

Diagnostic Process and Clinical Problem solving in Family Medicine Practice

Seminar delivered to Medical Year 4 1997-2008

**To be used for reference and academic discussion
only not constituting part of teaching programme of
any institution**

Updated 1 October 2015

Prof Albert Lee

MB BS(Lond) LLB (Hons-Lond) MPH M.Res & Prof.Stuyd in Ed (Bristol) MD(CUHK) FRACGP
FHKAM(FamMed) FRCP(Lond & Irel) FFPH(UK)

Clinical Professor (Head of Family Medicine 2002-07)

Department of Community & Family Medicine (now
JC School of Public Health and Primary Care)

The Chinese University of Hong Kong

Honorary Consultant in Family Medicine

At the end of the session, you should:

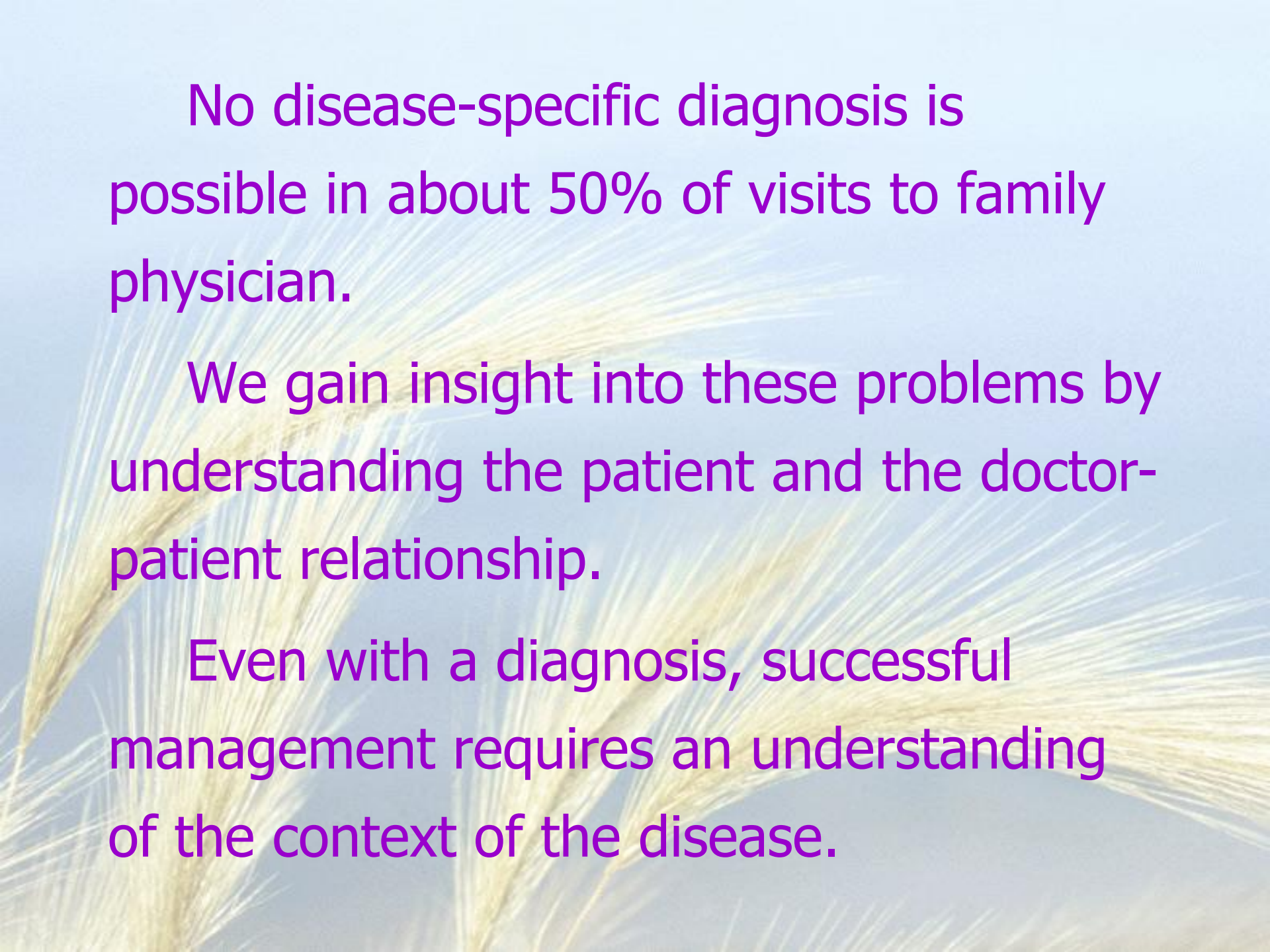
Have a better understanding about:

- How doctors make diagnosis in general
- How family doctors make diagnosis
- The different approaches to making diagnosis and clinical problem solving

Important tasks for doctors

- Understanding the patient
- Understanding his or her diseases

Over last 2 to 3 decades, teaching of interviewing skills has facilitated doctors with better means for understanding their patients but more work is needed to understand the illnesses/diseases



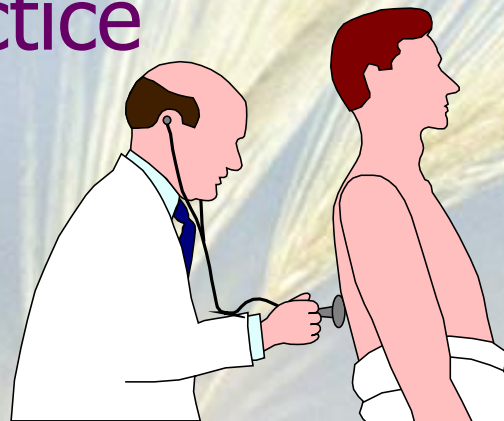
No disease-specific diagnosis is possible in about 50% of visits to family physician.

We gain insight into these problems by understanding the patient and the doctor-patient relationship.

Even with a diagnosis, successful management requires an understanding of the context of the disease.

FIVE Key Areas of Family Medicine

- Clinical practice-Health and disease
- Clinical practice-Human development
- Clinical practice-Human Behaviour
- Medicine and society
- The practice



Special features of Family Medicine Practice

- Highly prevalent health problems in family practice are not life threatening not really considered as diseases by hospital clinicians but illnesses by patients
- Not all clinical presentations would lead to established diagnoses
- Most are undifferentiated problems at early stage with less classic presentations

Special features of Family Medicine Practice

- Unique difficulties of diagnosing disease which presents in an early, undifferentiated form and of its management outside specialized hospital units with limited facilities for investigation
- Multiple problems, how to prioritize?
- Methods of disease prevention and health promotion in the community.

Problem Solving

- **Different prevalence**
- **Different cues**
- **Different predictive value of tests at early stages of illness**
- **Serial versus parallel testing**

Problem Solving

- **Different prevalence**

- **Age**

- **Sex**

- **Settings**

Disease

	Present	Absent	
Positive Test	a	b	a+b (test positive)
Negative Test	c	d	c+d (test negative)
	c+d	b+d	

Disease Prevalence 30%

Age Group 60

	Present	Absent	
Positive Test	270	70	340
Negative Test	30	630	660
	300	700	1000

Sensitivity: 90% Specificity 90%

PPV = $270/340 = 79.4\%$

NPV = $630/660 = 95.5\%$

Disease Prevalence 1%

Age Group 20

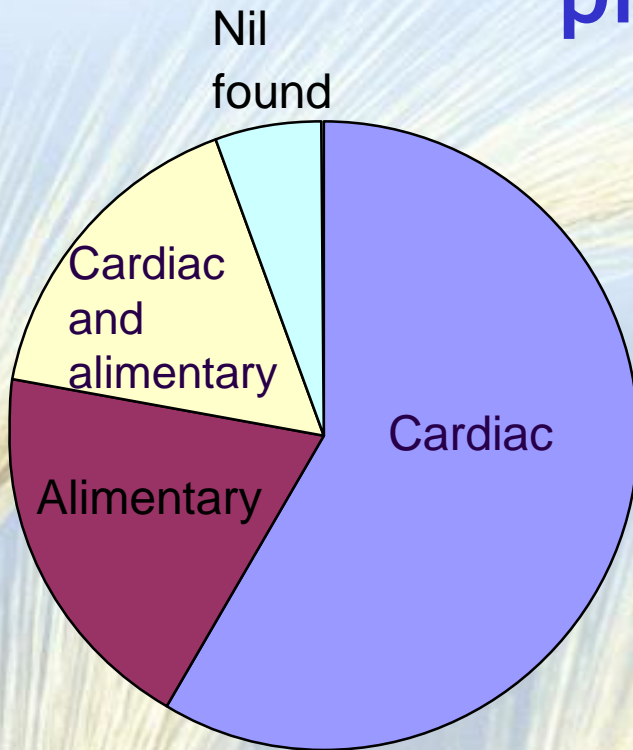
	Present	Absent	
Positive Test	9	99	108
Negative Test	1	891	892
	10	990	1000

Sensitivity: 90% Specificity 90%

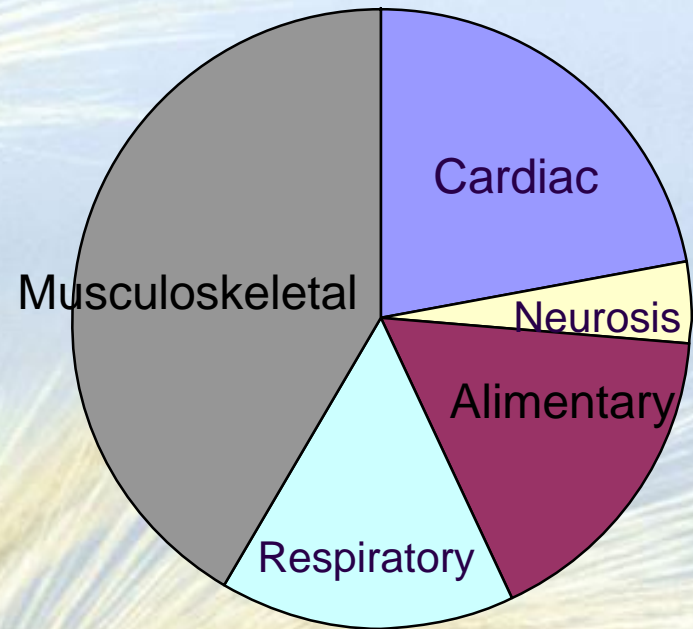
PPV = $9/108 = 8.3\%$

NPV = $891/892 = 99.9\%$

Contrasting cause of chest pain presenting in hospital and general practice



Hospital



General practice

Brian storm in small groups of
the three presentations over
next three slides for different
age groups

The background of the slide features a close-up photograph of several golden-brown grasses with long, thin, feathery seed heads. The grasses are set against a clear, light blue sky, creating a soft, naturalistic aesthetic.

Patient complains of tiredness

What are the most likely diagnoses?

- 20 years old female
- 45 years old male
- 55 years old female
- 65 years old male

Patient with palpitation

What are the most likely diagnoses?

- 20 years old female
- 45 years old male
- 55 years old female
- 65 years old male

**Patient complains loss of
appetite**

**What are the most likely
diagnoses?**

- 20 years old female
- 45 years old male
- 55 years old female
- 65 years old male

Diagnostic Process

Traditional/ Inductive Methods

- **The complete history and physical**
- **Gather all the information before making a diagnosis**
- **A battery of tests**

Diagnostic Process in Family Medicine

- **Diagnostic fallacy that family physicians would make diagnoses by collection clinical information in routine fashion**
- **Family physicians started off the process in formulation of provisional diagnostic hypotheses**
- **They then test the hypotheses by selective collection of clinical information from patient's history, clinical examination and laboratory test.**

Diagnostic Process

- **Inductive Method of Problem Solving:**

- **Unproductive**

- **Confusing**

- **Time-consuming**

Diagnostic Process in Family Medicine

- In the course of research, family physician will look for positive (confirming) and negative (refuting) evidence.
- This is hypothetico-deductive approach
- The process is cyclical and family physicians must prepare to revise and test the hypotheses further until it is refined to the point at which management decision is justified.
- Purely deductive approach can play relatively small role on some occasions

Diagnostic Process

- Presenting cues
- Gather information
- Interpret information
- Gather more information
- ???



Cues in Diagnostic Process

- When a patient presents a problem, the family physician is faced with a large data set: what patient says, the family physician's own observations, previous knowledge of the patient, relatives, from other physicians or other health professionals
- The different types of information are not of equal value and family physician responds to certain types of information having special meaning.
- We call these **'cues'** and it helps family physicians to understand the context of problem and/or understand the patient

Cues in Diagnostic Process

- A cue can be a **symptom, sign, statement, or an aspect of patient's behaviour**
- It may be something that is known about the patient such as **age, sex, ethnicity, occupation, past history**
- It may be a **contextual cue** such as **teenage girl accompanied by mother, a symptom tolerated by patients for years before presenting**
- It may be a **subjective cues**
- Cues can be **certain or probabilistic**

Diagnostic Process

Hypothetico-deductive reasoning

- **Form your diagnosis or hypotheses**
- **Gather information with a purpose**
- **Directed search**
- **Selective hx/pe/ix**

Existing Information in medical record

現有病歷資料

Patient Demography
eg. age, sex, ethnicity,
education, occupation
病人基本資料，例如：
年齡、性別、種族、
教育、職業

**Past Medical
History**
過往病歷

Life style
生活習慣

Health Perception
個人健康觀感

New observations

新的觀察資料

Any change
of function
activities

日常活動有否
出現變化

Any
adverse life
events

生活有否
出現大改
變

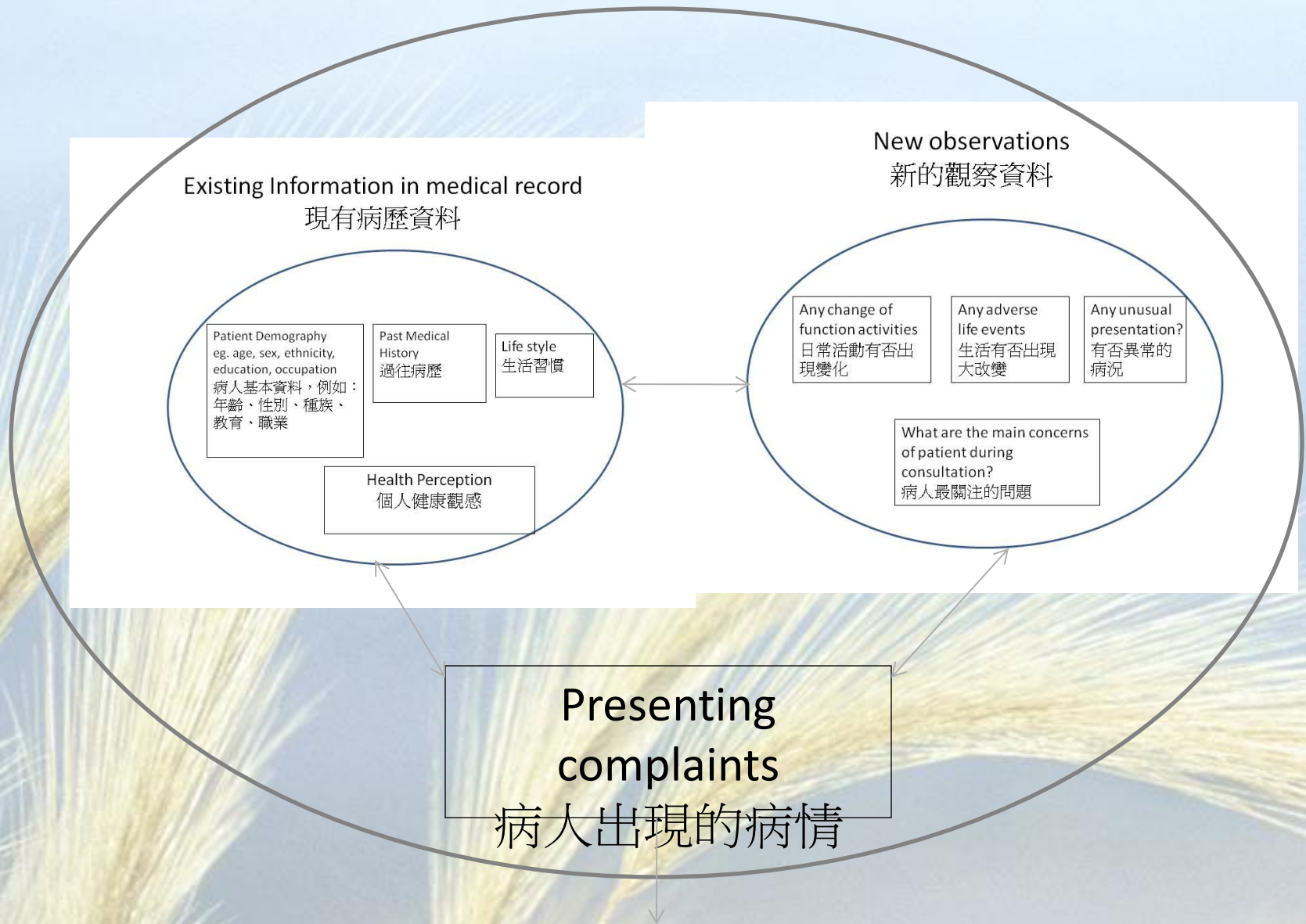
Any
unusual
presentat
ion?

有否異常
的病況

What are the main
concerns of patient
during consultation?

病人最關注的問題

Triangle of Preliminary Assessment



What are your
preliminary assessment
醫生初步評估

Provisional Diagnosis
Hypotheses
初步診斷的設定

```
graph TD; A[Perform necessary clinical examination and investigations  
進行適合的調查] --> B[Differential Diagnosis  
診斷];
```

Perform necessary clinical examination and investigations
進行適合的調查

Differential Diagnosis
診斷

```
graph TD; A[Appropriate Management / advice  
適合的治療 / 建議] --> B[Re-assessment  
再度評估]; B --> C[Problem persist  
病況持續]; B --> D[Improved resolved  
病情好轉];
```

Appropriate Management / advice
適合的治療 / 建議

Re-assessment
再度評估

Problem persist
病況持續

Improved resolved
病情好轉

Problem persist
病況持續

Review
再次評估

**Triangle of Preliminary
Assessment**

Diagnostic Process

Hypotheses Formulation

PST Approach:

- **Probability (most likely)**
- **Seriousness (most serious)**
- **Treatability (should not be missed)**

Ranking of hypotheses

- The hypotheses are placed in ranking order based on two main criteria: probability and payoff.
- **Payoff** is an indication of the **consequences of diagnosing or not diagnosing a disease**. The more serious the disease and the more amendable to treatment, the greater the positive payoff of making the diagnosis and the greater the negative payoff of missing on it.
- If the disease has a high payoff, it will rank high on the list even low probability, e.g., acute appendicitis in children with abdominal pain

Ranking of hypotheses

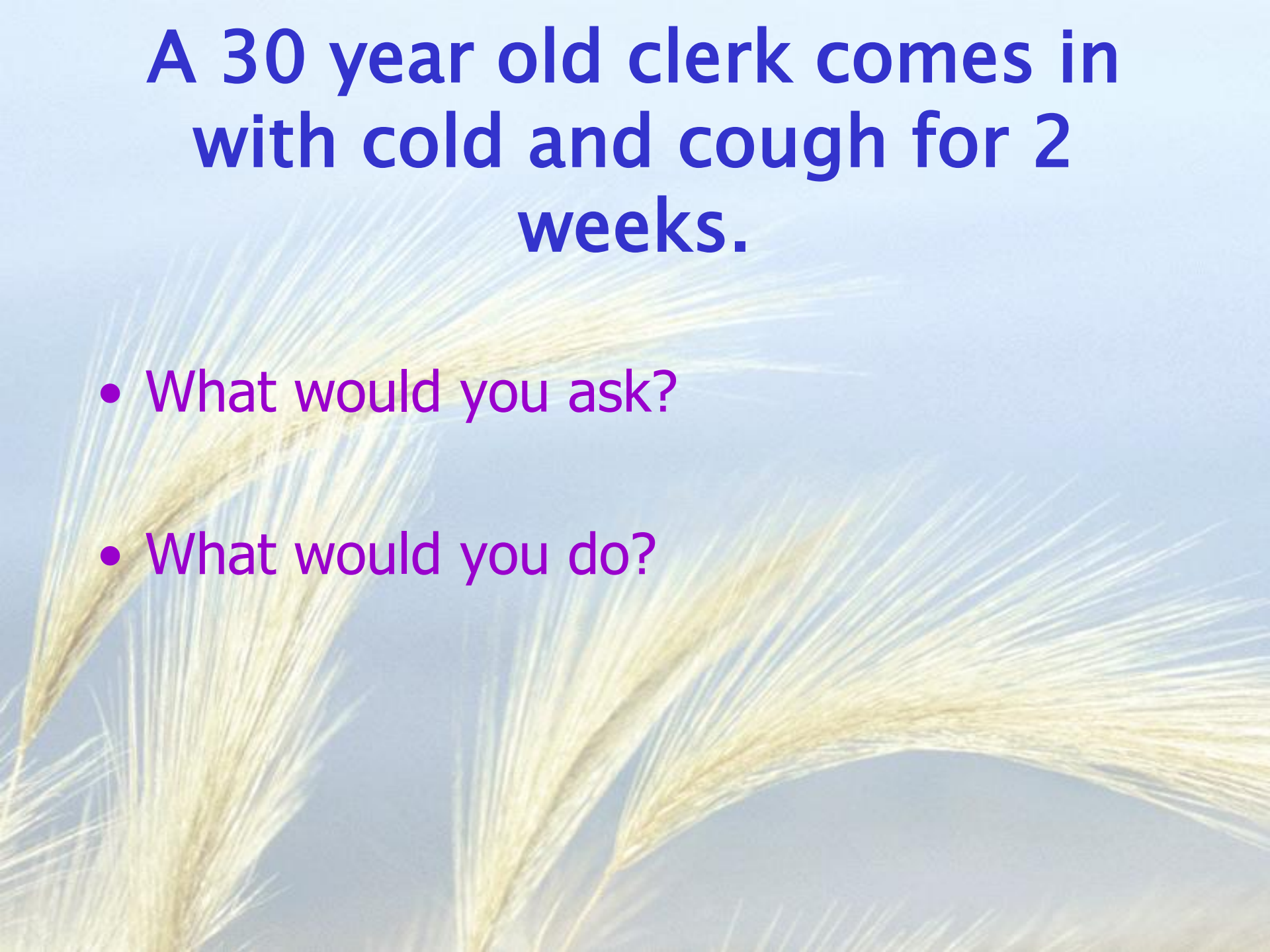
- If considerations of payoff is not the case, the hypotheses are ranked in order of probability.
- This is the conditional probability.
- If depression is first ranking hypotheses, one will begin the search of evidence for and against depression.
- If the diagnosis is supported, one will test it further to rule out other possible causes accounting for depressive like symptoms
- Family physicians not necessary always think of common problems and this depends entirely on cues, e.g, projectile vomiting in early infancy looks for pyloric stenosis

Diagnostic Process in Family Medicine

- Besides using common disease categories, family physicians use other types of category to deal with early and undifferentiated illness
- Patient with acute abdomen, the first task is to divide them into two categories; 'probably acute abdomen' or 'non acute abdomen.
- Similarly with chest pain, if categorised as 'non-cardiac chest pain', one would stop the search and observe the patient.
- The **prevalence of 'non-disease' is higher in family practice so the diagnostic tests will have higher predictive value.**

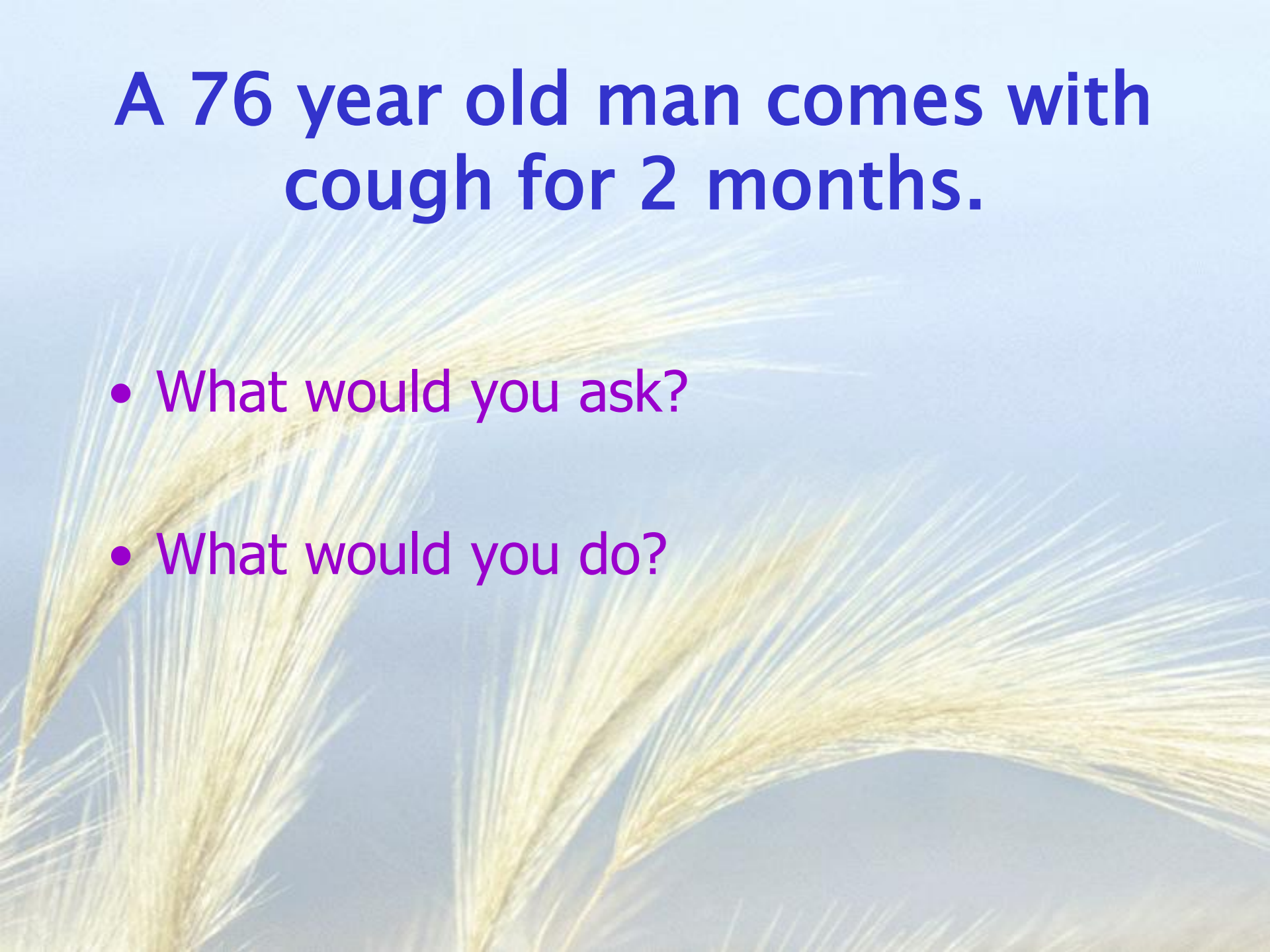
**A 30 year old clerk comes in
with cold and cough for 2
weeks.**

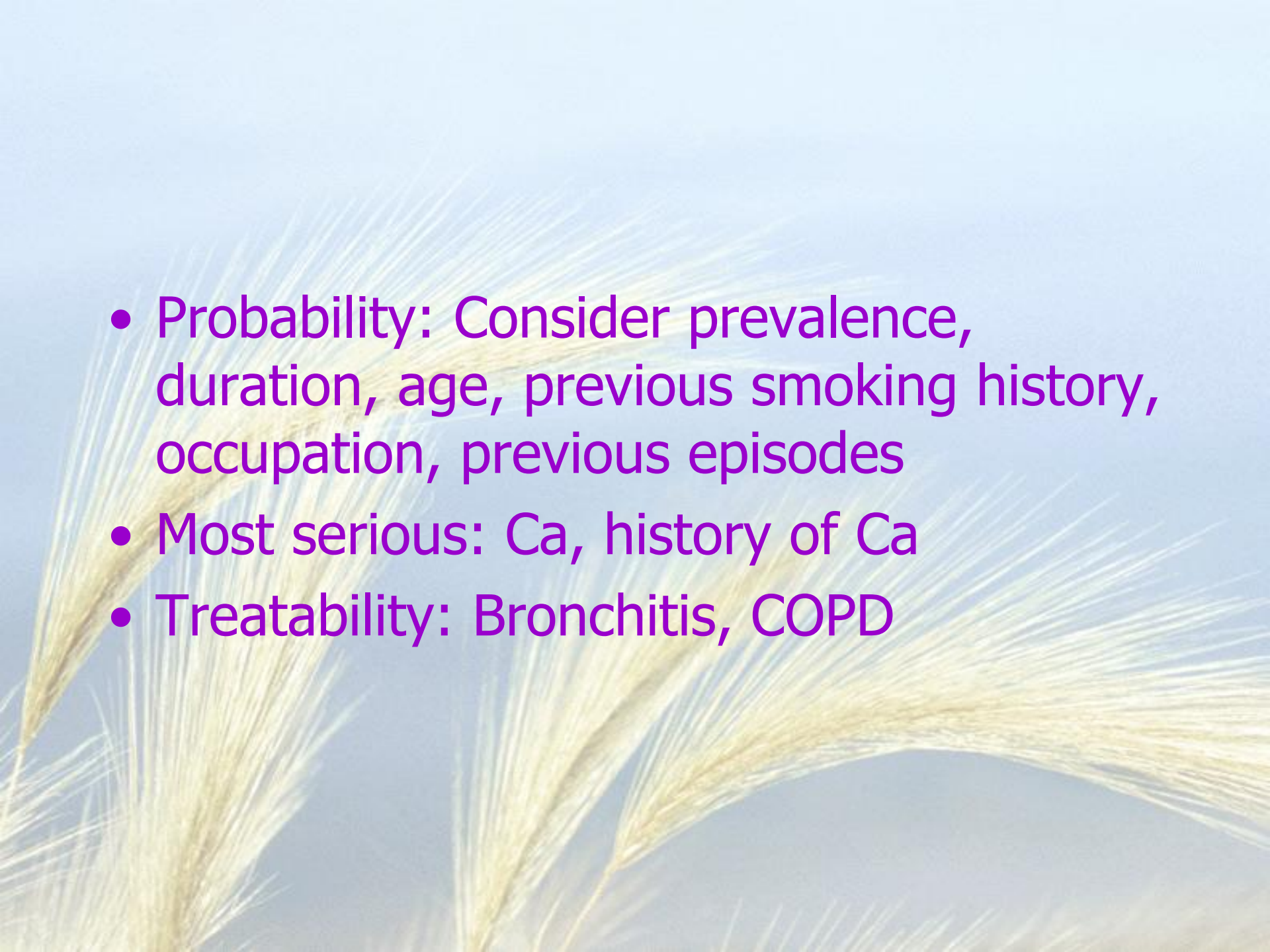
- What would you ask?
- What would you do?



A 76 year old man comes with cough for 2 months.

- What would you ask?
- What would you do?



- 
- Probability: Consider prevalence, duration, age, previous smoking history, occupation, previous episodes
 - Most serious: Ca, history of Ca
 - Treatability: Bronchitis, COPD

Diagnostic Probability: Prevalence in the community

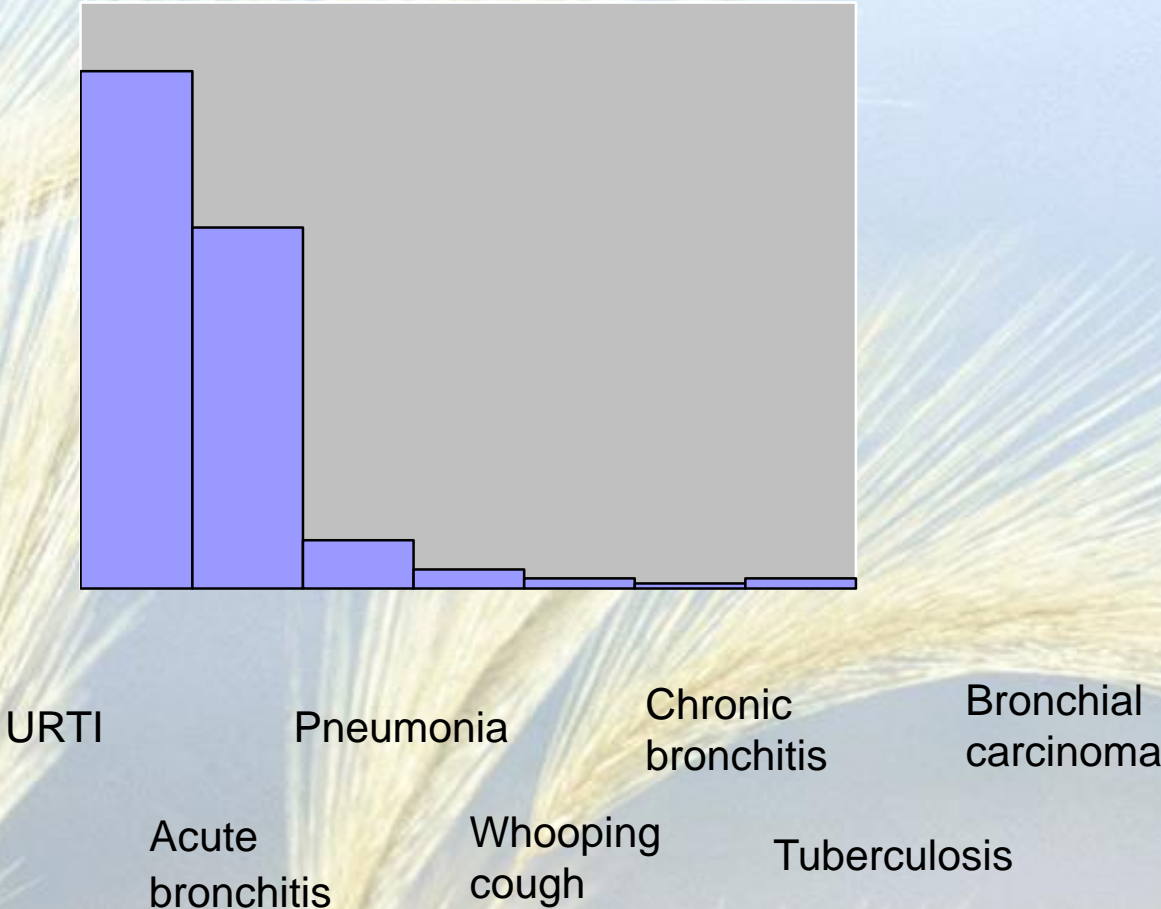
Diagnosis made	Frequency (%)	Crude probability
Acute bronchitis	36	Most likely
Common cold	35	
Influenza	7	Less likely
Chronic bronchitis	6	
Laryngitis tracheitis	6	
Pneumonia	1.9	Rare
Whooping cough	0.7	
Measles	0.4	
Pulmonary TB	0.4	
Ca lung	0.2	
Other	7	

Presenting symptoms of cough (N=527), adapted from Morrell, 1976

Diagnostic Probability: Duration

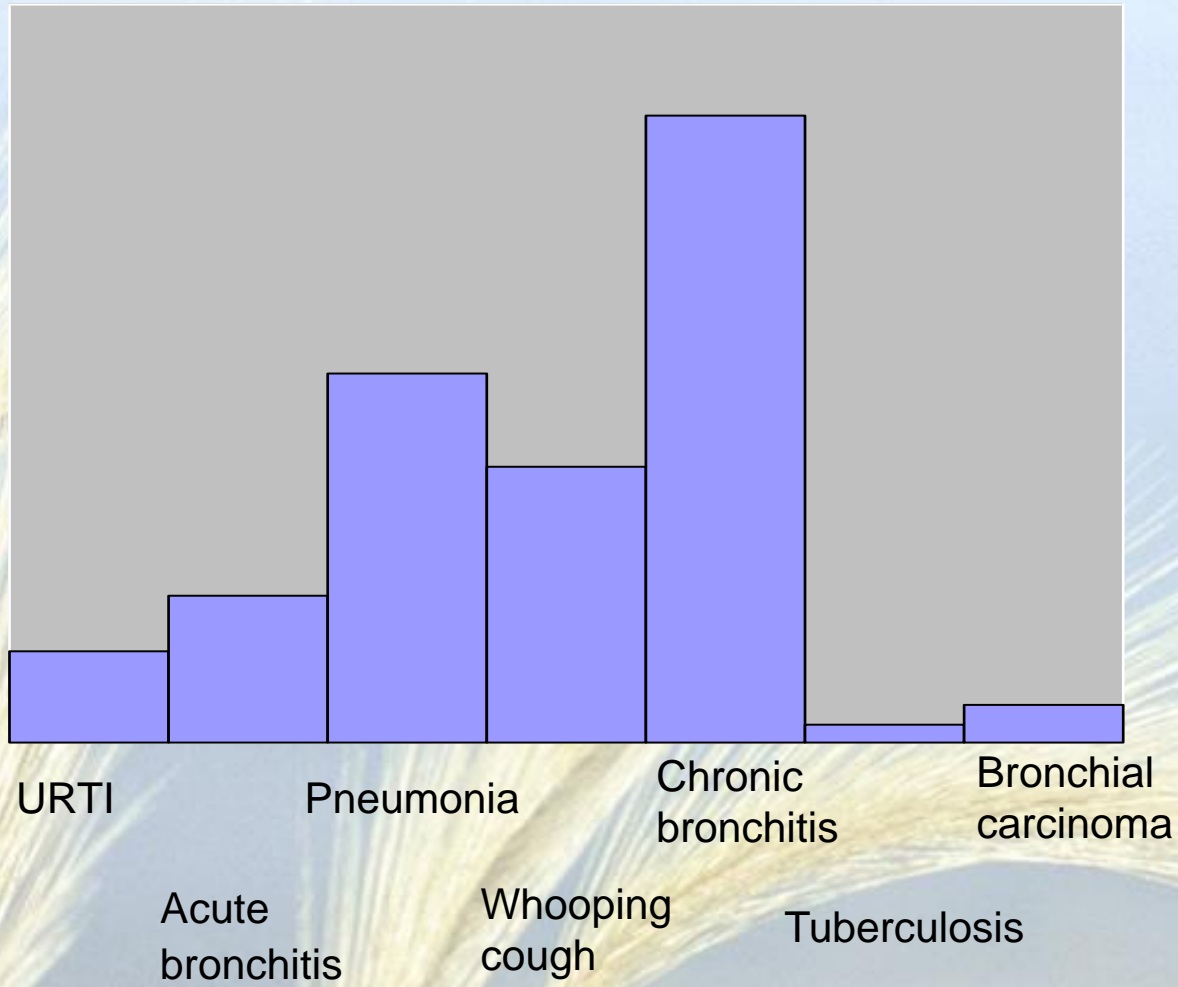
3 days

3 days



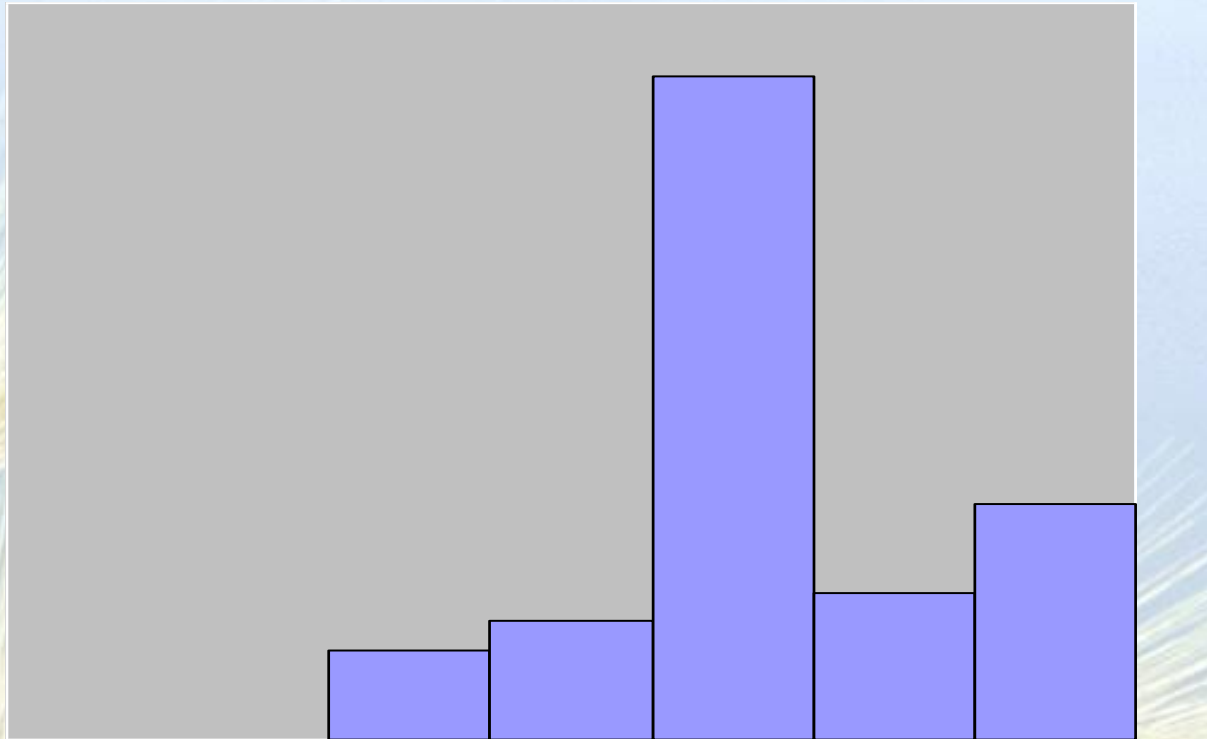
3 weeks

3 weeks



3 months

3 months



URT

Pneumonia

Chronic
bronchitis

Bronchial
carcinoma

Acute
bronchitis

Whooping
cough

Tuberculosis

Diagnostic Process: Seriousness

- **Should consider life threatening/serious incapacitating condition**
- **Even rare**

History & Mx

- In the 70 year old:
- Most serious and probable:
 - Frequency of cough, blood?
 - Associated symptoms: fever, wt loss
 - History of Ca
 - How daily life affected
- Full exam, Investigations: ESR?
- CXR

History & Management

- In the 20 year old, most likely URTI, symptomatic treatment and suggested follow up if no symptoms recur

A 60 year old lady was referred from private orthopaedic surgeon (she attended for back pain) to Family Medicine clinic because she had developed percordial chest pain with slight ST depression on ECG

- Why she was referred to you instead of specialist nearby?
- DDX?

DDx

Ischeamic heart disease

Reflux symptoms

Injury

Acute bronchitis

Anxiety

Costochondritis

Peptic ulcer

Gallstone

Pericarditis

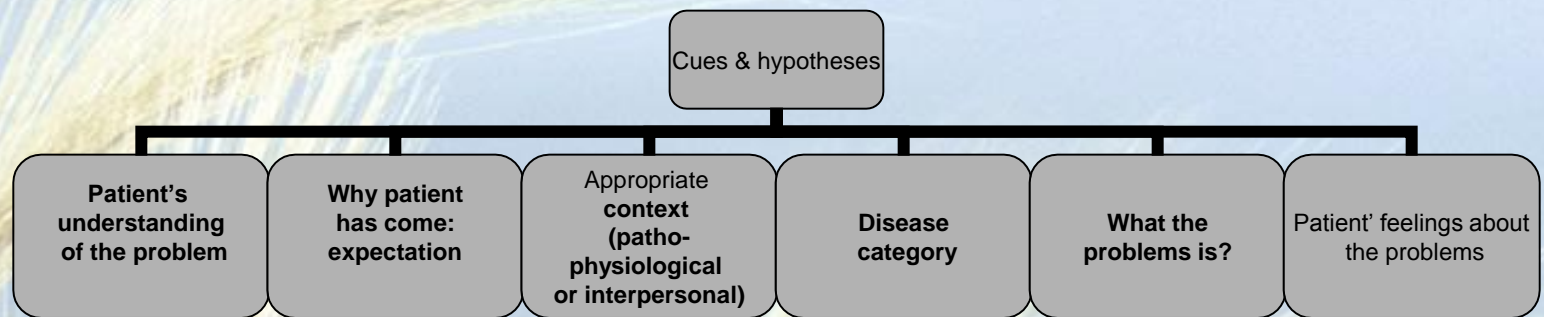
Myositis

Subsequent progress

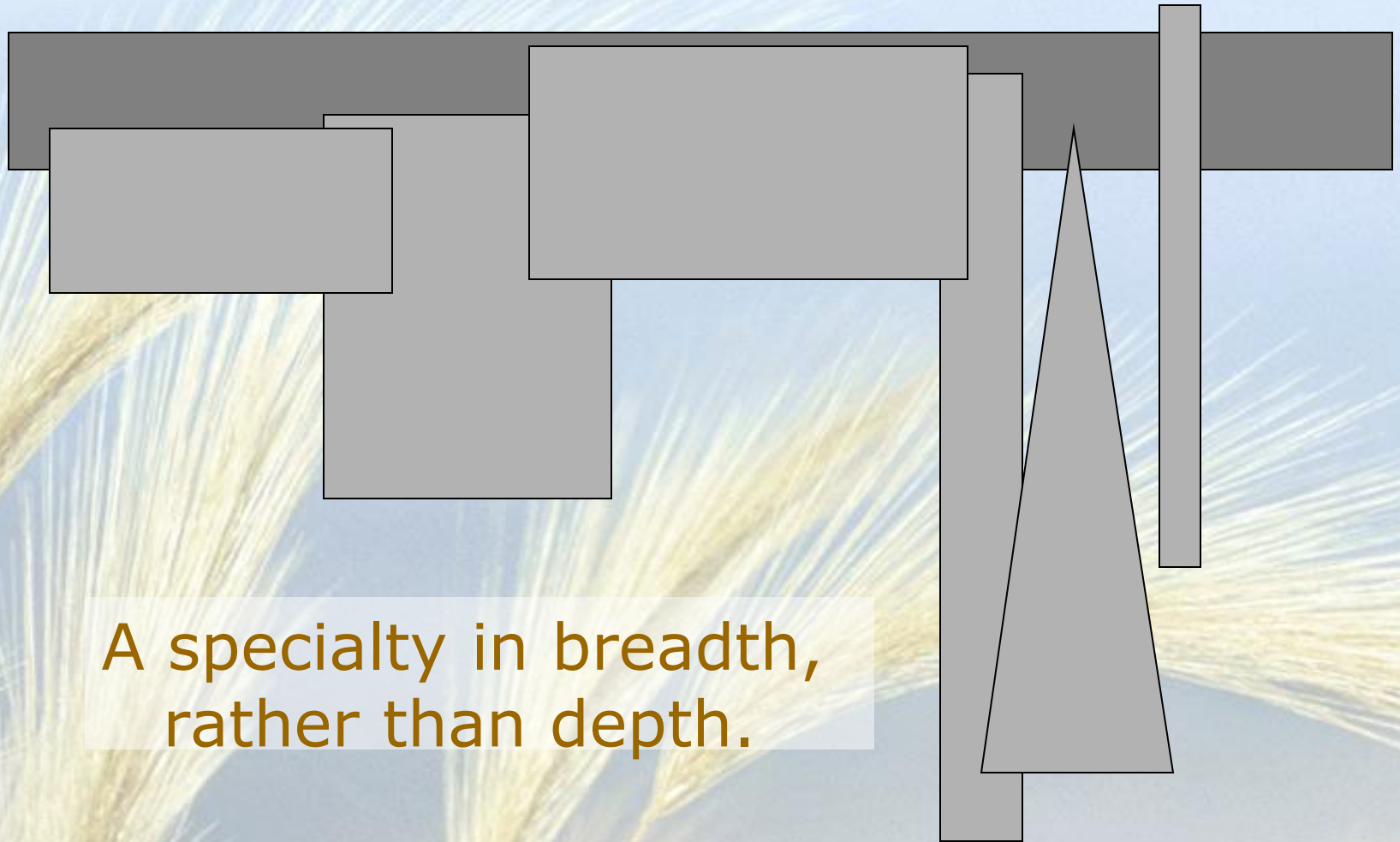
- Her symptoms suggestive of acid reflux and anxiety
- Reflux was confirmed with endoscopy and also noted to have mild duodenal ulcer
- She was found to have mild degree of anxiety

Subsequent progress

- Her symptoms developed again after several years
- She had extensive cardiac investigation but inconclusive and made the symptom worse
- Further review with hypothetico-deductive approach reviewed that anxiety was the leading cause of symptom
- Better after appropriate counselling



The Content of Primary Medical Care (I McWhinney)



Factors affecting clinical decision making

1. **Health problem (urgency, seriousness, natural history, etc)**
2. **Patient (expectation, culture, compliance)**
3. **Family (impact, support)**
4. **Other significant people**
5. **Doctor (communication with patients, previous experience with problem, knowledge, workload, uncertainty)**

Factors affecting clinical decision making

6. Investigations (indications, reliability, results)

7. Resources (availability and constrains)

8. Time factor

9. Ethical and medicolegal

10. Management (indications and contraindications, drug side effects and interaction, risk and benefits of therapy)

Patients with complex needs: “Heartsink’ patients

This is a group of patients with frequent attendances presenting with multiple complaints but usually no definite diagnosis would be established and no serious underlying organic causes of the complaints would be detected.

Those patients have complex unmet needs although they might not be life threatening.

Those patients living alone with little or no family or social support and/or frequent attendance to Emergency Departments with multiple problems without needs of admission would be potential cases.

Patient-Centred Clinical Method

(病人為本的臨床方法)

Exploring both
the disease &
illness experience
探索疾病及毛病

Understanding
the whole person
全人治理

Finding common
ground
找尋共通點

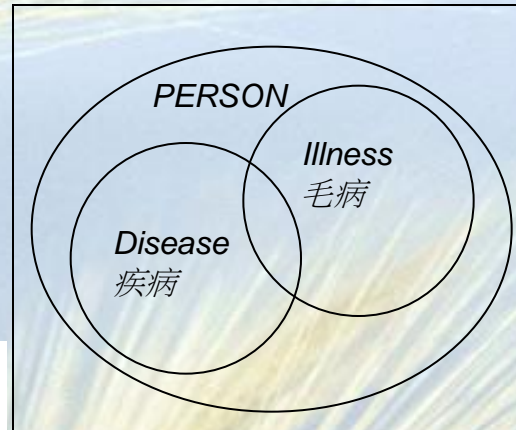
Physical, history, lab
病歷, 體檢, 化驗

Disease 疾病

Illness 毛病

*Ideas, expectations,
feelings, effect on function*
病人的[感受, 要求及想法]

Patient
presents
cues 病徵



Problems
問題

Goals
目的

Roles
功能

**Mutual
Decision**

Enhancing the
Patient-Doctor
Relationship
加強醫生及病人關係

Incorporating Prevention
and Health Promotion
介入預防及健康促進

Being Realistic