of health for this pt?
- How does the pt look? Does the pt appear to be sick or in |
<p>| None | None | None | None |</p>
<table>
<thead>
<tr>
<th>部位</th>
<th>检查内容</th>
<th>备注1</th>
<th>备注2</th>
</tr>
</thead>
<tbody>
<tr>
<td>皮肤</td>
<td>- 皮肤一般检查，记录任何伤口的遗留物，如果存在伤口，记录其位置、大小、排出物及气味。</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|      | - 检查皮肤，注意皮肤的弹性和恢复情况，皮下血肿或脱水可能。
      |       |       |
| 眼部  | - 检查眼睑、结膜和巩膜是否有异常。使用Snellen视网膜图测量视力。
      |       |       |
|      | - 检查每只眼的反应性及眼外肌运动。
      |       |       |
| 耳部  | - 使用耳镜检查中耳是否存在异常。
      |       |       |
|      | - 使用耳镜检查鼓膜是否存在隆起或凸起。
      |       |       |
|      | - 按压耳后部检查是否有压痛。
      |       |       |
|      | - 检查乳突压痛。
      |       |       |
| 鼻部  | - 使用耳镜检查鼻腔粘膜是否存在红色。
      |       |       |
|      | - 检查前额和上颌窦是否有压痛。
      |       |       |

Jun 2011
<table>
<thead>
<tr>
<th>Throat</th>
<th>discharge</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visualize the pharynx with a tongue depressor and light for any inflammation or abnormality</td>
<td>• None</td>
<td>• None</td>
<td>• None</td>
</tr>
<tr>
<td>Neck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Are there any visible abnormalities such as any swollen areas?</td>
<td>• Palpate for enlarged thyroid</td>
<td>• Ausculate carotid for bruit or thrill</td>
<td>• None</td>
</tr>
<tr>
<td>Lungs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Is the chest rising and falling effortlessly? Is the pt using the accessory muscles with breathing?</td>
<td>• Place hands on posterior chest &amp; confirm symmetrical chest expansion with inhalation.</td>
<td>• What are the lung sounds like? Any crackles, rhonchi or rhales?</td>
<td>• Are there any areas of dullness or hyperresonnace?</td>
</tr>
<tr>
<td>• Is the thorax symmetry with each breath?</td>
<td>• Is the trachea midline?</td>
<td>• Any wheezing or stridor?</td>
<td></td>
</tr>
<tr>
<td>• What are the rates, rhythm and the effort of the pt’s breathing?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Inspect the anterior chest for movement, is it symmetric?</td>
<td>• Palpate anterior chest for heaves, lifts and chills</td>
<td>• Listen for the heart sounds at Right and left 2nd intercostal space, epigastric areas, L sterna boarder and apex areas.</td>
<td>None</td>
</tr>
<tr>
<td>• Feel for a right ventricular impulse over the apex region</td>
<td></td>
<td>• What are the heart sounds, do you hear S1S2? Is there any murmur present?</td>
<td></td>
</tr>
</tbody>
</table>

**APPENDIX 11: Hypertension CV01**
### Abdomen
- Inspect the abd for peristalsis, striae, rashes, lesions, or other abnormalities
- Palpate the abd with a light, gentle motion in all quadrants for any tenderness or resistance
- Palpate deeply with the fingers in all four quadrants for any masses
- Ascultate for bowel sounds and note their frequency and character before palpation and percussion
- Percuss the abd lightly in all four quadrants for tympanic or dull sounds, only after auscultation

### Extremities
- Inspect all the extremities for any redness or abnormality
- Palpate the joints for any swelling, tenderness, or warmth
- Test for passive and active range of motion in all joints
- None
- None

### Neurological
- Observe general state of mental alertness, appropriateness of responses, orientation to date and place
- Use a filament and lightly touch the bottom of the feet to check the sensory system
- None
- None
Treatment for Hypertension

**Goal is maintaining BP<140/90, and <130/80 for pts with diabetes and/or history of CVD**

Management of Hypertension is a combination of Non-pharmacology and Pharmacology therapies

---

### Non-pharmacologic treatment

**Lifestyle Modification**
- ✔ DASH diet
- ✔ Salt Reduction
- ✔ Moderate Alcohol consumption
- ✔ Weight Reduction
- ✔ Increased physical activity

(Hebert, 2008); JNC (2003)

---

### Pharmacologic treatment

*All drug therapy should be initiated and titrated by a physician after a thorough evaluation*

**Initiating Treatment**

- **Stage I Hypertension (BP 140-159/90-99)**
  - If the pt is <55 years old, initiate hydrochlorothiazide 25mg once a day or Losartan 50mg once a day
  - If the pt is >55 years old, initiate Amlodipine 2.5mg or 5mg once a day

- **Stage II Hypertension (BP >160/>100)**
  - Initiate 2-drug combination of HCTZ 25mg + Losartan 50mg once a day or HCTZ 25mg + Amlodipine 2.5mg once a day

**Maintaining and follow-up**

- Recheck the blood pressure every 1-2 weeks until the optimal BP is achieved.
- Titrate hydrochlorothiazide by 25mg, losartan by 50mg and/or amlodipine by 5mg until optimal blood pressure is achieved.
- Stage I Hypertension: if BP is not controlled with HCTZ at 50mg, consider adding Losartan or Amlodipine at initial dosage
- When maximize the dose, consider adding additional agent or consider referral
- Periodic check (6 months to 1yr) for development of diabetes and/or hyperlipidemia
- Need to monitor for electrolytes, kidney functions every 3-6 months while on medications

**When to refer to a specialist/cardiologist**

- When the pt maximize the two agent without further optimization of blood pressure
- When the pt exhibits signs and symptoms of target organ damage such as increased BUN/Creat or abnormal EKG
Table 1. Anti-Hypertensive Medication List

<table>
<thead>
<tr>
<th>Name</th>
<th>Class</th>
<th>Mechanism of Action</th>
<th>Dosage</th>
<th>Side effects/Contraindication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochlorothiazide (HCTZ)</td>
<td>Thiazide Diuretics</td>
<td>Inhibiting Kidney’s ability to retain water</td>
<td>12.5, 25 or 50mg once or twice a day Max: 100mg</td>
<td>Headache, nausea, vomiting, hypokalemia, hypomagnesemia, hyperglycemia, photosensitivity</td>
</tr>
<tr>
<td>Almodipine</td>
<td>Calcium Channel Blockers</td>
<td>Blocking calcium channel, reducing intracellular calcium, further relaxing muscles including cardiac muscles</td>
<td>2.5, 5 or 10mg once a day Max: 10mg</td>
<td>Peripheral edema, headache, stomachache, dizziness, fatigue, flushing, chest pain, bradycardia *must measure HR</td>
</tr>
<tr>
<td>Losartan</td>
<td>Angiotensin II receptor antagonist</td>
<td>Blocking the angiotensin receptors, allowing the blood to flow smoothly and the heart to pump more efficiently.</td>
<td>25, 50 or 100mg once a day Max: 100mg</td>
<td>Dizziness, knee or back pain, muscle cramp, heartburn, diarrhea, angioedema,</td>
</tr>
<tr>
<td>Atenolol</td>
<td>Beta blockers</td>
<td>Reducing cardiac output, dilating blood vessel and lowering blood pressure</td>
<td>25, 50 or 100mg once or twice a day Max:100mg</td>
<td>Indigestion, constipation, nausea, dizziness, bradycardia *must measure HR</td>
</tr>
</tbody>
</table>


