



## American Association of Public Health Physicians

3433 Kirchoff Road

Rolling Meadows, IL 60008-1842

Phone (847) 371-1502; Fax (847) 255-0559

Web Site: <http://www.aaphp.org> E-mail: [aaphp@reachone.com](mailto:aaphp@reachone.com)

*The voice of public health physicians, guardians of the public's health*

# ***Preventive Services ToolKit Project***

## ***Instructor's Manual and Supplemental Materials***

### ***Module 5—Epidemiology as a Policy Tool***

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Prepared by Joel L. Nitzkin, MD, MPH; **PSTK** Principal Investigator and Project Director

504 899 7893; [jln-md@mindspring.com](mailto:jln-md@mindspring.com)

## **Table of Contents:**

Slide 1 – Title .....	2
Slide 2: Teaching Objectives.....	2
Slide 3: Epidemiology .....	2
Slide 4: Epidemiologic Process .....	2
Slide 5: Numerators and Denominators.....	3
Slide 6: Policy .....	3
Slide 7: Politics.....	4
Slide 8: Science and Policy .....	4
Slide 9: Inference and Causation .....	4
Slide 10: Direct Benefits of Preventive Services.....	5
Slide 11: Indirect Benefits of Preventive Services .....	5
Slide 12: Other Consequences of Preventive Services .....	6
Slide 13: Projecting Costs and Benefits – Special Issues .....	6
Slide 14: Small-Numbers Epidemiology .....	7
Slide 15: Syndemics .....	7
Slide 16: Data Models .....	8
Slide 17: Medical Data Model.....	9
Slide 18: Public Health Data Models .....	9
Slide 19: Community Data Models .....	9
Slide 20: Life Cycle of a Chronic Disease (:DM”) Program in a Healthcare Setting .....	9
Slide 21: Final Comments .....	10
<b>Supplementary Materials</b> .....	11
Surveillance Bookmarks.....	11
Cardiovascular Disease Bookmarks .....	11
Barriers to Prevention and to Cardiovascular Health .....	11
Medicare Benefits.....	12
Definitions .....	12
Public Health Model of Prevention .....	12
Gordon’s Continuum of Care Model.....	12
Syndemics.....	12
Qualitative Epidemiology.....	12
Environmental Scanning.....	13

**Slide 1 – Title**

AAPHP  
Preventive Services Toolkit

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**Epidemiology as a Policy Tool**

--how to insert science into policy and political deliberations

9/29/06      AAPHP **PSTK** Epidemiology      Module 5, Slide 1

This module will discuss translation of epidemiologic concepts and use of Epi tools to develop and influence health-related policy. As with the Planning module, the focus will be on the policy and administrative “mindsets” and how best for health professionals to connect with them. As with the Evidence and Planning modules, there are extensive supplemental materials accessible on line, appended to the Instructor’s Manual. In the case of the Epi module – these consist of an extensive set of internet “bookmarks” dealing with both Epi concepts and disease-related issues.

**Slide 2: Teaching Objectives**

Teaching Objectives

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- Identify and use patterns of illness, risk and likely response
- Use multiple data models
- Insert science into policy
- Understand time intervals and program life cycles -- and use this understanding to help long term survival of programs

9/29/06      AAPHP **PSTK** Epidemiology      Module 5, Slide 2

(read slide)

**Slide 3: Epidemiology**

Epidemiology

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-- using what we know about determinants of wellness, illness, disability and death to improve outcomes

- Etiology
- Risk profile
- Natural history
- Efficacy of preventive and therapeutic measures
- Practicability of preventive and therapeutic measures
- Intended and other consequences – social, cultural, economic and other

9/29/06      AAPHP **PSTK** Epidemiology      Module 5, Slide 3

(read slide)

**Slide 4: Epidemiologic Process**

Epidemiologic Process

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- Determine who is at risk
- Stratify groups by level of risk
- Determine why they are at risk
- Craft interventions to reduce that risk
- Track progress against projections

9/29/06      AAPHP **PSTK** Epidemiology      Module 5, Slide 4

(read slide)

**Slide 5: Numerators and Denominators**

**Numerators and Denominators**

- Numerator = the number sick
- Denominator = the number at risk
- **The secret to success for preventive services is figuring out how best to define the denominator(s)**
  - Who
  - How many?
  - How do we connect with them?

9/29/06 AAPHIP **PSTK** Epidemiology Module 5, Slide 5

(read slide)

**Slide 6: Policy**

**Policy**

- Strategy
- Tactics
- Deciding what to do and how to do it
- Deciding who pays and who benefits

9/29/06 AAPHIP **PSTK** Epidemiology Module 5, Slide 6

“Policy” is the translation of ideas into action – deciding what you want to do, and how you want to do it. In this context, it involves the selection of problems to be addressed and the interventions to address them.

“Strategy” is long-term and large-scale policy – like deciding whether or not to have a dedicated *diabetes management education program for Hispanic patients* in your medical center.

“Tactics” refers to the details of implementing a strategy – like deciding where to locate the new health education program and how to staff it.

“Policy” also involves deciding who pays the costs and who gets the benefits. This aspect of policy looms large in health-related decision-making and often gets in the way of effective and cost-efficient clinical and community preventive services.

- for example – the decision by many public health agencies that they will only provide healthcare to uninsured clients will sharply limit the amount of service they can provide, and will, more than likely drive away some clients for whom this would be the best and most culturally sensitive source of care.
- The decision within many healthcare systems to make available health education to all members as a service any member can access, if desired – is usually implemented in a way that fails to aggressively reach out to those who could most benefit from this service. This, in turn creates a situation in which the service is mainly used by the worried well, who have little to benefit from it, while those most in need of the service never connect with it. (the policy issue here is one of stratification and dedication of the service to those who most need it).
- (*tell story of Model Cities Immunization*) as an example of an innovative approach to public health policy, using both principles of epidemiology and the Allison model of “mindsets”

**Slide 7: Politics****Error! Objects cannot be created from editing field codes****Slide 7: Tell story of Louisiana Community Care as example of politics divorced from science**

**Science and Policy**

- ❑ **Policy should be based on both politics and science**
- ❑ **Science is needed**
  - To identify problems amenable to interventions
  - To select interventions
  - To project efficacy and cost efficiency
  - **To assure positive outcomes**
- ❑ **Health professionals need to insert science into the policy dialogue at every level**
  - Within the organization
  - Community
  - Political jurisdiction
- ❑ Epidemiology is the basic science of public health

9/29/06 AAPHP **PSTK** Epidemiology Module 5, Slide 8

**Re Science and policy – PSA screening in response to mammograms (in name of providing males a similar service)****Slide 9: Inference and Causation**

**Inference and Causation**

- ❑ **Causation**
  - Biological plausibility
  - Sequence of cause and effect
  - Determination of who is at risk, and why
- ❑ **Impact of interventions**
  - Biological plausibility
  - Sequence of cause and effect
  - Determination of efficacy

9/29/06 AAPHP **PSTK** Epidemiology Module 5, Slide 9

The best example of this are those from the Framingham Studies of heart disease where the defined population was some 40-50,000 adults in the town followed for the last 30-40 years to evaluate the likelihood of heart disease based on such parameters as blood pressure, relative weight, smoking, and more recently lipids and exercise. The recommendation for prevention of heart disease and stroke are remarkably effective interventions following from the study of the population. The major drawback of the study was a lack of participation by enough minorities to determine whether the changes

recommended for the basically white population was appropriate for generalizing to the entire US population.

- The relations of the major study parameters to the suspect disease were all biologically plausible. The sequencing of smoking and tobacco use for years before onset of disease was temporally (sequentially) appropriate. The study had sufficient power (a large enough population) to determine relative risk between those with and without the studied attribute. The preventive intervention recommended has been studied sufficiently to receive the gold seal of approval from the US Task Force on Preventive Services.

- Delays between exposure and illness; between delivery of preventive service and reduction of risk.

- Saturation of benefit (when the need for the service in question is so completely met that year to year additional reductions in morbidity and healthcare costs will no longer be expected)

- When looking at inference that leads to defining cause and effect, the incubation periods were appropriate, based on a significant accumulation of basic research about the attributes examined in the Framingham study. The incubation periods for development of stroke and heart disease were sufficiently long that the effect clearly preceded the outcome. Finally, while the penetration of preventive services to combat heart disease and stroke is not 100 %, it has saturated enough centers of

medical care delivery that the incidence of heart disease and stroke have diminished significantly over the past 20 years.

### **Slide 10: Direct Benefits of Preventive Services**

**Direct Benefits of Preventive Services**

- ❑ **Improved health outcomes**
- ❑ Persons served (process) (denominator)
- ❑ Illness/healthcare services averted (outcome) (numerator)
- ❑ Better understanding and increased personal responsibility by patients (system)

9/29/06 AAPHP **PSTK** Epidemiology Module 5, Slide 10

We should never forget that the purpose of preventive services is improve health outcomes.

There is no chance of that occurring unless the program succeeds in reaching the potential clients who could benefit from the program. This intermediate outcome variable can be seen as a benefit in itself, even if only for indirect benefits as noted below.

In the case of tertiary care DM programming, another substantial benefit is enhanced patient understanding and adherence to prescribed regimens of treatment. Once educated to this behavior for one diagnosis, the chances are good that the patient will show similarly improved adherence to prescribed regimens for other illnesses – thus conferring a system benefit.

### **Slide 11: Indirect Benefits of Preventive Services**

**Indirect Benefits of Preventive Services**

- ❑ Better adherence to medical recommendations for other health conditions
- ❑ Other improvements in lifestyle
- ❑ Improved member/patient and staff satisfaction and loyalty
- ❑ Possible competitive advantage in the marketplace

9/29/06 AAPHP **PSTK** Epidemiology Module 5, Slide 11

Once patients find that following your advice for one problem works they are much more likely to take your advice on other issues. For example; a patient who improves his or her ability to walk and up and down stairs after following a diet and losing weight is more likely to follow recommendations to stop smoking, drink less alcohol and consider counseling for diabetes management. This is consistent with evidence that once people improve one aspect of their life they are more likely to change other lifestyle behaviors such as wearing seat belts.

▪Patients whose health improves are more likely to interact well with staff members, giving them credit for helping with their improved status. They, in turn, will relate better to each other, leading to improved morale in the office/institution.

▪The combination of these outcomes is likely to lead to a competitive advantage in the market place.

### **Slide 12: Other Consequences of Preventive Services**

**Other Consequences of Preventive Services**

- ❑ Increased outpatient costs
  - Longer visits (health ed and counseling)
  - More visits
    - Better adherence to prescribed regimens of care
    - Alerted to early signs
- ❑ Low morale if by doctors and nurses not compensated for extra counseling/screening etc.
- ❑ Adverse reactions to preventive medications (statins, ACE inhibitors, etc)
- ❑ Adverse patient selection (from health insurance perspective)

9/29/06 AAPHP **PSTK** Epidemiology Module 5, Slide 12

Just as pediatricians, due to their successful use of preventive medicine are now besieged by mothers worried about everything they see on TV and in magazines, who bring well children into the office and waste time requesting unnecessary interventions. ,. Many patients are already paranoid about disease and one of the problems of providing preventive

services is that some patients will believe that everything is preventable and will call you about everything they read or perceive. If your organization does not believe in prevention and refuse to pay/recognize doctors and nurses for providing the service morale will drop and even clinically successful interventions will be abandoned. Prevention has to become an institutional belief; it has to be pervasive among all the staff, clinical and administrative. Adverse reactions to some medications, even when rare, can lead to fear of similar problems when other secondary or tertiary preventive services are suggested. Finally the institution of preventive services will increase the patient's length of stay, however the effect this has on the organization depends on how the services if delivered, and by whom.

### Slide 13: Projecting Costs and Benefits – Special Issues

Projecting Costs and Benefits –  
Special Issues

- Healthcare system
  - Fiscal/healthcare utilization
- Patient
  - Rates of illness, complications and death
  - Rates of long-term disability
  - Quality of life – for patient and for family members
    - Quality-adjusted Life Years (QALY's)
    - Disability-adjusted Life Years (DALY's)
- Employer
  - Absenteeism and on-the-job productivity)

9/29/06 AAPHIP **PSTK** Epidemiology Module 5, Slide 13

This slide is intended to focus on the issue costs and benefits from the perspective of multiple different stakeholders – to illustrate both the complexity of the healthcare environment and the need to carefully consider which of the stakeholders has primary say over whether the program or policy you are proposing will be approved.

In the healthcare system – what is a cost to the insurance carrier or payer is revenue for the provider. There have been examples of successful DM programs eliminated by hospitals because

they cut too much into their revenues.

The patient's major interest is quantity and quality of life. Unfortunately, patients have no direct say in health-related policies outside of community health center settings and a scattering of private sector settings. The current fad for consumer-centered health insurance plans appears to be designed more to shift risk from the insurance company to the consumer that it does to give the consumer greater control of his or her healthcare services. That being said, it does appear to be likely to result in more effective delivery of clinical preventive services.

The employer's concern about absenteeism and on-the-job productivity is not synonymous with the healthcare provider's interest in reducing healthcare costs. As mentioned before – depression, substance abuse, low back pain and arthritis are all health conditions that cause substantial loss of employee productivity without the promise that more effective treatment would reduce emergency room use or hospitalization. Thus, employers are very interested in these services, but health insurers are not.

### Slide 14: Small-Numbers Epidemiology

Small-Numbers Epidemiology

- Statistical significance impossible with community-level planning and evaluation
- **Rely on baselines and trends**
- $p < 0.2$  guideline can be used for program evaluation and use of GIS, Epi, and Statistical software
- **NEVER** base a local or state policy decision on a test of statistical significance

9/29/06 AAPHIP **PSTK** Epidemiology Module 5, Slide 14

When conducting clinical research, one usually goes through a statistical exercise by which one estimates the sample sizes needed (numbers of cases and numbers of controls) to achieve statistical significance at  $p < 0.05$ , if results come out as expected. When doing public health programming or disease management in a healthcare setting, one does not have the option of securing larger sample sizes, and, only rarely, does one have the luxury of arranging for a “control” group.

As a matter of fact, even before and after differences, beyond

the initial implementation of a public health or clinical preventive service are almost impossible to achieve in practice because the differences tend to be relatively modest (like a 10% reduction in infant mortality following an aggressive MCH program) and the numbers of cases small.

How does one then proceed to set up a data system to track whether or not the program is working as intended??

The usual advice is to aggregate data over a three to five year period to get larger numbers – but, in practice, with annual budgets and reports, this tends not to be satisfying.

While aggregating the data for statistical significance tends not to be satisfying, aggregating the data to smooth the trend line does tend to be helpful in providing convincing evidence of program effectiveness.

In practice, simple visual presentation of trend lines (smoothed or not) and comparison of each year's data compared to the immediate pre-implementation indices seem to work best.

While in common use in social service programs, use of  $p < 0.2$  (an 80% chance that the result was not due to random variation) can enable use of statistical and software tools for illustrating program progress or the lack thereof.

### Slide 15: Syndemics

Syndemics

- Definition: an ecological/systems approach to the study of **simultaneous and possibly synergistic** epidemics affecting a specified community or sub-population
- Examples
  - Youth – STDs, AIDS, Substance Abuse, Unplanned or undesired pregnancy
  - Elderly – diabetes, metabolic syndrome, cardiovascular and cerebrovascular disease
  - Urban inner city – Household Lead Poisoning
  - Suburban sprawl – Obesity

9/29/06 AAPHIP **PSTK** Epidemiology Module 5, Slide 15

*(suggested approach is to go through the contents of the slide twice – once a simple read, the second consisting of verbal presentation of the material below)*

▪ Syndemics provides an approach to consideration of linked sets of health problems involving the defined population, the new epidemics of chronic disease, that are multi-factorial and affect more than one organ system.

▪ Syndemics is defined as *two or more afflictions, interacting synergistically, contributing to excess burden of disease in a*

*population.*

▪ A syndemic orientation is primarily distinguished from other perspectives by its explicit emphasis on examining connections between health-related problems. With this concern, it offers a broader framework for understanding how multiple health problems interact in particular communities. A syndemic orientation elevates public health inquiry beyond its many individual categories to examine directly the conditions that create and sustain overall community health.

▪ Further the medical model of disease specialization, once praised for its utility and versatility, is proving inadequate for confronting such contemporary public health challenges as eliminating health disparities where chronic disease adversely affect certain defined populations when compared with those on whom most research has been performed, white males have remarkably different risks and outcomes..

▪ Although conventional prevention programs have had strong effects, for the most part the categorical approach has failed to assure the conditions for overall community health, and it has done little to spread successes equitably among subgroups in society.

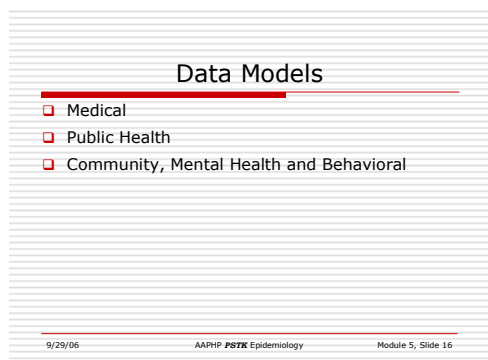
▪ Related concepts include: linked epidemics, interacting epidemics, connected epidemics, co-occurring epidemics, co morbidities, and clusters of health-related crises.

▪In addition to considering single risk factors that impact the incidence of multiple diseases, it also considers how the burden imposed by one disease complicates the management of the others. A syndemic approach facilitates the search for interventions that can simultaneously address multiple linked health problems in a manner acceptable to the host community and in a way that will not make any of the problems worse.

- The tools of syndemics include the basic tools and concepts of epidemiology and biostatistics, plus two types of tools not commonly used by epidemiologists and healthcare policy makers.
  - System dynamics tools look at the ecosystem in which the illness occurs and provide both qualitative and quantitative analysis of how multiple variables interact with each other.
  - Navigational software can be used to estimate the directionality (getting better or worse) and strength of proposed alterations of the ecosystem.

Domains addressed include all four community environments (social, physical, biologic, and administrative/political) plus common etiologic factors and how each illness impacts each of the others.

### Slide 16: Data Models



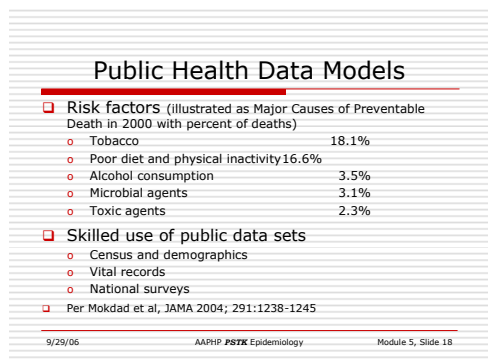
To most effectively address opportunities for improving health status and reducing healthcare costs, one must be able to address health-related issues from at least three different perspectives – medical, public health, and community/mental health/behavioral. These will be explored, one at a time, in the next three slides.

There are many ways to lump and divide concepts and paradigms for exploring root causes of illness in the community.

### Slide 17: Medical Data Model

Error! Objects cannot be created from editing field codes.

### Slide 18



▪The medical paradigm sees health issues in terms of diagnosis and procedure. While this is appropriate when the mission is one of treating illness – it simply does not meet our needs for planning and evaluating preventive services.

An example of the medical data paradigm is shown in this slide – as the five leading causes of death in the year 2000

tabulates the data according to major risk factor or etiologic agent. According to these data, about 35% of all deaths are due to the two top-ranked risk factors – tobacco and “poor diet and physical inactivity.”

### Slide 19: Community Data Models

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The third of the three paradigms consists of the factors most likely to be most visible to people in the community, especially within socially and economically disadvantaged communities. If health professionals are to partner with community stakeholders – as proposed in the COPC module, it is critically important that the health professionals develop an understanding of these issues and

**Slide 20: Life Cycle of a Chronic Disease (:DM") Program in a Healthcare Setting**

Life Cycle of a Chronic Disease ("DM")  
Program in a Healthcare Setting

- ❑ Start-up
  - (0 to 6 months)
  - all cost and little or no outcome/benefit
- ❑ Initiation of service to saturation of need
  - (3 months to 3 or 4 years)
  - year to year reductions in healthcare costs
- ❑ Stabilization of benefit
  - (year 4 or 5 and beyond)
  - continuation of maximum benefit,
  - no more year-to-year reductions in cost

9/29/06 AAPH P **PSTK** Epidemiology Module 5, Slide 20

When considering Return on Investment (both health-related and fiscal) for a new or expanded preventive service – at least five different delays (each measured in months) must be considered:

- Conception of proposal to approval – this will vary by healthcare entity and by type of service. Adding an adult immunization or a pap smear does not require the cost and time for preparation and training that a colonoscopy or behavioral intervention does.

- Approval to implementation – may have to await start of a new fiscal year unless external funding secured unless the new service can be easily integrated into an ongoing procedure that fits into a reimbursable DRG.

- Once approved – there are two major options – “build” the program internally by hiring and training your own staff, or “buy” the service – pre—packaged from an outside vendor. Buying the service from an outside vendor will usually speed program implementation, but increase (often double) the cost, and may, depending on the vendor, limit your ability to extend similar preventive services to other patients with other diseases.

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**Slide 21: Final Comments**

Final Comments

- ❑ Supplemental Materials appended to Instructor's Manual
  - <http://www.aaphp.org>, under "Preventive Services ToolKit"
- ❑ Q and A

9/29/06 AAPH P **PSTK** Epidemiology Module 5, Slide 21

As with the Evidence and Planning modules, there is a package of supplemental material pertinent to this module, available on line at [www.aaphp.org](http://www.aaphp.org), with no registration or membership required. It is appended to the Instructor's manual, and, in the case of the Epi module, it consists of hotlinks to a wide array

of internet resources dealing with Epi methodology, specific diseases and selected management and policy concerns.

## Supplementary Materials

### **Surveillance Bookmarks**

Epidemiology Super-course (U. Pitt)

<http://www.pitt.edu/%7Esuper1/>

CancerBACKUP Active surveillance (active monitoring)

<http://www.cancerbacup.org.uk/Cancertype/Prostate/Treatment/Activesurveillance>

CDC Division of Public Health Surveillance and Informatics

<http://www.cdc.gov/epo/dphsi/casedef/>

European Influenza Surveillance Scheme

<http://www.cdc.gov/epo/dphsi/casedef/>

FoodNet (CDC) - Diseases & Pathogens Under Surveillance

<http://www.cdc.gov/epo/dphsi/casedef/>

NHS – Surveillance Data

<http://www.show.scot.nhs.uk/scie/surveillance.html>

Influenza Surveillance – Canada Definitions for the 2004-2005 season

[http://www.phac-aspc.gc.ca/fluwatch/04-05/def04-05\\_e.html](http://www.phac-aspc.gc.ca/fluwatch/04-05/def04-05_e.html)

Johns Hopkins Hospital System – Surveillance

<http://hopkins-heic.org/surveillance/>

Update on Vaccine Safety Issues .

[http://www.phac-aspc.gc.ca/publicat/pch/vol3supb/pche\\_i.html](http://www.phac-aspc.gc.ca/publicat/pch/vol3supb/pche_i.html)

CDC - Pediatric & Pregnancy Nutrition Surveillance System

<http://www.cdc.gov/pednss/>

Monitoring and Surveillance for Livestock and Poultry Diseases

<http://www.aphis.usda.gov/vs/nahps/surveillance/>

US-AID - Faculty Based Surveillance

[http://www.usaid.gov/our\\_work/global\\_health/id/surveillance/fbrsurveillance.html](http://www.usaid.gov/our_work/global_health/id/surveillance/fbrsurveillance.html)

### **Cardiovascular Disease Bookmarks**

Prevention and Cardiovascular Disease (AHA)

<http://www.americanheart.org/presenter.jhtml?identifier=1247>

Cochrane Library

<http://www.cochrane.org/reviews/en/ab000362.html>

Facilitating Prevention in Primary Care

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=6439332&dopt=Citation](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6439332&dopt=Citation)

Screening for Diseases:Prevention in Primary Care(ACP) <http://www.rsmppress.co.uk/bksnow.htm>

The Framingham Study, The first 50 years. <http://www.framingham.com/heart/>

Framingham & Epidemiology\

<http://www.hhmi.org/biointeractive/museum/exhibit98/content/e2info.html>

Coronary Risk Profile - Health Risk Appraisal

<http://www.americanheart.org/presenter.jhtml?identifier=4528>

Risk Stratification and Epidemiology of Sudden Death

<http://www.biomedcentral.com/1523-3782/6/>

Epidemiology and prognosis of coronary heart disease

<http://patients.uptodate.com/topic.asp?file=chd/64193&title=Angina>

### **Barriers to Prevention and to Cardiovascular Health**

Barriers to Dietary Control (JAMA)

<http://jama.ama-assn.org/cgi/content/full/287/10/1258>

Barriers to Prevention

<http://www.merck.com/mmhe/sec01/ch005/ch005d.html>

Barriers to Cardiovascular Health

<http://72.14.203.104/search?q=cache:K2U8pVuYvDsJ:www.hhs.state.ne.us/hew/hpe/cvh/docs/ch5barriers.pdf+prevention+barriers&hl=e>

### ***Medicare Benefits***

Medicare Prevention Benefits

[http://www.samhsa.gov/MMA/mma\\_benefits.aspx](http://www.samhsa.gov/MMA/mma_benefits.aspx)

Contribution of Lifestyle-Related Factors to Preventable Death

<http://www.iom.edu/CMS/3793/24066.aspx>

### ***Definitions***

<http://www.pitt.edu/%7Esuper1/> U.Pittsburgh -Epidemiology Page

Epidemiology- Definitions <http://www.google.com/search?hl=en&lr=&rls=GGLD,GGLD:2004-33,GGLD:en&oi=defmore&defl=en&q=define:epidemiology>

The WWW Virtual Library <http://www.vlib.org/>

Medicine and Health Epidemiology <http://vlib.org/Medicine>

Glossary of Clinical Epidemiology

<http://www.med.ualberta.ca/ebm/define.htm>

### ***Public Health Model of Prevention***

Primary Prevention in the Adult (AHA)

<http://www.americanheart.org/presenter.jhtml?identifier=4704>

Secondary Prevention(AAFP)

<http://www.aafp.org/afp/20050615/2289.html>

Tertiary Prevention(Diabetes - see fourth paragraph)

<http://www.healthierus.gov/steps/summit/prevportfolio/strategies/reducing/diabetes/prevention.htm#levels>

### ***Gordon's Continuum of Care Model***

Gordon's Continuum of Care

<http://www.mentalhealth.samhsa.gov/publications/allpubs/SMA00-3437/SMA00-3437ch3.asp>

### ***Syndemics***

Syndemics

<http://www.cdc.gov/syndemics/>

Syndemics - Definition <http://www.cdc.gov/syndemics/overview-definition.htm>

Syndemics – Uses <http://www.cdc.gov/syndemics/overview-definition.htm>

Syndemics - Planning & Evaluation

<http://www.cdc.gov/syndemics/overview-planeval.htm>

### ***Qualitative Epidemiology***

Institute for Qualitative Epidemiology

<http://www.uofaweb.ualberta.ca/iqm/nav03.cfm?nav03=35213&nav02=33481&nav01=30519>

## Quantitative Epidemiology

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=8935733&dopt=Abstract](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8935733&dopt=Abstract)

## ***Environmental Scanning***

An Environmental Scan

<http://www.oclc.org/membership/escan/default.htm>

Environmental Scanning <http://www.horizon.unc.edu/courses/papers/enviroscan/>

Political, economic, social, and technological impact on the CNIB.

<http://www.cnib.ca/strategicplan/scan.htm>

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