PATTERNS OF HEALTH EXAMINATION SERVICES PROVIDED BY PHYSICIANS IN COMMUNITY HOSPITALS OF NAKORNSRITHAMMARAT, TRANG AND PATTALUNG PROVINCES

KRAISORN TOHTUBTIANG

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Thesis
entitled

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Kraisorn Tohtubtiang

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ABSTRACT

A cross sectional study was conducted in all community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces to identify the patterns of health examination services provided by physicians, the frequency with which physicians provided each health examination services procedure and factors associated with appropriate health examination services. An anonymous self-administered questionnaire was used for data collection during January 3, and January 28, 2005. Chi square test was used to analyze factors associated with patterns of health examination service and also difference among health insurance schemes. And multiple logistic regression was used to identify factors independently influencing patterns of health examination.

Of the total of 114, 93 physicians responded to the questionnaires. The proportion of physicians providing appropriate health examinations was only 9.7%. But when Chest X-ray was excluded from the original criteria, the appropriateness was raised to 66.7%. There was no difference in the provision of appropriate health examination according to patients' health insurance schemes. The frequencies with which physicians provided weight and blood pressure measurement to most of their patients were more than 95%, while only 2.2% provided immunization. Age of physician and number of average out patient-cases a physician served per hour were the only 2 factors which were significant associated with patterns of health examination service. Physicians aged younger or equal to 30 years old were 12 times more likely to provide appropriate health examination services than the older.

Reminder systems such as fact sheets or check lists for health examination patients to fill in when they are waiting for their physicians and well-trained screening nurses to help physicians in providing some procedures are recommended to increase compliance of physicians on health examination service guidelines.

KEY WORDS: APPROPRIATE HEALTH EXAMINATION SERVICE / PHYSICIANS / COMMUNITY HOSPITAL

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CHAPTER 1
INTRODUCTION

1.1 Rationale and justification of the study

What is health examination?

Health examination for general population is a health care service provided by physician to asymptomatic individual people for finding disease or abnormal health status. Health examination covers health prevention and promotion service including counseling about appropriate health behaviors for risk reduction as well. Health examination is not similar to physical examination, which provided to symptomatic patient for diagnosis the existed disease. Health examination for asymptomatic people not only laboratory investigation but also include complete history taking, complete physical examination, immunization and counseling.[1]

Essential of health examination

Every asymptomatic people is recommended to receive regular health examination for early detection of serious diseases that could be treated and also prevention and promotion interventions to maintain health status and prolong life.[1] There are evidences for the efficacy of a cancer screening or preventive intervention comes from a reduction in mortality and/or incidence of cancers shown in conclusive randomized controlled trials (RCT).[2] For example, strong indirect evidence lends support to cytology screening for cervical cancer. Insufficient use of this screening method accounts for a large proportion of invasive cervical cancers.[3] Health examination also can reduce premature morbidity and mortality, while preserve function and enhance quality of life to older adults.[4]

Trend of health examination is increasing

In US, the Healthy People 2010 project includes numerous objectives that advice physicians to practice both primary and secondary prevention through counseling,

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screening and immunization.[5] In Thailand, to encourage people to concern more about their health status, the government lounged the cervical cancer screening campaign free of charge for every woman who is between 35-44 years old though this is not included in the universal coverage policy. Some public sectors, which were professionally in medical laboratory investigation services such as Faculty of Medical Technology, also interested in health examination and provided mobile health examination services to other public sectors.[6]

There are health examination services in every level of health care all government hospitals, private hospitals, private clinics and private medical laboratories. The facilities and abilities to provide health examination services vary among them. Private hospitals promote several health examination programs for difference levels of customers as well. Many private companies put health examination services for their employee every year as routine activities.[7]

Misunderstanding about health examination

Health examination in asymptomatic people is generally accepted. But the existing “routine annual checkup” which emphasized only in laboratory investigations following the “already-prepared package” has not enough academic evidences to show the benefit in health promotion.[8] The most important part of health examination for asymptomatic people is the process of history taking and physical examination. Only few laboratory investigations are generally accepted that have enough effectiveness for routinely provided to the whole population.[1] For example, Chest X-ray (CXR) detected many incipient lesions that did not progress to cancer and consequently, a relatively high proportion of patients would have to undergo unnecessary, invasive treatment procedures. MRI (Magnetic Resonance Imaging scan) for early diagnosis of Alzheimer’s disease, which to date has no effective treatment, was also considering overused. [2,3]

Health examination especially screening test is a double-edged sword, sometimes clumsily wielded by the well intended. Although ubiquitous in current medical practice, screening is widely misunderstood and misused. Screening has a darker side

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that is often overlooked. It is inconvenient, unpleasant and expensive. A second wave of injury can arise after the initial screening insult: false-positive results and true-positive results leading to dangerous interventions. Although the stigma associated with correct labeling of people as ill might be accepted, those are incorrectly labeled as sick suffer as well. For example, labeling productive steelworkers as being hypertensive led to increase absenteeism, adoption of a sick role and independent of treatment.[3]

International standard of health examination

There are a lot of reviews regarding to the evidence for the effectiveness of health examination processes by responsible organizations such as American Medical Association, American College of Physician, U.S. Preventive Service Task Force (USPSTF), Canadian Task Force on Preventive Health Care (CTFPHC) and World Health Organization (WHO).[2,8,9] The main principles are concluded as the following consensus:

1. Health examination in asymptomatic people in the appropriate time is useful in promoting health status.
2. Since adult's age is vary and the risks to develop diseases are difference among age group, socioeconomic status, genetic and other factors, individual health examination should be selective approached.
3. Physicians should integrate health promotion and prevention interventions and deliver to people in every opportunity not only in the health examination period.

Different countries have their own standard for health examination and screening guidelines. For example, the two North American Task Forces tend to view preventive strategies differently in terms of how globally the evidence is assessed. While the CTFPHC examined each maneuver in the context of specific cancers, the USPSTF examined the overall potential benefits for many different clinical outcomes simultaneously, i.e. cancer, cardiovascular, etc.[2] The guidelines also depend on the prevalence of diseases in each country, since even very good tests have poor positive predictive value when applied to low-prevalence populations.[3]

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Health examination in Thailand and Standard of health examination for Thai people

Recently, patterns of health examination in Thailand still emphasizes on laboratory investigations following the “already-prepared package”. Although Thai Medical Council, Royal College of Medicine and other relevant Royal Colleges had set the committees to construct the “Guide to Periodic Health Examination and Maintenance for Thai People”[8] by using evidence-based method, no research studied about patterns of health examination provided by Thai physicians and compliance of them toward this guideline.[1] Most of the physicians still have different attitudes and practices, generally depend on their background of knowledge in their specialty field and clients’ need.[7] In Thailand, the smallest unit of health care that has physician is the community hospital level and integrating of preventive care into practice has become an important challenge for all primary care physicians. [10]

Nakornsrithammarat, Trang and Pattalung provinces.

Office of Permanent secretary, Minister of Public Health changed zoning system of public health administration of Thailand from 12 regions to 19 regions to increase effectiveness of provincial administration. Each area had its own Inspector and Evaluator. Nakornsrithammarat, Trang and Pattalung provinces are in the same region, region 16. Studying in all province of this area leads to more comprehensive and more feasible for policy implementation.

The better understanding about patterns of health examination services provided by physicians in community hospitals will help for implementation of promoting program to increase physicians’ compliance on the national health examination services recommendation.

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1.2 Research question

What are the patterns of health examination services provided by physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces?

1.3 Research objectives

General objective

To identify the patterns of health examination services provided by physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces

Specific objectives

1. To measure the proportion of appropriate health examination services provided by physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces
2. To measure the frequency of physicians provided each health examination services procedure in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces
3. To identify the factors associated with appropriate health examination services provided by physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces
4. To identify factors influencing to appropriate health examination service

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1.4 Operational conceptual framework

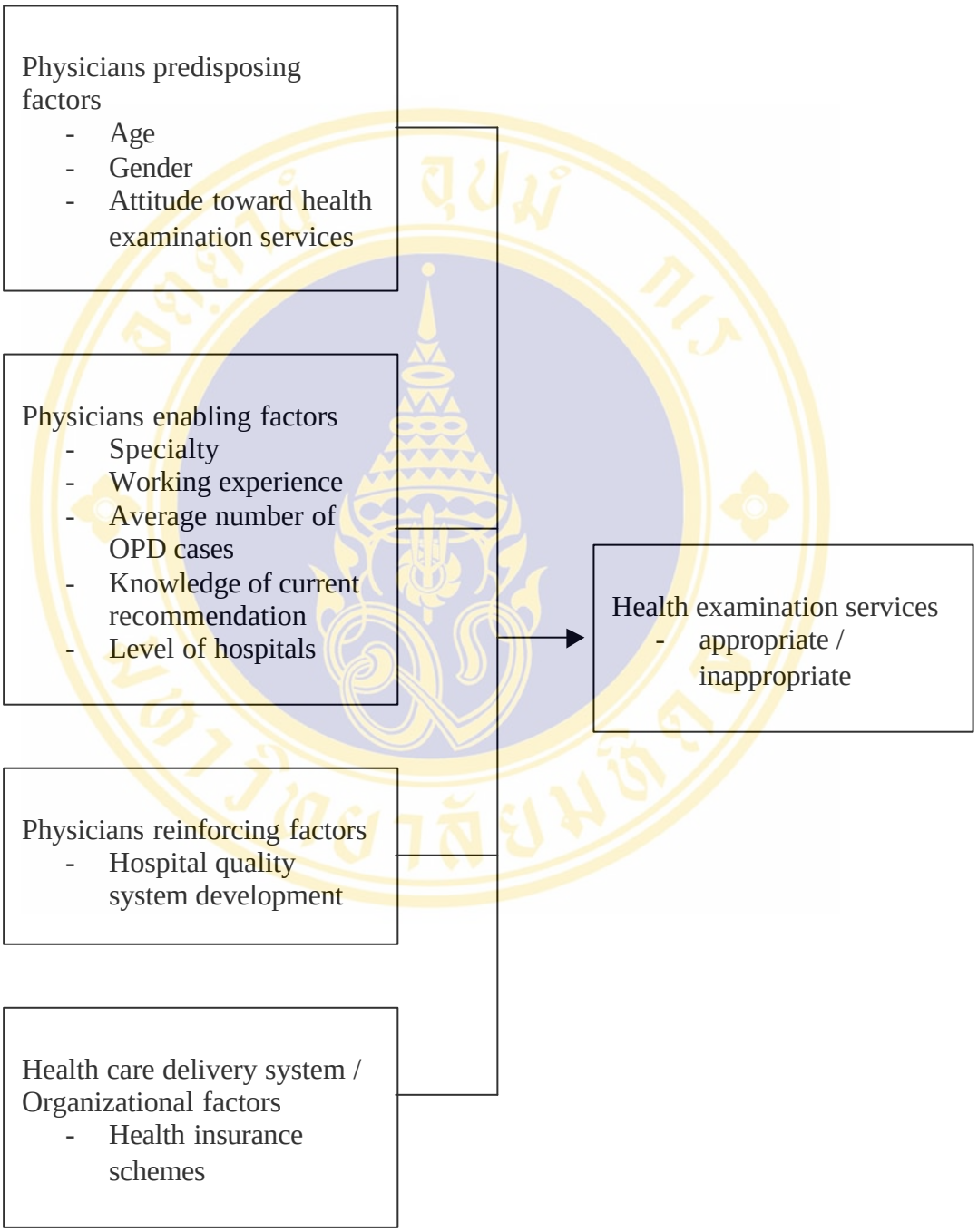

Figure 1 Conceptual framework

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1.5 Research hypothesis

1. There is an association between age of physicians and patterns of health examination services.
2. There is an association between gender of physicians and patterns of health examination services.
3. There is an association between attitude of physicians toward health examination and patterns of health examination services.
4. There is an association between specialty of physicians and patterns of health examination services.
5. There is an association between working experience of physicians and patterns of health examination services.
6. There is an association between knowledge of current recommendation on health examination guideline and patterns of health examination services.
7. There is an association between level of hospitals and patterns of health examination services.
8. There is an association between average numbers of out patient cases and patterns of health examination services.
9. There is an association between hospital quality development system and patterns of health examination services.
10. There is no difference in patterns of health examination services among health insurance schemes.

1.6 Operational definition of studied variables

Health examination

Refer to the health care service provided by physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces to asymptomatic individual adult age more than 20 years old who came to hospital for health examination service. Health examination in this study did not include compulsory health examination

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required by relevant organization such as health examination before being employed or health examination for driving licenses.

Appropriate health examination

Refer to the health examination complied with the recommendation for asymptomatic adult in "Guide to Periodic Health Examination and Maintenance for Thai People"[8]. The guideline grades the essential of health examination procedures regarding evidence-based medicine into four levels of power of recommendation:

A = There is a good evidence to support the recommendation that the condition be specifically considered in a periodic health examination. (Must do)

B = There is a fair evidence in addition to the experts' suggestion to support the recommendation that the condition be specifically considered in a periodic health examination. (Should do)

C = There is insufficient evidence to recommend for or against the inclusion of the condition in a periodic health examination, but recommendations may be made on other group. (May or may not do)

D = There is a fair or good evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination. (Don't do)

Since evidences to support the benefit for patients in health examination services procedures with power of recommendation levels B and C are not good enough and providing these procedures are vary depend on the physicians' judgment only. Therefore, this study will use power of recommendation "A" and "D" procedures to measure the appropriation of health examination, which are:

The physicians should ask about (level A)

1. Smoking status
2. Alcohol consumption
3. Exercise activities
4. Changing in body weight
5. Raw food digestion
6. Family planning

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7. Family history of serious disease and cause of death
8. History of Sexually Transmitted Disease (STD)
9. Drug abuse
10. Risk factor of Diabetes Mellitus (DM)
11. Risk factor of atherosclerotic disease
12. Traffic injury prevention
13. Risk factor of Mycobacterium Tuberculosis (TB) infection
14. Early signs and symptoms of common cancer

And the physicians should provide (level A)

15. Weight measurement
16. Height measurement
17. Calculation of Body Mass Index (BMI)
18. Blood pressure (BP) measurement
19. Urine analysis (U/A)
20. Stool examination
21. Pap smear for screening cervical cancer in sexually active women or women age more than 35 years old
22. Diphtheria and tetanus immunizations
23. Rubella immunization

And the physicians should not provide (level D)

1. Ultrasonography (U/S) and Computed Tomography scan (CT scan)
2. Tumor markers measurement
   AFP for liver cancer (CA liver)
   CEA for colon cancer (CA colon)
   CA 19-9 for pancreas cancer (CA pancreas)
   CA 125 for ovarian cancer (CA ovary)
   PSA for prostate cancer (CA prostate)
3. Chest X-ray screening for lung cancer (CA lung)
4. Resting Electrocardiogram (EKG) in age less than 40 years old

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The health examination is appropriate if

1. The physicians or their assistants provided at least 3 of the procedures with power of recommendation “level A” to 75% or more of their patients and
2. The physician or their assistants provided the procedures with power of recommendation “level D” to 50% or less of their patients.

Age referred to age of physicians categorized to 4 age groups, 21-30 year old, 31-40 year old, 41-50 years old and 51-60 years old for descriptive presentation; and 2 age groups for statistical analysis as younger than or equal to 30 year old and older than 30 year old.

Gender referred to physical gender of physicians categorized to male and female

Attitude referred to attitude of the physicians toward health examination services, by asking the physicians with a series of 12 questions. The choices of the answers were strongly agree, agree, uncertain, disagree and strongly disagree. With the total score of 60, physicians’ attitude score were compute for the means and categorized to favorable or unfavorable, favorable attitude if total score above the mean and unfavorable if total score under the mean.

Specialty referred to specialty of physicians categorized for descriptive analysis as Internist, General Practice (GP), Family medicine (Family physician or GP who had already passed the College of Family Physician’s examination), Internal medicine, General surgery, Obstetrician-gynecologist, Pediatrics, Preventive medicine and other specialty. For statistical analysis specialty was categorized as have or not have board certification.

Working experiences referred to number of years after graduated from medical school categorized for descriptive analysis as less than or equal to 5 years, 6-10 years, 11-15 years, 16-20 years and more than 20 years and categorized for statistical analysis as less than or equal to 5 years and more than 5 years.

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Knowledge of current recommendation referred to knowledge of physician regarding the content in "Guide to Periodic Health Examination and Maintenance for Thai People"[8], by asking the physicians with 19 multiple choices questions. The correct answer was given 1 score and incorrect answer was given 0 score. With total score of 19, physicians' knowledge was categorized to 3 levels. Good knowledge if total score = 16 (>80%) or more, fair knowledge if total score between 12 and 15 (60-80%) and poor knowledge if total score = 11 or less (<60%).

Level of hospital referred to number of beds of the hospital categorized to 4 levels, 1st level have 90 beds, 2nd level have 60 beds, 3rd level have 30 beds and 4th level have 10 beds.

Average number of OPD cases referred to average numbers of out patients cases per physician per hour in the community hospitals, categorized for descriptive analysis as less than or equal to 5 cases per hour, 6 to 10 cases per hour, 11 to 15 cases per hour, 16 to 20 cases per hour and more than 20 cases per hour and categorized for statistical analysis as less than or equal to 15 cases per hour and more than 15 cases per hour.

Hospital quality development system referred to quality system of the hospital to improve quality of health examination services by using method of International Standard Management System and Outcome (ISO), Hospital Accreditation (HA) or Health Promoting Hospital (HPH), categorized for descriptive analysis as no quality development system, have one kind of quality development system and have two kinds or more of quality development system and categorized for statistical analysis as hospital with HPH system and hospital without HPH system.

Health insurance schemes referred to Health insurance schemes of health examination service receivers categorized to Civil Servant Medical Benefit Scheme (CSMBS), Social Security Scheme (SSS), Universal Coverage Scheme (UC), and Fee for Service (FFS).

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CHAPTER 2
LITERATURE REVIEW

Contents of Literature of Review

2.1 Literatures regarding to the outcome variable
- 2.1.1 What is health examination?
- 2.1.2 Essential of health examination
- 2.1.3 Misunderstanding about health examination
- 2.1.4 International standard health examination
- 2.1.5 Health examination in Thailand and standard of health examination for Thai people

2.2 Literatures review of theoretical model

2.3 Literatures regarding to the independent variables
- 2.3.1 Age and Gender
- 2.3.2 Attitude of physicians toward health examination
- 2.3.3 Working experience and Specialty
- 2.3.4 Number of patients and level of the hospital
- 2.3.5 Health insurance scheme

2.1 Literatures regarding to the outcome variable

2.1.1 What is health examination?

In 1927, Fish and Crawford [11] released a manual of procedure about how to make the periodic health examination and stated that the purpose of the periodic health examination was not the diagnosis of so-called “disease” but the detection of physical impairment, predisposition to disease and health risk behaviors. The purpose of any individual physician or organization attempting the periodic health examination should not consist of separating the sick from the well, but of searching for and accurately the slight impairments which were present in the subject examined, and which would ultimately lead to disease conditions if not correct.

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Since new era of health service, Health examination for general population has wider definition as not only for finding disease or abnormal health status but also health examination cover health prevention and promotion service including counseling about appropriate health behaviors for risks reduction as well.[1] Health examination is not similar to physical examination which provided to symptomatic patient for diagnosis the existed disease. Health examination for asymptomatic people not only laboratory investigation but also include complete history taking, complete physical examination, immunization and counseling.[1,7,8]

"Guide to Periodic Health Examination and Maintenance for Thai People" [8] state that health examination for general population is a health care service provided by physician to asymptomatic individual people for finding disease or abnormal health status. Health examination covers health prevention and promotion service including counseling about appropriate health behaviors for risk reduction as well. Health examination is not similar to physical examination, which provided to symptomatic patient for diagnosis the existed disease. Health examination for asymptomatic people not only laboratory investigation but also include complete history taking, complete physical examination, immunization and counseling.[1]

2.1.2 Essential of health examination

Every asymptomatic people is recommended to receive regular health examination for early detection of serious diseases that could be treated and also to receive prevention and promotion interventions to maintain health status and prolong life.[1] Health examination also can reduce premature morbidity and mortality while preserving function and enhancing quality of life to older adults.[4]

Screening, one component of health examination, can improve health. The most persuasive evidence for the efficacy of a cancer screening or preventive intervention comes from reduction in mortality and/or incidence of cancers shown in conclusive randomized controlled trials (RCTs).[2] For example, strong indirect evidence lends support to cytology screening for cervical cancer. Insufficient use of this screening method accounts for a large proportion of invasive cervical cancers. [12]

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In US, the Healthy People 2010 project includes numerous objectives that advice physicians to practice both primary and secondary prevention through counseling, screening and immunization.[5] In Thailand, to encourage people to concern more about their health status, the government lounged the cervical cancer screening campaign free of charge for every woman who is between 35-44 years old though this is not included in the universal coverage policy. Some public sectors, which were professionally in medical laboratory investigation services such as Faculty of Medical Technology, also interested in health examination and provided mobile health examination service to other public sectors.[6]

There are health examination services in all level of health care every government hospitals, private hospitals, private clinics and private medical laboratories. The facilities and abilities to provide health examination service vary among them. Private hospital promoted several health examination programs for difference levels of customers as well. Many private companies put health examination services for their employees every year as a routine activities.[7]

2.1.3 Misunderstanding about health examination

Health examination in asymptomatic people is generally accepted. But the existing “routine annual checkup” which emphasized only in laboratory investigations following the “already-prepared package” has not enough academic evidences to show the benefit in health promotion.[8] The most important part of health examination for asymptomatic people is the process of history taking and physical examination. Only few laboratory investigations are generally accepted that have enough effectiveness for routinely provided to the whole population.[1] For example, Chest X-ray detected many incipient lesions that did not progress to cancer and consequently, a relatively high proportion of patients would have to undergo unnecessary, invasive treatment procedures. MRI scan for early diagnosis of Alzheimer’s disease, which to date has no effective treatment, was also considering overused.[2,3]

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Screening is a double-edge sword, sometimes clumsily wielded by the well intended. Although ubiquitous in contemporary medical practice, screening is widely misunderstood and misused.[3] Screening differs from the traditional clinical use of tests in several important ways. Ordinarily, patients consulted with clinicians about complaints or problems. This prompt testing was to confirm or exclude a diagnosis. Because the patient was in pain and requested our help, the risk and expense of tests were usually deemed and accepted by the patient. By contrast, screening engages apparently healthy individuals who are not seeking medical help. [13] Alternatively, consumer-generated demand for screening such as for osteoporosis and ovarian cancer might lead to expensive programs of no clear value. Hence, the cost, injury and stigmatization related to screening are especially important.[14]

Every adverse outcome of screening is iatrogenic and entirely preventable. An adverse effect can arise after the initial screening insult: false positive results and true-positive results leading to dangerous interventions.[15] Although the stigma associated with correct labeling of people as ill might be accepted, those are incorrectly labeled as sick suffer as well. Screening can also lead to harmful treatment. Treatment of hyperlipidemia with cofibrate several decades ago provides a sobering example. The availability of a screening test does not imply that it should be used. Indeed, before screening is done, the disease should be medically important and clearly defined, and its prevalence reasonably well known. The natural history should be known, and an effective intervention should be existed. Concerning policy, the screening program must be cost effective. The facilities for diagnosis and treatment must be readily available, and the course of action after a positive result must be generally agreed on and acceptable to those screened. Finally, the test must do its job. It should be safe, has a reasonable cut-off level defined, and be both valid and reliable.[3]

2.1.4 International standard health examination

Numerous government and non-government agencies, medical professional societies and health care organizations have established specific practice recommendations concerning screening and prevention. Studies in baseline screening

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or primary prevention information on all subjects are subsequently linked with national or regional incidence, or mortality databases without intervening surveillance of lesions have served a useful purpose in providing evidence of benefit for interventions. The new era of evidence-based medicine has spawned a number of consortia of biomedical researchers specialized in reviewing published clinical and epidemiological evidence on a systematic basis, ranking the available evidence in terms of the type of study, the quality of the information and the generalizability of the results to different health care settings. This consortia are affiliated with government agencies, professional societies or private non-profit organizations dedicated to the improvement of health care delivery.[2]

Two organizations noteworthy for their systematic approaches in reviewing the evidence for the effectiveness of cancer screening interventions are the US Preventive Services Task Force (USPSTF)[14] and the Canadian Task Force on Preventive Health Care (CTFPHC)[16]. These two organizations have cooperated in reviewing the appropriateness of a wide range of clinical preventive services in use in North America, including screening tests for early detection of disease, immunizations to prevent infections and counseling for disease risk reduction. These organizations rank the quality of the published evidence via the same descriptors adopted by the Physician's Data Query (PDQ) database program and making specific graded recommendations for or against adoption of procedures as part of standard clinical practice. USPSTF graded the power of the recommendations for adoption of a particular screening intervention according to the following classification.

A = There is a good evidence to support the recommendation that the condition be specifically considered in a periodic health examination.

B = There is a fair evidence to support the recommendation that the condition be specifically considered in a periodic health examination.

C = There is insufficient evidence to recommend for or against the inclusion of the condition in a periodic health examination, but recommendations may be made on other group.

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D = There is a fair evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination.

E = There is a good evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination.

There are a lot of reviews regarding to the evidence for the effectiveness of health examination procedures by several responsible organizations such as American Medical Association, American College of Physician, USPSTF, CTFPHC and WHO. [2,8,9] The main principles are concluded as the following consensus:

1. Health examination in asymptomatic people in the appropriate time is useful in promoting health status.
2. Since adult's age is vary and the risks to develop diseases are difference among age group, socioeconomic status, genetic and other factors, individual health examination should be selective approached.
3. Physicians should integrate health promotion and prevention interventions and deliver to people in every opportunity not only in the health examination period.

Different countries have their own standard for health examination and screening guidelines. For example, the two North American Task Forces tend to view preventive strategies differently in terms of how globally the evidence is assessed. While the CTFPHC examined each maneuver in the context of specific cancers, the USPSTF examined the overall potential benefits for many different clinical outcomes simultaneously, i.e. cancer, cardiovascular, etc.[2] The guidelines also depend on the prevalence of diseases in each country, since even very good tests have poor predictive value positive when applied to low-prevalence populations.[3]

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2.1.5 Health examination in Thailand and standard of health examination for Thai people

A key factor in the implementation of policy guidelines based on the best available evidence is the general structure of the health care delivery system. Many countries with a universal payer system of socialized medicine tend to examine overall benefits of screening and prevention strategies in relation to delivery costs and are generally more restrictive in their acceptance of novel technologies.[2]

Recently, patterns of health examination In Thailand still emphasizes on laboratory investigations following the “already-prepared package”. [8] Most of the physicians still have different attitudes and practices, which generally depend on their background of knowledge in their specialty field. The health examination depends on the socio-economical status of the receivers and their need as well. This leads to an argument among medical societies and the other relevant organizations, especially the government welfare system about essentiality, cost-effectiveness, benefit and harm toward health status of Thai asymptomatic people, including appropriate period for physical examination and procedure to identify the high risk groups.[1]

Therefore, Thai Medical Council, Royal College of Medicine and other relevant Royal Colleges including the Consortium of Medical Specialties Training Institutions of Thailand set up the committees to construct the “Guide to Periodic Health Examination and Maintenance for Thai People”[8] by using evidence-based method for both government and private sectors in providing health examination procedures to Thai people. This project were supported by Health System Research Institute.[7] The principles in developing this guideline are

1. safety of health examination procedures: because health examination receivers are healthy people, safety should be then the most important;
2. effectiveness of the procedures: including sensitivity, specificity, positive and negative predictive value and efficiency of the examinations;

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3. severity of the problems: the health problem should be the burden health problem of Thai people, and early diagnosis can lead to curative or better quality of life.

This guideline graded the power of the recommendations for adoption of a particular health examination procedure according to the following classification.

A = There is a good evidence to support the recommendation that the condition be specifically considered in a periodic health examination.

B = There is a fair evidence as well as the experts' suggestion to support the recommendation that the condition be specifically considered in a periodic health examination.

C = There is insufficient evidence to recommend for or against the inclusion of the condition in a periodic health examination.

D = There is a good or fair evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination.

Though a substantial number of researches support that delivery of clinical preventive and screening services to general population can reduce premature morbidity and mortality, while preserve function and enhance quality of life, but a desired level of clinical preventive service delivering is not always attained.[4,5,17] The compliance of physicians on preventive or screening guideline from several studies shows low percentage of activities provided. They were varying from only 6% asking about the risk of sexually transmitted disease to 63% asking about tobacco and alcohol used.[18] Freedman et al. [19] also found that screening rate among patients according to recommendations of Canadian Task Force on Preventive Health care (CTFPHC) range from 28% of patients screened for hearing impairment to 100% of patients screened for hypertension. Another group of researchers studied about fecal occult blood test (FOBT) and found the appropriate performance only 40%.[20]

Overall appropriate preventive activity especially screening also vary among several studies.[18,19,21] For example, Cowan et al. [22] studied a randomized

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controlled trial about the effect of a fact sheet reminder on performance of the periodic health examination and found that the physicians' compliance in control group performed only 5.8% of indicated periodic health examination actions, even the experimental group still performed only 10.5% of indicated actions. And Coups et al. [23] found that 28.6% of adults from the 1998 National Health Interview Survey in USA who reported having a routine checkup last year being screened for none of following behavioral health risk factors; physical activities, smoking status, alcohol consumption and overweight. Even at least one risk factor was screened for an average only 57.7%.

2.2 Literatures review of theoretical model

An ideal model for clinical preventive care must consider the physician, the patient and the many factors which influence each of them. The conceptual framework for this study is based on the work of Walsh and McPhee [24] which proposes a model to conceptualize the many factors involved in the provision and receipt of clinical preventive care. This *Systems Model of Clinical Preventive Care* (figure1) focuses on the patient-physician interaction and contains components of behavioral, communication, health education and psychosocial theories. It details categories of factors which promote or inhibit completing preventive care activities.

The patient is separately influenced by a set of predisposing factors, enabling factors and reinforcing factors. Similarly, the physician is influenced by a set of predisposing, enabling and reinforcing factors. Independently influencing both the patient and physician are health care delivery system/organizational factors, preventive activity factors and situational factors/cues to action. Barriers to accomplishing the preventive activity can occur at any level of the model. Identifying the components and dynamics of the model can enable us to define more clearly these barriers and overcome them.

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Outcomes of this model are defined as decreased disease incidence (smoking cessation contributes to a reduction in incidence of lung cancer), decreased morbidity (Pap smear screening leads to cervical cancer detection at earlier stages) and decreased mortality (seat belt use leads to fewer motor vehicle accident death). Preventive behavior in this model is any activity or procedure which, when undertaken or completed, has the potential to result in one or more of the desired outcomes.

The patient is influenced by many factors. Predisposing factors are those which involved with the patient's "wanting to," or being motivated to, engage in preventive care such as demographic factors, beliefs, attitudes toward the preventive activity and health promotion, motivation and expectation. Enabling factors are the skills and resources required to perform an action such as knowledge and education about the need for preventive care, physiologic factors, skills (reading), income and logistics (convenience and scheduling). Reinforcing factors are the supports or rewards for engaging in the preventive activity, include social support/approval and inherent reinforcement value of the preventive activity.

The physician is also influenced by predisposing, enabling and reinforcing factors. Physician predisposing factors are socio-demographic characteristics, personal health habits, physician's attitudes and physicians' perception of their own ability (self efficacy). Physician enabling factors are training in prevention, specialty, technical expertise, understanding of the goals of prevention and knowledge of current recommendations and logistics (i.e. time, staff, space and equipment). Physician reinforcing factors are patient satisfaction, communication with colleagues and colleague support and approval.

Health care delivery system factors independently affect both the physician and the patient in the provision of preventive care. They are access to medical care, ready availability of specific preventive services, cost, logistic factors, time restrictions and coordination with community resources. Test and preventive activity factors include efficacy, efficiency, cost effectiveness and actual or potential risks or discomfort.

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Situational and environmental factors (cues to action) may trigger health behavior. The cues may be internal (e.g., symptoms) or external (e.g., reminders to physicians and /or patients).

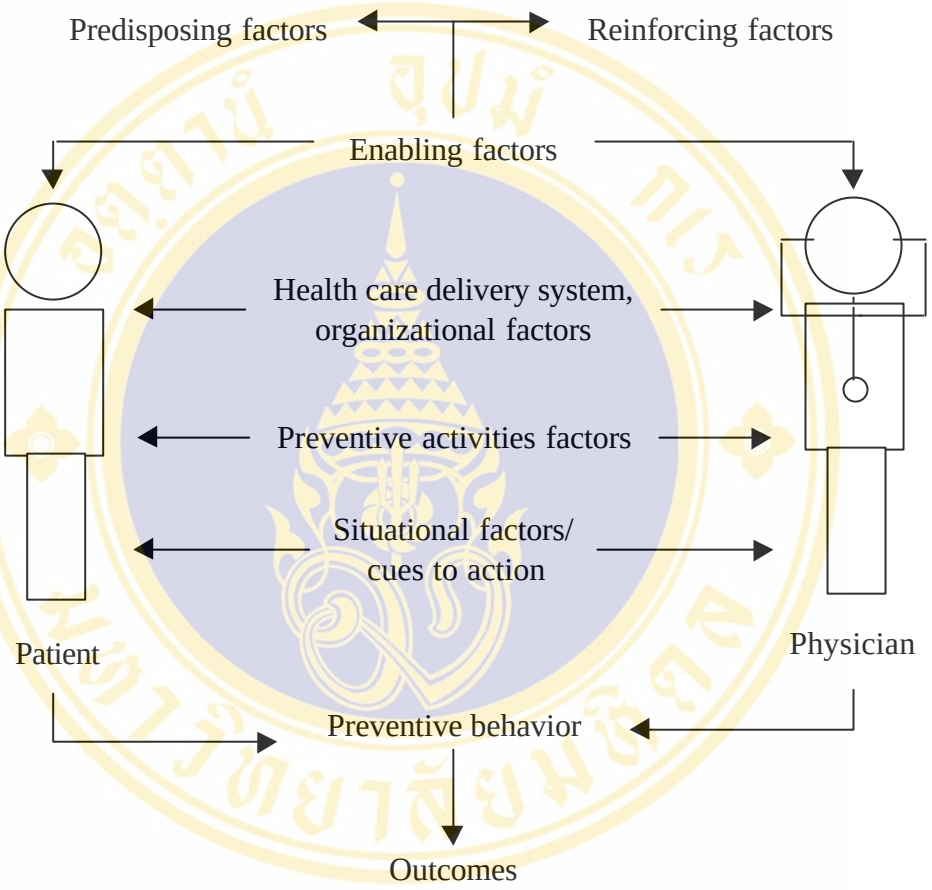

Figure 2 The Systems Model of Clinical Preventive Care

Applying this Systems Model of Clinical Preventive Care in this study, decreasing of disease incidence, morbidity and mortality which were defined as "outcome" of this model could not be measured. Therefore, health examination procedures were considered as "preventive behavior" in this model, since they are activity undertaken for the purpose of preventing disease or detecting disease in an asymptomatic state. Though preventive behavior (health examination) comes from both patient and physician contributions and this model is unique in its focus on the

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patient-physician interaction, only the factors influencing on the physician will be considered in this study. In Thailand public hospital, the physicians' contributions have more role than the patients' contributions. Study about factors influencing on patients can be done separately with longer period of data collection and larger scale of study population since many patients' factors are very differ e.g. individuals' motivation, expectation and physiologic factors.

Since every community hospitals in this study have approximately the same availability and quality of standard health examination services equipments for example CXR, Pap smear, EKG and other laboratory investigation machines, access to medical care factors and test and preventive activity factors were not included to be an independent variable. And up to now, there is no reminder system for either physicians or patients in health examination services, the cues to action were not considered as an independent variable as well.

2.3 Literatures regarding to the independent variables

2.3.1 Age and Gender

Several studies have shown that age and gender of physicians are associated with delivering of preventive health care services including cancer screening such as Lane et al. and McGregor et al. [25,26] found in studying about systems model of clinical preventive care that the compliance to recommendation for cancer screening was higher among physicians who were female and younger. Same as the study of Ely et al. [27] toward the physician characteristics on compliance with adult preventive care guideline which found that compliance with history taking recommendations was independently associated with female physician. Even in the study conducted by Canadian Task Force on the Periodic Health Examination, they reviewed the socio-demographic of physicians as a determinant of implementation of health examination. [9]

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These supported the work of Frank and Kunovich-Frieze [28] in 1995. They reviewed literature about physicians' prevention counseling behaviors and found that age has been demonstrated in a number of studies to be a powerful negative predictor of counseling habits. Younger physicians were specifically more likely to counsel regarding cardiovascular disease prevention, smoking, alcohol consumption and benefits of influenza vaccine. Younger physicians have also been found to agree more with American Cancer Society recommendations for screening Pap smear and to be more likely to appreciate the values of aerobic exercise and the eating of balanced diet.

Frank and Kunovich-Frieze also found substantial evidence that female physicians are more likely to offer mammograms, Pap smears and pelvic examinations. They have also found that even when age and specialty are adjusted for, women are more likely than men to counsel regarding prevention and these differences are most evident in topics that are difficult to discuss such as alcohol and sexual behavior.

2.3.2 Attitude of physicians toward health examination

The systems model of clinical preventive care by Walsh and McPhee [24] in 1992 suggested that attitude and personal health habits may play a role in delivery of clinical preventive service. Frank and Kunovich-Frieze [28] summarized in their literature review in 1995 that attitudes affect preventive counseling practices. Physicians who feel that counseling is important, who feel they are effective in changing patient behaviors and who believe they have a greater knowledge of risk factors are more likely to counsel their patients. But Ely et al. [27] study in 1998 and found that attitudes about preventive care was not the independent factor associated with compliance on history taking recommendations. Delnevo et al. [5] also reported in their study that although the residents had positive attitudes and perceptions toward prevention, their clinical preventive practice fell short of the nation's objectives.

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2.3.3 Working experience and Specialty

Working experience (years since graduation from medical school) and specialty of the physicians also played role as physicians' predisposing factors in providing preventive intervention to the people.[25] Schroy et al. [29] studied about cancer screening in USA in 2002 and found that although both specialist and general practitioners have suboptimal overall compliance with recommended guidelines in colorectal cancer screening but specialists are more likely to implement appropriate screening strategies than general practitioners. These result against the work of Frank and Kunovich-Frieze [28], which stated that one of the most consistent predictors of physician counseling is being a primary care practitioner. They found that the more physicians perceive themselves to be the primary care provider, the more counseling they perform. They also noted that primary care physicians have a greater interest in and a greater likelihood to practice prevention than do other specialists.

2.3.4 Number of patients and level of the hospital

The more amounts of patients resulted in the less time to serve them. Although theoretically physicians should have sufficient time to provide health prevention service to their patients. Inadequate time during a quick out patient visit to address the health examination recommendations can be significant barrier.[17,21] But in the study of Ely et al. [27] argued that lack of time was not the independent factor associated with compliance on history taking recommendations.

The CTFPHC reviewed the organization factors as a determinant of implementation of health examination.[9] Other studies, about preventive service delivery recommended by the USPSTF, stated in the same direction that office characteristics such as availability of technology and personnel, and office practice structure are associated with the delivery of preventive services or an external barrier to guideline adherence.[17,30] And Delnevo et al. [5] concluded that factors related to the office environment were also associated with increased delivery of clinical preventive services.

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2.3.5 Quality development system of the hospital

Quality development system was promoted not only in private hospital but also every government hospital. The first system applied in community hospital was International Standard Management System and Outcome (ISO). Then, Hospital Accreditation (HA) was very accepted. HA trended to be the minimal requirement in the future for every hospital joined Universal Coverage policy. And when health promotion became the theme of new era of primary health care, Health Promoting Hospital (HPH) was developed.

There was a research article, conducted by McMenamin et al. [21] in the year 2004, using the data from the National Study of Physician Organizations and the Management of Chronic Illness of U.S. to document the extent to which physician organizations offer health promotion programs. The analysis found that organizations that report on quality data to outside organizations had higher adjusted odds of offering any health promotion programs.

2.3.6 Health insurance scheme

Health insurance has been shown to be one of the strongest predictors of receiving cancer screening services. For example, Carrasquillo and Pati [31] studied the role of health insurance on Pap smear and found that lack of insurance and a usual source of care are major factors contributing to differentials in Pap smear rate and suggested that the elimination of differentials in insurance coverage alone may result in a substantial narrowing of disparities in cancer screening. And Lane et al. [25] also supported that health insurance is one of the significant reinforcing factors in the model of clinical preventive care in her study about cancer screening in the year 2000. But Roos et al. [32] studied about delivering of preventive care, and his result against that universal free insurance alone does not appear to be enough to counteract the failure to target preventive care toward the least healthy group.

Health examination is a health care service provided by physician to asymptomatic individual people for finding disease or abnormal health status including counseling about appropriate health behaviors. Everyone is recommended

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to receive regular health examination to maintain health status and prolong life. But the existing “routine annual check up” following “already-prepared package” has not enough academic evidence to show the benefit of health promotion. Several countries including Thailand had constructed guideline for health examination for their own people. The compliance of physicians toward these guidelines are vary depend on the measurement procedures.

In this study, A Systems Models of Clinical Preventive Care was used as the theoretical model. Only factors influencing on physicians’ site were considered. Physician predisposing factors are age, sex and attitude toward health examination services. Physician enabling factors are specialty, working experience, knowledge of current recommendation on health examination, level of hospitals and average number of OPD cases per physician. Organizational factor is health insurance scheme of patients. The dependent variable of this study is the appropriation of health examination services according to “Guide to Periodic Health Examination and Maintenance for Thai People”.

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CHAPTER 3
METHODOLOGY

3.1 Study design

Cross sectional study

3.2 Study population

The study population was all physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung provinces, consisted of 60 physicians in Nakornsrithammarat province, 25 physicians in Trang province and 29 physicians in Pattalung province.

Inclusion criteria:

1. The physicians have to work continuously in that hospital for at least 6 month before data collection.
2. The physicians have to provide health examination services for asymptomatic adult people in that hospital.

All physicians in study population who meet the inclusion criteria were recruited in the study.

Response rate:

The overall response rate in these 3 provinces was 81.6%. The highest response rate was in Trang province 88% (22 from 25 physicians), the second was Nakornsrithammarat province 80% (48 from 60 physicians) and the lowest was in Pattalung province 79.3% (23 from 29 physicians).

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3.3 Research instruments for data collection

The anonymous self-administered questionnaires were used to collect the data. The questionnaires consisted of 4 parts, totally 72 questions.

Part I: General information

This part consisted of 10 questions, most of them were closed end, and asked about demographic characteristics of physicians and their hospitals' information such as age, sex, working experience, specialty, number of beds in the hospital, the average OPD cases the physicians served per hour in their community hospitals and the quality system development of the hospital.

Part II: health examination procedures

This part was a series of health examination procedures delivered to the people by asking the physicians how often they or their assistances provide these procedures to their patients; very few or none (<10%) of patients, some (~ 25%), half (~ 50%), most (~ 75%) and almost all or all (>90%). These procedures included asking about smoking status, alcohol consumption, exercise activities, changing in body weight, raw food digestion, family planning, family history of serious disease and cause of death, history of sexually transmitted disease (STD), drug abuse, risk factor of DM, risk factor of atherosclerotic disease, traffic injury prevention, risk factor of TB, early signs and symptoms of common cancer, provide weight measurement, height measurement, calculation of BMI, blood pressure (BP) measurement, urine analysis (U/A), stool examination, pap smear for screening cervical cancer in sexually active women or women age more than 35 years old, diphtheria and tetanus (Td) immunizations, rubella immunization, Ultrasound (U/S) and CT scan, tumor markers measurement, AFP for CA liver, CEA for CA colon, CA 19-9 for CA pancreas, CA-125 for CA ovary, PSA for CA prostate, Chest X-ray (CXR) for screening CA lung and resting EKG in age less than 40 years old.

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The physicians will be asked to answer separately among each type of patients' health insurance scheme.

Part III: Attitude towards health examination services

This part provided the questions about physicians' attitude toward health examination services. There were 12 questions, totally 60 scores. Choices of the answer were strongly agree, agree, uncertain, disagree and strongly disagree. The score were given according to the degree of attitude and categorized as follows:

Scores for negative statements			Scores for positive statements		
Strongly agree	=	1	Strongly agree	=	5
Agree	=	2	Agree	=	4
Uncertain	=	3	Uncertain	=	3
Disagree	=	4	Disagree	=	2
Strongly disagree	=	5	Strongly disagree	=	1

The questions number 1, 2, 3, 4, 8 and 11 of this part were positive attitude questions and the rest were negative attitude questions. The total score less than or equal to average score were categorized as unfavorable attitude and total score more than average score were favorable attitude.

Part IV: Knowledge of current recommendation

This part composed of 19 multiple choices questions asking the physician about how often to provide each health examination procedure to their patient according to the "Guide to Periodic Health Examination and Maintenance for Thai People"[8]. Each question had only one correct answer. The score was given 1 score for correct answer and no score for wrong answer. With total score of 19, physicians' knowledge was categorized to 3 levels. Good knowledge if total score = 16 or more (> 80%), fair knowledge if total score was 12 to 15 (60-80%) and poor knowledge if total score less than or equal to 11 (<60%).

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3.4 Test of validity and reliability

Test of content validity:

The questionnaires were translated to Thai language and sent to 3 experts to examine the correctness, validity, language used and language cleanness. Then the questionnaires were corrected before pretest.

Test of reliability:

The questionnaires were pre-tested for the reliability of the attitude part and knowledge part for 30 cases. The respondents were the physicians in community hospital of Songkla provinces. The internal consistency methods were used, Cronbach's Alpha coefficients and Kuder – Richardson correlation were calculated. The alpha of reliability was 0.637 for the attitude and 0.71 for knowledge.

3.5 Data collection procedure

1. Beforehand, a letter describing the aims and process of this study was sent to these 3 Provincial Health Offices to request permission to access all physicians in every community hospitals for recruitment to this study. After obtaining the permission from Provincial Health Offices, arrangements were made for collecting data.
2. The questionnaires were sent by mail to every community hospitals in these 3 provinces.
3. The questionnaires were covered by covering letters informing the physicians of the study's objective and asking them to participate. The physicians were ensured that confidentiality and anonymity was rigorously respected, and that the provincial offices and other relevant organizations would not know what the physicians filled in.
4. One week after the questionnaires were mailed, every recruited hospital were called to follow up the responsiveness and to answer any question from participants.
5. All questionnaires were cleaned and collected individually at hospital site.

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3.6 Data analysis procedure and statistics used

The MINITAB version-13 statistical program was used for analysis of data. Univariate analysis (mean, standard deviation, frequency and percentage) was used to describe the sample. For bivariate analysis, Chi-square test was used to access the significance association between independent variables and patterns of health examination and also the significance difference among health insurance schemes. And for multivariate analyses, multiple logistic regression was used to identify factors influencing to appropriate health examination service as well.

The percentage of characteristics of physicians, hospitals' characteristics, means age of physician, means of years after graduated (working experience) and mean numbers of OPD cases per physician per hour were calculated. The average percentages of physicians who provide appropriate health examination (provide "level A" health examination procedure to 75% or more of their patients and provide "level D" health examination procedure to 50% or less of their patients) and the percentage of physician who provide these health examination procedures in each type of health insurance scheme were calculated as well.

The chi-square (χ^2) test was used to compare the percentages of appropriate health examination to each type of independent variables. *P*-value smaller than 0.05 was considered as significant association. The factors influencing to appropriated health examination services were evaluated by multiple logistic regression in relation to the following variables; (a) physicians' age sex and attitude; (b) practice related variables (specialty, working experience, knowledge level, average numbers of OPD cases per hour and numbers of beds in their hospital); (c) quality development system of the hospital.

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CHAPTER 4
RESULTS

The purpose of this study was to identify the patterns of health examination services provided by physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces. The study population was all physicians in community hospitals of these 3 provinces who work in that hospital for at least 6 month before data collection and provide health examination services for asymptomatic adult people. The physicians were asked to fill in self-administered questionnaires during January 3, 2005 and January 28, 2005. The results would be presented in the following 4 sections.

Part 1: Characteristics of the physicians and hospitals

Part 2: Proportion of physicians provided appropriate health examination service in each health insurance scheme

Part 3: Association between patterns of health examination service of physicians and characteristics of physicians, hospitals' characteristic and different in patterns of health examination service among patients' health insurance scheme

Part 4: Factors influencing appropriate health examination service

4.1 Characteristics of the physicians and hospitals

4.1.1 Characteristics of the physicians

Table 1 presented the distribution of the respondents (physicians) according to their demographic characteristics, such as age, gender, working experiences, specialty and average number of patient a physician served per hour.

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60.2% of the respondents in these 3 provinces were male physicians (66 physicians). The age of the respondents ranged from 25 to 53 years old with mean age of 30.44 years. 71.1% of them (66 physicians) were younger than or equal to 30 years old. 19 physicians (21.1%) were between 31 to 40 years old. 7 physicians (7.5%) were between 41 to 50 years old. Only 1 physician (1.1%) was older than 50 years old.

Regarding to their working experience, with the range of 2 to 28 years, average duration of graduated was around 6 years. 72% of the respondents (67 physicians) graduated from medical school for less than or equal to 5 years. 2 physicians had working experience 16-20 years and only 5 physicians had more than 20 years experience.

Three fourth of the respondents (71 physicians, 76.3%) had no board certification. For board-certified physicians, majority of them were family physician (11 physicians, 11.8%), two of them had both General Practice and Family Medicine certificates and 3 of them had certificates of both Preventive Medicine and Family Medicine. Other specialists were 2 pediatricians, 1 general surgeon, 1 orthopedist and 1 OB-GYN specialist. There were 5 physicians who got Preventive Medicine certificate and another one had got Master degree in Public Health.

Respondents in this study served the patients range from 5.5 to 30 cases per physician per hour with average at 19.1 cases. Almost half of the respondents (44 physicians, 47.3%) served 16 to 20 cases of patients per physician per hour. Two physicians (2.2%) served less than 5 patients per physician per hour, four physicians (4.3%) served 6 to 10 patients per physician per hour, 22 physicians (22.6%) served 11 to 15 patients per physician per hour and another 21 physicians served more than 20 patients per physician per hour.

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Table 1 Number and percentage of characteristic of the physicians

Characteristics of the physicians	Number (N = 93)	Percentage %
Age group (year old)		
25 - 30	66	71.0
31 - 40	19	20.4
41 - 50	7	7.5
51 - 53	1	1.1
Mean = 30.44 SD = 6.293 Min = 25 Max = 53		
Gender		
male	56	60.2
female	37	39.8
Working experience (year)		
≤ 5	67	72.0
6-10	9	9.7
11-15	10	10.8
16-20	2	2.2
> 20	5	5.4
Mean = 6.03 SD = 5.970 Min = 2 Max = 28		
Specialty		
No Board certificate	71	76.3
General Practice	3	3.2
Family Medicine	7	7.5
General Practice and Family Medicine	1	1.1
Preventive Medicine	2	2.2
Preventive Medicine and Family Medicine	3	3.2
General Surgery	1	1.1
Obstetrics and Gynecology	1	1.1
Pediatrics	2	2.2
Orthopedics	1	1.1
Public Health	1	1.1

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Table 1 Number and percentage of characteristic of the physicians (cont.)

Characteristics of the physicians	Number (N = 93)	Percentage %
Average cases/physician/hour		
≤ 5	2	2.2
6-10	4	4.3
11-15	22	23.7
16-20	44	47.3
>20	21	22.6
Mean = 19.1 SD = 5.117 Min = 5.5 Max = 30		

4.1.2 Attitude and knowledge toward health examination service

Half of the respondents (47 physicians, 50.5%) had favorable attitude toward health examination service. Another half of the respondents (46 physicians, 49.5%) had unfavorable attitude (Table 2).

Table 2 Number and percentage of the respondents classified by level of attitude towards health examination service

Level of Attitude	Number (N = 93)	Percentage %
Favorable attitude (≥39)	47	50.5
Unfavorable attitude (≤ 38)	46	49.5
Mean = 38.8 SD = 3.583 Min = 32 Max = 48		

Note: Number in bracket is the total attitude score

From Table 1 in appendix A, there were two questions of attitude toward health examination service which respondents had positive attitude more than 90%; question number 3 about well-trained nurses can help physicians in providing some health examination procedures (94.6%) and question number 4 about physicians, while

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providing health examination service, should pay more attention on screening for health risk than laboratory investigation (90.3%).

Answers of 19 multiple choices questions asking the physician about how often to provide each health examination procedure to their patient according to “Guide to Periodic Health Examination and Maintenance for Thai People” were analyzed and found that no respondent achieved good knowledge level (80% of total knowledge score). Only 23 physicians (24.7%) had fair knowledge level and three fourth of them (70 physicians, 75.3%) had poor knowledge level (Table 3).

Table 3 Number and percentage of the respondents classified by level of knowledge on health examination service

Level of knowledge	Number (N = 93)	Percentage %
Good knowledge (16 to 19)	0	0.0
Fair knowledge (12-15)	23	24.7
Poor knowledge (0 to 11)	70	75.3
Mean = 8.9 SD = 3.574 Min = 1 Max = 15		

Note: Number in bracket is the total knowledge score

There was one question which more than 90% of the respondents chose correct answer, question number 1 (Table 2 in appendix A) about how often to provide blood pressure measurement to asymptomatic patients (91 physicians, 97.8%). The questions which very few of the respondents chose the correct answer were 1) question number 3 about how often to provide chest X-ray to asymptomatic patients, there were only 3 physicians (3.2%) chose the correct answer; 2) question number 5 about how often to provide urine analysis to asymptomatic patients and question number 9 about how often to measure fasting plasma glucose level in asymptomatic patients age more than 45 years old, each question had only 16 physician (17.2%) who chose the correct answer and 3) question number 15 about how often to provide clinical breast examination to female asymptomatic patient (17 physicians, 18.3%).

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4.1.3 Characteristic of the hospital

More than half of the responded physicians had worked in 30-bed hospital (53 physicians, 57.0%). The second was 60-bed hospital which had 29 physicians (31.2%) and the least was 90-bed hospital which had only 11 physicians (11.8%). There is one 10-bed hospital in Nakornsrithammarat province but the physician who had worked there was not available to answer the questionnaire during period of data collection.

On the subject of quality development system of the hospitals, 68 physicians (73.1%) had worked in hospital with HA system. 35 in 65 had worked in hospitals which had only HA system, 25 had worked in hospital which had both HA and HPH system, 5 had worked in hospital which had both HA and ISO system and 3 had worked in hospital which had all HA, HPH and ISO system.

There were six physicians (6.5%) who had worked in hospital which had only ISO system and only one physician (1.1%) had worked in hospital which had only HPH system. The rest eighteen physicians (19.4%) had worked in hospital which had no quality development system (Table 4).

Table 4 Number and percentage of the respondents classified by characteristics of the hospitals

Hospital characteristics	Number (N = 93)	Percentage %
Number of beds		
30	53	57.0
60	29	31.2
90	11	11.8

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Table 4 Number and percentage of the respondents classified by characteristics of the hospitals(cont.)

Hospital characteristics	Number (N = 93)	Percentage %
Quality development system		
No	18	19.4
ISO	6	6.5
HA	35	37.6
HPH	1	1.1
ISO + HA	5	5.4
HA + HPH	25	26.9
ISO + HA + HPH	3	3.2

Note: ISO = International Standard Management System and Outcome (ISO),
HA = Hospital Accreditation
HPH = Health Promoting Hospital

4.2 Proportion of physicians provided each health examination procedure for each health insurance scheme

4.2.1 Health examination procedure with power of recommendation level A

Table 5 showed the percentage of respondents provided each health examination service procedures with “power of recommendation level A” to most of their patients (detail in Table 3 to Table 6 in Appendix A). The study showed that around 60% of the respondents asked most of their patients about smoking status and alcohol consumption, the percentage of asking among health insurance scheme are approximately similar. Almost half of the respondents asked most of their patients about physical exercise (average 47.9%), risk for DM (average 46.0%) and risk for atherosclerotic disease (average 43.3%), no different among health insurance scheme.

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Considering about changing in weight and early signs and symptoms of common cancer diseases, the respondents asked most of their patients about these risks for average 29.9% and 31.2% respectively, still no different among health insurance scheme. One fourth of the respondents asked most of their patients, without different among health insurance scheme, about history of drug abuse or addiction (average 26.3%) and family history of serious disease (average 24.5%). The result also showed that 17.3% of respondents asked most of their patients about risk for TB infection and only 8.9% of respondents asked most of their patient about risk for traffic-related injury.

Around 10% of the respondents asked most of their patients about family planning and history of STD. The highest proportion was in CSMBS patients (9.7% for family planning and 10.8% for history of STD) and the lowest proportion was in SSS patients (7.6% for family planning and 7.5% for history of STD). Very few of the respondents asked most of their patients about raw food ingestion, the highest proportion belonged to fee for service patients (6.5%). CSMBS and UC patients had the same proportion at 5.4% and only 4.3% of the respondents asked their SSS patients about raw food digestion.

Almost all respondents provided weight and blood pressure measurements to most of their patients (average 97.6% and 98.6% respectively). But for height, only 46.0% of the respondents (51.7 % in CSMBS and equally 44.1% for the other schemes) provided height measurement to most of their patient. One third, average 31.5%, and two third, average 68.3%, of the respondents provided BMI calculation and Urine analysis respectively to most of their patients, highest in CSMBS patients and almost no different among the other schemes. Only 13.5% of the respondents provided stool examination to most of their patients, not much different among health insurance scheme. At the average of 36.9%, 39.8% of the respondents provided Pap test to most of their CSMBS patients, highest among health insurance schemes. The second was fee for service patients, 36.6%, and 35.5% belonged to SSS and UC patients. Regarding to vaccination, both Td and Rubella, only 2.2% of the respondents reported that they provided vaccination to most of their patients.

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Table 5 Percentage of respondents provided health examination procedures with power of recommendation"level A" to most of their patients (75% or more) classified by health insurance scheme

Health examination procedures	Means % of 4 schemes N = 93	Health insurance scheme			
		CSMBS %	SSS %	UC %	FFS %
Asking					
Smoking status	60.8	62.4	60.2	60.3	60.3
Alcohol consumption	60.5	61.3	59.2	60.2	61.3
Physical exercise	47.9	49.5	47.4	47.4	47.3
Change in weight	29.9	31.2	29.1	29	30.1
Raw food digestion	5.4	5.4	4.3	5.4	6.5
Family planning	8.9	9.7	7.6	9.7	8.6
Family history of serious disease	24.5	22.6	24.7	25.8	24.7
History of STD	9.2	10.8	7.5	9.7	8.6
Addiction	26.3	25.8	25.8	27.9	25.8
Risk for DM	46.0	44.1	44.1	48.4	47.4
Risk for atherosclerotic disease	43.3	44.1	42	43	44.1
Risk for traffic-related injury	8.9	8.6	8.6	8.6	9.7
Risk for TB infection	17.3	17.3	16.2	18.3	17.3
Symptoms of common CA	31.2	31.2	29.1	32.3	32.3
Check					
Weight	97.6	97.9	97.8	97.8	96.8
Height	46.0	51.7	44.1	44.1	44.1
Blood pressure	98.6	98.9	98.9	98.9	97.8
Provide					
BMI calculation	31.5	37.7	29.1	29.1	30.2
U/A	68.3	74.2	67.8	65.6	65.6
Stool exam	13.5	14	12.9	12.9	14
Pap test	36.9	39.8	35.5	35.5	36.6
Td vaccine	2.2	2.2	2.2	2.2	2.2
Rubella vaccine	2.2	2.2	2.2	2.2	2.2

Note: Td = Diphtheria and Tetanus vaccine

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4.2.2 Health examination services with power of recommendation level D

In this study, the health examination is appropriate if the physicians or their assistants provided at least 3 of the procedures with “power of recommendation level A” to 75% or more of their patients and provided the procedures with “power of recommendation level D” to not more than 50% of their patients. Table 7 showed the percentage of the respondents provided health examination procedures with “power of recommendation level D” to more than 50% of their patients (Inappropriate).

Table 6 Percentage of respondents provided health examination procedures with power of recommendation “level D” to more than 50% of their patients classified by health insurance scheme (Inappropriate)

Health examination procedures	means % of 4 schemes N = 93	Health insurance scheme			
		CSMBS %	SSS %	UC %	FFS %
CXR	80.1	87.1	79.6	75.2	78.5
Resting EKG in age < 40	26.7	26.9	25.9	25.9	28.0

Note: CXR = Chest X-ray, EKG = Electrocardiogram

The result showed that 80.1% of the respondents provided CXR to more than half of their patients, highest in CSMBS patients 87.1% and lowest in UC patients 75.2%. Around one fourth of the respondents (26.7%) provided EKG to more than half of their patients age younger than 40 years old. The highest proportion was in fee for service patients 28.0% and lowest in SSS and UC patients 25.9%. Concerning tumor markers and U/S or CT scan, all physicians provided them to not more than 50% of their patients (Table 3 to Table 6 in appendix A).

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4.2.3 Proportion of physicians provided appropriate health examination service

Most of the physicians provided at least 3 procedures with recommendation "level A" to 75% or more of their patients, highest in CSMBS patients 95.7% and lowest in Fee for Service patients 90.3% (Table 7). But most of them also provided at least 1 procedure with power of recommendation "level D" to more than half of their patients (Table 8). The highest proportion still was in CSMBS patients (89.3%) but the lowest changed to UC patients (78.5%).

Table 9 showed the proportion of physicians provided appropriate health examination service among each health insurance scheme. The results showed that, when the original criteria were used, only 9.7% of the physicians provided appropriate health examination service to their patients in CSMB scheme. The physicians provided appropriate health examination service highest for their UC patients, 18.3%, and only 15.1% for their social security and fee for service scheme patients.

When CXR were excluded from the original criteria of appropriate health examination service, overall proportion of physicians who provided appropriate health examination service to their patients were raised from 9.7% to 66.7%. Opposite to what had been mentioned, the highest proportion was in CSMBS patients (68.8%), and the others scheme were similarly 66.7%.

Table 7 Number and percentage of physicians provided at least 3 of the procedures with recommendation "level A" to 75% or more of their patients classified by health insurance scheme

Health insurance scheme	Number (N = 93)	Percentage %
CSMBS	89	95.7
SSS	85	91.4
UC	85	91.4
Fee for service	84	90.3

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Table 8 Number and percentage of physicians provided at least 1 procedure with power of recommendation "level D" to more than half of their patients (Inappropriate) classified by health insurance scheme

Health insurance scheme	Number (N = 93)	Percentage %
CSMBS	83	89.3
SSS	76	81.7
UC	73	78.5
Fee for service	76	81.7

Table 9 Proportion of physicians provided appropriate health examination service classified by health insurance scheme

Health insurance scheme	Health examination service			
	Include CXR in criteria		Exclude CXR from criteria	
	Appropriate n (%)	Inappropriate n (%)	Appropriate n (%)	Inappropriate n (%)
CSMBS	9 (9.7)	84 (90.3)	64 (68.8)	29 (31.2)
SSS	14 (15.1)	79 (84.9)	62 (66.7)	31 (33.3)
UC	17 (18.3)	76 (81.7)	62 (66.7)	31 (33.3)
Fee for service	14 (15.1)	79 (84.9)	62 (66.7)	31 (33.3)
Average of 4 schemes	13.5 (14.5)	79.5 (85.5)	62.5 (67.2)	30.5 (32.8)

Note: CSMBS = Civil Servant Medical Benefit Scheme, SSS = Social Security Scheme, UC = Universal Coverage Scheme (30 baht scheme)

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4.3 Association between patterns of health examination service and characteristics of physician, characteristics of hospital and health insurance scheme

For statistical analysis, providing CXR to not more than 50% of the patients was excluded from the original criteria of appropriate health examination service. The CXR – excluded criteria were used in the following analysis.

4.3.1 Physicians' predisposing factors and patterns of health examination service

For statistical analysis, age of physicians was classified into two groups as younger than or equal to 30 years old and older than 30 years old. The results showed that there was a statistical significant association between age of physician and patterns of health examination service (*P*-value = 0.016) (Table 10).

Gender in this study was classified into male and female. The results showed that there was no statistical significant association between gender of the physicians and patterns of health examination service (*P*-value = 0.549) (Table 10).

Attitude towards health examination service of the physicians in this study were classified into 2 groups, favorable attitude if the physicians got total score more than average score and unfavorable attitude if the physicians got total score less than average score. The results showed that there was no statistical significant association between attitude towards health examination service of the physicians and the patterns of health examination service (*P*-value = 0.769) (Table 10).

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Table 10 Association between physicians' predisposing factors and proportion of appropriate health examination service (CXR-excluded)

Physicians' predisposing factors	N = 93 n	Health examination service	
		Appropriate n (%)	Inappropriate n (%)
Age group			
≤30 years old	66	49 (74.2)	17 (25.8)
> 30 years old	27	13 (48.1)	14 (51.9)
	χ^2 = 5.871	df = 1	*P*-value = **0.016***
Gender			
Male	56	36 (64.3)	20 (35.7)
Female	37	26 (70.3)	11 (29.7)
	χ^2 = 0.359	df = 1	*P*-value = 0.549
Attitude towards health examination service			
Favorable	47	32 (68.1)	15 (31.9)
Unfavorable	46	30 (65.2)	16 (34.8)
	χ^2 = 0.086	df = 1	*P*-value = 0.769

Note: * statistical significance at p-value < 0.05

4.3.2 Physicians' enabling factors and patterns of health examination service

For statistical analysis, specialty of the physicians was classified into no board certified physicians and board certified physicians. The results showed that there was no statistical significant association between board certification and patterns of health examination (*P*-value = 0.730) (Table 11).

Working experience of the physicians was classified into 2 groups, for statistical analysis, as less than or equal to 5 years and more than 5 years. The resulted indicated that there was no statistical significant association between working experience of the physicians and patterns of health examination service (*P*-value = 0.253) (Table 11).

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Table 11 Association between physicians' enabling factors and proportion of appropriate health examination service (CXR-excluded)

Physicians' enabling factors	N = 93 n	Health examination service	
		Appropriate n (%)	Inappropriate n (%)
Specialty			
No Board certificate	71	48 (67.6)	23 (32.4)
Board certificate	22	14 (63.6)	8 (36.4)
$\chi^2 = 0.119$		df = 1	*P*-value = 0.730
Working experience			
≤ 5 years	67	47 (70.1)	20 (29.9)
> 5 years	26	15 (57.7)	11 (42.3)
$\chi^2 = 1.308$		df = 1	*P*-value = 0.253
Average OPD cases per physician per hour			
≤ 15 cases	28	23 (82.1)	5 (17.9)
> 15 cases	65	39 (60.0)	26 (40.0)
$\chi^2 = 4.318$		df = 1	**P*-value = **0.038**
Knowledge about health examination service			
Fair knowledge	23	17 (72.7)	6 (26.1)
Poor knowledge	70	45 (64.3)	25 (35.7)
$\chi^2 = 0.722$		df = 1	*P*-value = 0.395
Number of beds of the hospitals			
30 beds	53	34 (64.2)	19 (35.8)
60 beds	29	19 (65.5)	10 (34.5)
90 beds	11	9 (81.8)	2 (18.2)
$\chi^2 = 1.305$		df = 2	*P*-value = 0.521

Note: * statistical significance at p-value < 0.05

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The average OPD case per physician per hour was classified into 2 groups, less than or equal to 15 cases per physician per hour and more than 15 cases per physician per hour for statistical analysis. The results in table 11 indicated that, there was a statistical significant association between average OPD cases a physician served per hour and the patterns of health examination service (*P*-value = 0.038).

Since there was no physician achieved good knowledge level, knowledge about health examination service of the physicians was classified into 2 groups as Fair knowledge and Poor knowledge. The results in table 11 showed that there was no statistical significant association between knowledge about health examination service of the physicians and the patterns of health examination service (*P*-value = 0.395).

Because there was no response from the physician who worked in the only 10 – bed hospital in Nakornsrithammarat province, this study classified number of beds of community hospitals into 3 groups as 30 beds, 60 beds and 90 beds. The results showed that there was no statistical significant association between number of beds of the hospitals and the patterns of health examination service (*P*-value = 0.521) (Table 11).

4.3.3 Physicians' reinforcing factor and patterns of health examination service

For statistical analysis, quality development system of the hospital was classified into 2 groups as hospital with HPH system and hospital without HPH system. The results in table 12 showed that there is no statistical significant association between quality development system of the hospitals and patterns of health examination service (*P* value = 0.205)

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Table 12 Association between physicians' reinforcing factors and proportion of appropriate health examination service (CXR-excluded)

Physicians' reinforcing factor	N = 93 n	Health examination service	
		Appropriate n (%)	Inappropriate n (%)
Quality development system			
Have HPH system	29	22 (75.9)	7 (24.1)
No HPH system	64	40 (62.5)	24 (37.5)
$\chi^2 = 1.603$		df = 1	*P*-value = 0.205

4.3.4 Difference in patterns of health examination service among health insurance scheme

The result also showed that patterns of health examination service was not statistically significant difference among health insurance scheme. *P*-value for CXR – excluded criteria was 0.986 (Table 13).

When patterns of health examination service of physicians was analyzed separately according to different types of patients' health insurance scheme, the factors that statistically significant associated with patterns of health examination service were the same as were analyzed together. Age of the physicians and average OPD cases a physician served per hour were the only two factors which had *P*-value less than 0.05 (Table 14).

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Table 13 Difference in health examination service (CXR-excluded) among health insurance scheme

Health insurance scheme	n	Health examination service	
		Appropriate n (%)	Inappropriate n (%)
CSMBS	93	64 (68.8)	29 (31.2)
SSS	93	62 (66.7)	31 (33.3)
UC	93	62 (66.7)	31 (33.3)
Fee for service	93	62 (66.7)	31 (33.3)
$\chi^2 = 0.146$		df = 3	*P*-value = 0.986

Table 14 Association between predisposing, enabling, reinforcing factors of the physicians and patterns of health examination service classified by health insurance scheme

Factors	*P*-value			
	Health insurance scheme			
	CSMBS	SSS	UC	FFS
Age	***0.024**	***0.015**	***0.015**	***0.015**
Gender	0.806	0.549	0.549	0.549
Attitude towards health examination service	0.878	0.769	0.769	0.769
Specialty	0.941	0.730	0.730	0.730
Working experience	0.345	0.253	0.253	0.253
Average OPD cases per physician per hour	***0.021**	***0.038**	***0.038**	***0.038**
Knowledge about health examination service	0.543	0.395	0.395	0.395
Number of beds of the hospital	0.589	0.521	0.521	0.521
Quality development system	0.554	0.614	0.614	0.614

Note: * statistical significance at p-value < 0.05

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4.4 Factors influencing patterns of health examination service

The factors influencing patterns of health examination service of the physicians could be found by logistic regression models. Multivariate analysis technique as the multiple logistic regression was used. Dependent variable was the appropriateness of health examination service and the other variables were explanatory variables, which were categorical. Independent (explanatory) variables were divided into three groups, according to conceptual framework, and analyzed in three models.

Model One was for the physicians' predisposing factors only, Model Two for both predisposing and enabling factors and Model Three for all predisposing, enabling and reinforcing factors. Since the difference in patterns of health examination service among health insurance scheme (last box in conceptual framework) was a factor about health care delivery system, which affected both physicians and patients' site at the same time. Therefore this variable was excluded from this regression analysis process.

The results in table 15 showed that Model 3 was the best because all physicians' factors and hospitals' factors were controlled and value of -2 Log likelihood was closest to 0. The only factor constantly influencing patterns of health examination service was age of the physicians. Physicians who were younger or equal to 30 years old had 12.6 times higher in providing appropriate health examination service than physicians who were older than 30 years old.

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Table 15 Multiple Logistic Regression Analysis between predisposing, enabling, and reinforcing factors of the physicians and patterns of health examination

Factor	Model 1		Model 2		Model 3	
	b	AdOR	*b*	AdOR	*b*	AdOR
Age ≤ 30 years old (1)	1.158*	3.184* (1.191, 8.510)	2.594*	13.386* (1.255, 142.773)	2.539*	12.665* (1.156, 138.745)
Male (2)	0.025	1.025 (0.391, 2.686)	-0.486	0.615 (0.207, 1.822)	-0.608	0.544 (0.178, 1.668)
Have favorable attitude (3)	0.211	1.235 (0.503, 3.030)	0.119	1.126 (0.429, 2.955)	0.168	1.183 (0.444, 3.150)
Have board certification (4)			1.182	3.262 (0.433, 24.583)	1.176	3.241 (0.423, 24.814)
Have working experience ≤ 5 years (5)			-1.015	0.362 (0.026, 5.097)	-0.929	0.395 (0.029, 5.364)
Served ≤ 15 cases / hour (6)			1.028	2.795 (0.818, 9.553)	1.121	3.069 (0.871, 10.811)
Have fair knowledge (7)			0.528	1.695 (0.507, 5.667)	0.474	1.607 (0.473, 5.462)
Work in 60-bed hospital (8)			-0.922	0.398 (0.072, 2.184)	-1.020	0.360 (0.065, 1.997)
Work in 90-bed hospital (8)			-0.729	0.482 (0.075, 3.108)	-0.831	0.436 (0.068, 2.807)
Have HPH system (9)					0.839	2.314 (0.769, 6.967)
-2 Log likelihood		-112.481		-102.829		-100.459
Significance		0.116		0.077		0.056
df		3		9		10
n		93		93		93

Note: * statistical significance at p-value < 0.05, Ad = Adjusted, *b* = Estimated Coefficient

Number in bracket under the Adjusted OR is 95% CI,

Number in bracket after each factor is the referencing number

1. Age > 30 years, 2. Female, 3. Have unfavorable attitude, 4. No board certification,

5. Have working experience > 5 years, 6. Served > 15 OPD cases per hour,

7. Have poor knowledge, 8. Work in 30-bed hospital, 9. Have no HPH system

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Conclusion

From univariate analysis (Chi-square), the factors associated with patterns of health examination service of the physicians were

1. Age of physician with *P*-value = 0.016
2. Average OPD cases a physician served per hour with *P*-value = 0.038

From multivariate analysis (Multiple Logistic Regression), the factor constantly influencing patterns of health examination service of the physicians was age of physician with Adjusted odds ratio = 12.665.

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CHAPTER 5
DISCUSSION

A System Model of Clinical Preventive Care provides a useful framework for understanding how a variety of factors influence a desired prevention behavior or outcome. This study applied physicians' site of this model to study patterns of health examination service in the population of physicians in community hospitals of Trang, Nakornsrithammarat and Pattalung Provinces.

According to objectives of the study, the following discussion were composed of 4 parts ; 1) study design and methodology, 2) proportion of appropriate health examination services, 3) frequency of physicians provided each health examination services procedure, 4) factors associated with appropriate health examination services

5.1 Study design and methodology

The overall response rate of this study was 81.6%, higher than was obtained in mail surveys of physicians in community hospital of Thailand [33] which was 66.3% for the whole country and 70% when considered only Southern region and of survey of the physicians about cancer screening by McGregor et al [26] in Canada which obtained only 58%. The response rate of more than 80% of the whole probabilistic of physicians made of the presented results a valid indication of the patterns of health examination that physicians in these 3 provinces provided to their patients. High response rate probably due to data collection technique, which was, at 2 weeks after mailing questionnaire, every hospital was called to make appointment with coordinating physicians for data collection.

Limitations of the presented design include cross-sectional nature of the study and self reporting of the patterns of practice. As with most cross-sectional analyses,

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causality and the possibility of unmeasured confounders need to be considered. It may be expected that response bias would be distributed at random and not associated with any particular characteristics so that this potential bias may not impact the findings of the study in relation to factors associated with patterns of health examination service. Although selection bias remained a possibility, respondents did not differ from non-respondent in terms of geographic location of practice, level of hospitals and the policy from the Ministry of Public Health since these 3 province were in the same provincial administration area. A review of physician surveys comparing early vs. late respondents (a proxy for non-respondents) found few differences in demographic factors, suggesting non-respondents bias may be less important in physician surveys compared to surveys of the general public[34].

The self-administered questionnaire used in this study was developed base on data in “Guide to Periodic Health Examination and Maintenance for Thai People” and its content validity was verified by the editor of the guideline. The questionnaire was tried out for reliability of attitude part and knowledge part in physicians of community hospital in Songkla provinces. Coefficients of reliability were 0.637 and 0.71 for attitude part and knowledge part respectively.

5.2 Proportion of appropriate health examination service

In planning for further implementation, an accurate identification of baseline levels of appropriateness in providing health examination services is fundamental to set realistic goals for which progress toward accomplishment can be developed. Accordingly, this study was designed to determine how often physicians of these 3 provinces provide appropriate health examination to their patient and to determine factors associated with patterns of health examination service. Hence, construction of the indicator summarizing frequency and appropriate provision as a whole to be used in the multivariate analysis for identifying factors influencing patterns of health examination service was very important. This study set criteria for appropriate health examination as 1) The physicians or their assistants had to provide at least 3 of the

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procedures with power of recommendation “level A” to 75% or more of their patients and 2) they had to provide procedures with power of recommendation “level D” to not more than half of their patients.

The results from this study found that when the original criteria were used, only 9.7% of the physicians provided appropriate health examination service to their patients in CSMB scheme (highest for their UC patients, 18.3%, and only 15.1% for their social security and fee for service scheme patients, Table 9).

Although more than 90% of the physicians provided at least 3 procedures with power of recommendation “level A” to most of their patients (Table 7), most of them (80 - 90% depend on patients’ health insurance scheme, Table 8) still provided at least one procedure with power of recommendation “level D” to more than half of their patient. Therefore, the proportion of physicians provided appropriate health examination service was very low (around 10%, Table 9). The most common “level D” procedure which physicians almost always provided was CXR (75.2-87.1%). And the second most common was EKG (25.9 -28%).

Therefore, when CXR were excluded from the original criteria of appropriate health examination service, overall proportion of physicians who provided appropriate health examination service was raised from 9.7% to 66.7%. Opposite to what had been mentioned, the highest proportion was in CSMBS patients (68.8%), and the others scheme were similarly 66.7%. (Table 9)

And when both CXR and EKG were excluded from the original criteria of appropriate health examination service, the proportion of appropriateness was raised up to 90.3 to 95.7% (Table 8 in Appendix A) This results showed that over providing CXR and EKG were the weakness point of appropriate health examination service.

This finding contributed to the previous literatures that a desired level of clinical preventive service delivering is not always attained.[4,5,17] and the physicians’ rate of prevention practice fall below recommended level [35, 36]. Several studies

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conducted in Western countries chose some procedures such as Pap smear, screening mammography or Colorectal cancer screening as an indicator of appropriateness health examination. But health problems of Thai people were unique and difference from western countries, basic summarizing indicator for appropriate health examination as a whole was necessary. Using 3 of the “level A” procedures as criteria for appropriateness might not be the best option. Results in Table 7 in Appendix A showed that means number of “level A” procedures the physicians provided to most of their patients was approximately 8.2 procedures.

An initial problem might be due to the fact that physicians might not be aware of, or familiar with the guidelines. Although practice guidelines should improve quality of care, the publication of a set of guidelines by itself did not ensure changes in physician behavior [17]. Multiple barriers can limit physician guideline adherence. Lack of awareness and familiarity is one of the barriers. Even if physicians are aware of the guideline recommendations, there may still be a lack of familiarity with the specific content or details of the guideline. The guideline used in this study was published in the year 2000, four years before data collection. It is possible that younger physicians who had just graduated form medical school might be more familiar with the guideline than older physicians

Lack of agreement with guideline may also lead to non-adherence. Physicians may disagree with the concept of guidelines in general. Even if physicians agree with the concept of guidelines, they may disagree with specific aspects of a particular guideline. The results in this study showed that although half of the respondent physicians had favorable attitude towards health examination, level of their attitude was not so good. With the total attitude score of 60, the maximum score was only 48, and the means of total score was only 38.8 (Table 2).

The results also indicated that the respondents had poor to fair knowledge about health examination service (no respondent had got good knowledge level, Table 3). Especially knowledge about providing CXR to their patients, the result from Table 2 in Appendix A indicated that almost all physicians did not know that CXR should not

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be provided to their asymptomatic health examination patients (only 3.2% of the physicians chose the correct answer). In addition with structure of community hospitals which was not available for the physicians to gain more up-to-date information may lead to gaps in knowledge and insufficient current available evidence. These may lead to disagreement and non-adherence to the guideline as well.

The automatically performance of previous practice due to habit or custom may also be a barrier to guideline adherence. Clinical inertia has been described as the failure of health care provides to initiate or intensify therapy when indicated. Clinical inertia is associated with preventive care, because such disorders (hypertension or diabetes) have no overt symptoms at first [37]. Beaulieu MD et al.[38] used focus group method to study about practice guidelines for clinical prevention and suggested that physicians reported difficulties in explaining to their patients the recommendations of the Canadian Task Force on Preventive Health Care, which they found complex and inconsistent with popular wisdom. They also found that both patients and physicians attributed high value to the detection of insidious diseases, even in the absence of proof of the effectiveness of such activity.

Physicians may also have difficulty changing well-established routines, despite appropriate awareness and familiarity with guidelines. In addition, organizational or environmental constraints beyond a physician's control are external barrier to the guideline adherence. Even if a physician is aware of the guideline and overcomes the barriers previously mentioned, external barriers from patients, practice organizations and other forces may limit their effective performance. A physician in these 3 provinces had to serve in average almost 20 OPD patients per hour (Table 1). Even though average OPD cases the physicians served per hour was not an influencing factor of patterns of health examination service of the physicians. Completing health examination service within 3 minutes length is unachievable.

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5.3 Frequency of physicians provided each health examination services procedure

Blood pressure and weight measurement are the only two health examination procedures in which almost all physicians in these 3 provinces provided to most of their asymptomatic patients (98.6% and 97.6% respectively)(Table 5). Compare to the results form the study of Lopez-de-Munain J et al.[18] which reported that 63.6% of their respondent physicians provided blood pressure measurement to most of their patients and only 41.9% performed weight monitoring. This sounded like almost all physicians in these 3 provinces concerned about health risk especially overweight and high blood pressure status. Indeed, these two procedures might not be given by physicians themselves but screening nurses routinely provided for all patients, not only for health examination purpose.

This explanation was supported by the result from attitude part which indicated that 94.6% of the physicians strongly agree that well-trained nurses can help physicians in providing some health examination procedures (Table 3 in Appendix A). Moreover, if the physicians' intention was screening for obesity, weight and height measurement should be performed together to calculate BMI. But proportions of physicians provided height measurement and performed BMI calculation were much lower (46% for height measurement and 31.5% for BMI calculation and in general, height measurement are not routinely performed by screening nurses without physicians' special requirement). However, this finding suggested that in case of having not enough physicians, promoting well-trained nurses or paramedic could improve quality of health examination service.

The actual proportion of physician concerned about health risk, especially risk for chronic disease such as DM, HT and Cardiovascular disease, could be observed from the frequency of physician asking about physical exercise, risk for DM and risk for atherosclerotic disease which was around 46-48%. This proportion was relatively low compare to the burden of these problems. Incidence rate of DM in Thailand was 4-6% [39]. DM is a chronic disease, which causes both short term and long term

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complications to the patients. Long term complication of DM leads to abnormal of small blood vessels and end up with diabetic retinopathy and diabetic nephropathy. Chronic renal failure is the last outcome, which causes both patients and government waste large amount of resources. Screening for risk factors of DM such as asking about family history of DM, checking for obesity and high blood pressure will be helpful to select high-risk patient for further laboratory investigation.

Cardiovascular disease, one of the most common causes of death in Thailand [40], is another big public health problem. Asking about risk factor for atherosclerotic disease, such as family history of stroke and lack of physical exercise, is the first step of primary prevention method to reduce mortality rate and complication of cardiovascular disease.

Health examination period is an excellent opportunity for physicians to discuss about these risks factors with the patients, even in asymptomatic. Since the patients who come to hospital for health examination might experience some events that cause them feel uncertainty about their health such as illness of their family members, friends, colleagues, or received some information from any media about health and want to be healthy. They were open, ready and willing to discuss any health topic with their physicians. Physicians should catch this great chance to explore their health risks and reduce them.

Approximately 60% of the physicians in this study asked most of their asymptomatic patients about smoking status and alcohol consumption and around one fourth of them asked about drug addiction (Table 5). Many studies used these procedures as criteria for appropriate preventive care. The proportions of asking vary from 68.5 - 85% for smoking status, 64.2 - 98% for alcohol consumption and around 20% for addiction or substance abuse [18, 21]. Given that smoking and alcohol related deaths are quite high in Thailand, systematically identifying all smokers and alcohol abuser and strongly advising all of them to quit is of utmost importance. The lower proportion of physicians in this study compare to previous reports may reflect limitation in knowledge about how to counsel their patients to quit smoking or

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reducing alcohol use of the physicians. Time available was another key problem. The physicians might feel worthlessness if they found smoker or drinker but have no time to counsel them. To overcome these problems, counseling unit and well-trained counseling nurses, which had already existed in every hospital, should be considered.

Around 30% of the physicians asked most of their patients about symptoms of common cancer. Cancer is the third common cause of death for Thai people with not less than 60,000 new cases a year [40]. The guideline used in this study recommended physicians to screen 8 alarming symptoms of common cancer which are 1) chronic change in digestion and defecation, 2) abnormal bleeding, 3) chronic unhealed wound, 4) having abnormal mass or lump, 5) color-changing or growing nevus, 6) chronic cough or hoarseness, 7) unintentional weight loss and 8) chronic tinnitus. However, questionnaire used in this study did not separately asked for each cancer symptom. Therefore, this proportion of physicians represented as a whole picture only. As mentioned above, people come for health examination might have some uncertainty in health or fear of something. Fear of suffering from cancer is one of the most common reasons the people come for health examination. Physicians can increase their patients' satisfaction by explore this feeling and ask for early symptoms of cancer for reassuring.

According to the guideline, there were only three laboratory investigations, which were recommended to provide to the patient, Urine analysis (U/A), Stool exam and Pap test. Two third of the physicians provided U/A to most of their patients but only 13.5% of physicians ordered stool exam. For stool exam, unlike the other screening, it involves a two-step process, which requires a second appointment for collection of specimen while other laboratory investigations, even blood test, patients were more convenient for specimen collection. These make stool exam vulnerable to lack of either physician recommendation or patient follow through.

Only 36.9% of the physicians in this study provide Pap test to most of their patients, highest in CSMBS patient 39.8% and lowest in UC and Social Security scheme patients, 35.5%. While Lopez-de-Munain J et al. reported 44.5% of their

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respondent physicians provide Pap test to most of their patients. Despite unlike others, Pap smear is the only cancer screening method, which had enough evidence support that can reduce mortality rate of cancer [8].

Incidence rate of cervical cancer in Thailand was 23.4 per 100,000 (5,000 – 6,000 new cases a year), but number of death from cervical cancer in the year 2000 was only 324 cases, equal to 1.1 per 100,000 female population. This data indicated that cervical cancer has high incidence rate but low mortality rate. Because of having good screening method (Pelvic Examination and Pap test), physicians can detect this cancer earlier and lead to higher curative treatment rate. Countries with higher rate of Pap smear had lower mortality rate of cervical cancer. For example British Columbia which had Pap test covering rate more than 85% of target population, could reduce mortality rate of cervical cancer up to 72% while Denmark could cover only 40% of their target population, could reduce mortality rate of cervical cancer only 25%.

Relatively low proportion of physician provided Pap test may be due to the fact that every district had promoted cervical cancer screening in their area by empowering public health officers or nurses at PCU or health centers to do Pap test by themselves instead of refer to hospital. Therefore a portion of target population had already received Pap test before come for general health examination. Another facility to provide Pap test was menopausal clinic, which had already existed in every hospital. Menopausal clinic will provide Pelvic examination and Pap test to every case at least once a year and sometimes also provide other health examination procedure as well. This study did not include health examination service in special clinic like menopausal clinic in the inclusion criteria. Further study in this area might be helpful to measure exact rate of providing Pap test to the target patients.

Providing vaccination to the patients during health examination seemed impossible. Only 2.2% of the physicians reported that they provide Td and Rubella vaccine to most of their patient during health examination. These results contributed with the previous report of Delnevo et al.[5] that in internal medicine resident enrolled

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in their study, verifying and updating patients' immunization status (i.e., tetanus booster and rubella serology) occurred infrequently.

For tetanus toxoid, it was possible that most of the patients had already received tetanus toxoid when injured or when getting pregnancy and have anti natal care (ANC). Since general interval for booster dose of tetanus toxoid is 10 years and booster dose is not recommended within 5 year after last dose. Although some physicians might assume that their patients can receive passive immunization when wounded, primary prevention and booster immunization is recommended since it can reduce rate of providing human tetanus immune globulin or equine antitoxin which is more complicated and expensive.

For rubella vaccination, since the guideline recommended that the target group for rubella vaccine was sexual-active women only and additionally, before giving rubella vaccine, physicians have to confirm that their female patients were not getting pregnancy and will not get pregnant for 3 more months after vaccinated. Therefore, low rate of vaccination was not surprising.

CXR and resting EKG were the only two "level D" procedures the physicians provided to 75% or more of their patients. Although some physicians still ordered U/S or tumor marker measurement but nobody provided to more than half of their patients. It was not unexpected that proportion of physician provided CXR was quite high, average 80.1% and highest in CSMBS patients 87.1% (Table 6).

CXR was routinely performed in health examination service for decades. It was on the top of the list of health examination procedure that all CSMBS people can reimburse from the government [8]. But nowadays, every institute did not recommend using CXR to be screening method for Tuberculosis or lung cancer. Even in high-risk group [41-43] WHO had set criteria of suspicious TB cases as 1) have chronic fever 2) chronic cough more than 3 weeks and 3) hemoptysis or unexplained weight loss. Then the suspicious cases should receive sputum examination and CXR further. For screening method, WHO recommended to do only in high-risk group by using

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standard method, tuberculin test. In case of positive tuberculin test, the suspicious case should received sputum examination and CXR later. Furthermore, to diagnose TB in general population, only 1 in 100 cases that CXR result was compatible with TB infection. If performed in high-risk group, abnormal CXR was found up to 3 in 100 cases. Another problem in using CXR for TB screening was effectiveness in interpretation CXR results. Sensitivity to diagnose TB from CXR in community hospital was only 48% with specificity of 71% [8].

Though using CXR for screening for lung cancer was simple, painless, convenient and not expensive. However, accuracy and sensitivity of the test were quite low. CXR could detect lung cancer only when tumor size was larger than 1 centimeter. Moreover, to find one case of lung cancer, performing CXR to 259 smoking people were needed [8]. However, despite of many evidences did not recommend providing CXR in health examination service, as mentioned above, lack of knowledge and inertia of previous practice due to habit or custom may also be barriers to guideline adherence.

5.4 Factors associated with appropriate health examination services

5.4.1 Physicians' predisposing factors

Age

The only physicians' predisposing factor, which had statistical significant association with patterns of health examination service, was age of physician. Age of physician also the only influencing factors to patterns of health examination service when the other factors were controlled in multivariate analyses (Multiple Logistic Regression method). Physicians age less than or equal to 30 years old were three times more likely to provide appropriate health examination service to most of their patients.

In fact, age had been demonstrated in a number of studies to be powerful negative predictor for counseling habits and providing preventive care. Lane DS et al.

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[25] found that younger physicians performed more cancer screening according to the recommendation more then the older. McGregor et al.[26] reported that those who recommended screening to most of their patients were more likely to be younger. And Frank and Kunovich-Frieze [28] had reviewed many literatures and supported that younger physician would be more likely than older physicians to counsel patients regarding prevention.

The guideline used in this study was published and distributed in the year 2000. It is possible that younger physicians had more familiarity with this guideline since they had just graduated and still firm with the evidence based practice concept. They might have more intention to continue their medical education since most of them trended to enter resident training program for some specialty certification.

Gender

Gender of physician in this study had no statistical significant association with patterns of health examination service, P-value = 0.549. Even when gender was cross-tabulated with Pap test (Table 9 in Appendix A), there was still no statistical significance association between gender of the physician and appropriateness in providing Pap test. Although the proportion of female physician in this study (male: female = 1.5: 1) was much lower than what they were in medical school (male: female = 1: 1.1), this finding was against studies' results of Frank and Kunovich-Frieze[28] which reported that female physicians were more avid preventionists than male. Because, in setting of community hospital in Thailand, either male or female physicians served large amount of patients. They had no different in service pattern. However, it was observed that female physicians trended to provide more Pap test to most of their patients than male physicians, especially in CSMBS patients (*P*-value = 0.064). This observation can be applied to improve appropriateness of health examination service by organize female patients to have health examination service with female physicians (if available).

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Attitude

It was not surprising that attitude of the physicians toward health examination service was not associated with patterns of health examination service (*P*-value = 0.769). Although many researchers such as Delnevo CD et al. [5], Lopez-De-Munain et al.[18] and Frank and Kunovich-Frieze[28] indicated that favorable attitude towards preventive care was strongly associated with a greater preventive activity, there was one study stated that positive attitude about preventive care was not independently associated with compliance of physician in counseling recommendation. The total attitude score of respondents in this study was not high and condensed around means plus/minus standard deviation. Therefore, statistical analyses by using means as cut point might not be the best method. The Cronbach's Alpha coefficients of reliability of questionnaire for attitude part, which was lower than 0.7 also suggested that, the attitude part of this questionnaire, must be considered as the weak point for this study.

5.4.2 Physicians' enabling factors

Specialist

Three fourth of the physicians in this study were generalist (71 physicians, 76.3% had no board certification). For specialist, majority of them were Family physician (11 physicians) and Preventive Medicine specialist (5 physicians). This finding was almost similar to demographic characteristic of physicians in community hospital reported in the study of Phuthasen P [33] that 73.4% of them had no board certification. However, Specialty of the physicians in this study had no association with patterns of health examination service (*P*-value = 0.730). This topic had never been studied in Thailand before. Hence, comparison would be done with results from western countries.

Many studies reported that specialty of the physicians had significant association with preventive care activity such as Lopez-De-Munain et al.[18] found that internal medicine was the only specialty significant associated with a better preventive practice and suggested that programs to encourage specialists in family medicine to perform more preventive services should be developed, Delnevo CD et al.

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[5] and Frank and Kunovich-Frieze [28] reported that primary care physician, especially generalist, have a greater likelihood to practice prevention than do other specialists. While some studies against that no significant difference was found among board certified physician and family practitioner in providing screening method. In Thailand, Phuthasen P [33] found that most of the physicians in community hospitals (91.5%) practice as general practitioner, only 8.5% practiced as specialist. This supported the fact that, in context of community hospital, board-certified and no board certified physicians were not difference in patterns of practice.

Working experience

Regarding working experience of the physicians, even though proportion of physician who had graduated from medical school equal to or less than 5 years was 72% (almost equal to proportion of physician age equal to or less than 30 years old, 71%), surprisingly, there was no association between working experience and the patterns of health examination service (*P*-value = 0.253). Usually, medical students in Thailand graduated from medical school at the age of 24, after working as internist in provincial hospital for 1 year they were routinely placed in community hospital. Therefore, age of physician and their working experience should be related. The only explanation was there were some physicians who started their medical school training late, and this group of physician became confounder of the result.

Average OPD case

Average OPD case a physician served per hour was the only enabling factor which had statistical significant association with patterns of health examination service (*P*-value = 0.038), although after other variables were controlled by multiple logistic regression method, it was not the influencing factor. This finding supported report of McMenamin SB et al. [22], which stated that one major barrier, is the limited time physicians have to deliver all of the recommended preventive services to patients. Frank and Kunovich-Frieze [28] also found from their work that as many as 70% of physicians cite a lack of time as a disincentive to counsel their patients. This result enhanced the major problem in providing health care in community hospital

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that physician- patient ratio was not suitable and some strategies to improve health care quality have to be developed.

Knowledge

No physician in this study achieved good knowledge level from the questionnaire (total knowledge score more than 80%). Only 24.7% had fair knowledge level, the rest got poor level. Knowledge about health examination of physician was not associated with patterns of health examination service they provided to their patients (*P*-value = 0.395). This results against what Ely JW et Al. [27] and Frank and Kunovich-Frieze[28] reported that knowledge was independently associated with counseling activities. Since the contexts of physicians were different, both reports studied in family medicine and internal medicine resident during training programs. Their knowledge might have more affect to their practice pattern. The percentage of physician who chose the correct answer (Table 2 in Appendix A) also hinted that there were many physicians who still believed that some "level D" procedures were useful such as tumor marker level measurement (i.e., CEA, CA 19-9, CA 125, PSA, AFP) and Ultrasound.

Level of the hospital

Number of bed was used to categorize level of hospital in this study. Since number of bed indicated facilities of hospital and amount of health care resources the hospital received. Although after Universal Coverage policy was implemented, some health care resources were distributed according to number of patients in each catchments area. But the already-existed resources could not be moved. The distribution of hospital in these 3 provinces represented the whole picture of Thailand, which had more 30-bed hospital.

The result that number of beds of the hospital had no association with patterns of health examination service (*P*-value = 0.521) was explainable. Although McMenamin et al. [21] and Carpiano RM et al. [30] found that organizational size was significantly and positively associated with an increase in number of health promotion programs offered to the patients. In Thailand, Every community hospital had the same problem,

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they had not enough physicians, every physician (including specialist) had to work as general practitioner, they had to serve as primary care or secondary care level and they had high physician turn over rate. The most important thing was every hospital had equivalent potential in providing health examination service. They had equivalent availability of technology and personnel. All “level A” procedure could be performed in even 30-bed hospital. And even 90-bed hospital could not provided tumor marker measurement, the patients had to be referred to provincial hospital only.

5.4.3 Physicians’ reinforcing factors

Quality development system of the hospital

Health examination was both primary prevention and secondary prevention. Because health examination could screen for early diagnosis treatable disease (secondary prevention), and during health examination, physician could counsel their patients to modify some health risk to prevent disease occurrence (primary prevention). Both steps aimed to promote health for patient. Concept of health examination allied with Health Promoting Hospital System (HPH), which encourage hospital to provide more health promotion. Therefore, in this study, HPH was considered more than the other two systems.

There was 29% of the respondent physician worked in hospitals which passed HPH criteria. Almost half of them (46%) worked in hospital with other quality development system. And the rest (18%) worked in hospital without any quality development system. Although there was a study of McMenamin et al.[21] stated that organizational characteristic such as reporting on quality data to outside organizations and receiving public recognition for quality scores were associated with offering more health promotion program, this study was conducted in the U.S. which had different context from Thailand. Therefore, the finding that hospital with HPH system was not statistical associated with patterns of health examination service (*P*-value = 0.205) was acceptable. And regarding previous discussion, it is shown that individual factors had more affect on patterns of providing health examination of the physician than organizational factors.

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5.4.4 Health insurance scheme of the patient

Since criteria for appropriate health examination service in this study were set for evaluate whole performance of the physician. When patterns of health examination service was analyzed separately according to different types of patients' health insurance scheme, the factors that statistically significant associated with patterns of health examination service were the same as were analyzed together. And the result also showed that patterns of health examination service was not statistically significant difference among health insurance scheme (*P*-value = 0.986).

Although 84% of the physician agree or strongly agree that people with different payment system should receive the same health examination procedure (Table 16 in Appendix A), in fact, there were some discrepancies among health insurance scheme when physicians performed each health examination procedure. The obvious one in "level A" procedures was U/A. 74.2% of the physician performed U/A to most of their CSMBS patients while only 65.6% performed to their UC and Fee for Service patients. Another noticeable one was Pap test, 39.8% of the physician provide Pap test to most of their CSMBS patients while only 35.5% in UC and SSS patients. The widest gap was in performing CXR. Up to 87.1% of physician provided CXR to most of their CSMBS patients, while only 75.2% provided to their UC patients.

It was noticed that all wide-gap procedures (U/A, Pap test, and CXR) were laboratory investigation and performed to CSMBS patient the most. This finding was probably due to reimbursement system of CSMBS patient. Though, physicians did not report discrepancy among health insurance scheme in performing tumor marker measurement. But in practical, when CSMBS patient come for health examination, they might receive more laboratory investigations, especially "level B and C" procedures such as Fasting Blood Sugar and Cholesterol level.

This observation was consistent with the study of Carrasquillo and Pati [31] ,which found that lack of insurance and a usual source of care are major factors contributing to differentials in Pap smear rate and suggested that the elimination of

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differentials in insurance coverage alone may result in a substantial narrowing of disparities in cancer screening. Another study [25] also supported that health insurance is one of the significant reinforcing factors of the patient in her study about cancer screening.

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CHAPTER 6
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Health examination is a health care service provided by physician to asymptomatic individual people for finding disease or abnormal health status including counseling about appropriate health behaviors. “Guide to Periodic Health Examination and Maintenance for Thai People” was constructed for physicians to improve their quality of providing health examination. But study about compliance of physicians toward these guidelines had never been conducted. The purpose of this study was to identify the patterns of health examination services provided by physicians in community hospitals of Nakornsrithammarat, Trang and Pattalung Provinces. The better understanding about patterns of health examination services will help for implementation of promoting program to increase physicians’ compliance on the national health examination services recommendation.

6.1.1 Methodology

This cross-sectional study used the anonymous self-administered questionnaire to collect data during January 3, and January 28 2005. The total population was 114 physicians, 93 of them responded to the questionnaire (response rate 81.6%). The questionnaire was tried out for reliability of attitude part and knowledge part in physicians of community hospital in Songkla provinces. Cronbach’s Alpha coefficients of reliability were 0.637 and 0.71 for attitude part and knowledge part respectively.

Univariate analysis (mean, standard deviation, frequency and percentage) was used to describe the obtained data. Chi-square test was used to access the significance association between each factor and patterns of health examination and also the significance difference among health insurance schemes. The independent factors influencing to appropriate health examination services were evaluated again by multiple logistic regression.

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6.1.2 Results

Majority of the respondent physicians were male (60.2%), age ranged from 25 to 53 years old. With mean age of 30.4 years old, around 70% of them were younger than or equal to 30 years old. 72% of them had working experience less than or equal to 5 years (means = 6 years, ranged from 2 to 28 years). Three fourth of them had no board certification and for board certified physicians, half of them were Family Physician. In average, respondents in this study served the OPD patients 19.1 cases per hour.

Regarding to attitude and knowledge about health examination service, only half of the physician had favorable attitude, another half were unfavorable. Nobody got good knowledge level, one fourth of them had fair knowledge and the rest were in poor level. The question which almost all physicians chose wrong answer was about how often to provide chest X-ray to asymptomatic people.

Concerning hospital characteristic, 57% of the respondent worked in 30-bed hospital and 30% worked in 60-bed hospital. They also reported that around 30% of them worked in Health Promoting Hospital (HPH) and more than 70% of them worked in hospital with HA system.

In relation to proportion of physicians provided each “level A” health examination procedure to most of their patients, around 60% of them asked about smoking status and alcohol consumption. Less than half of them asked about physical exercise, risk for DM, and risk for atherosclerotic disease, around 30% asked about changing in weight and early symptoms of common cancer. And very few of them (less than 10%) asked about history of STD, family planning, raw food digestion and risks for traffic injury.

Almost all physicians provided weight and blood pressure measurement to most of their patients. But they provided only 46% for height measurement and 31.5% for BMI calculation. Although around 70% of them provided U/A to most of their

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patients, the proportion of providing Pap test was only 37%. The lowest rate of providing was stool examination (13.5%) and Td vaccine (only 2.2%)

CXR and EKG were the only two “level D” procedures that the physicians provide to more than half of their patients (Inappropriate). Up to 80% of the physicians reported that they provided CXR to most of their patient and around 25% for EKG.

The proportion of physicians provided appropriate health examination service when the original criteria were used was only 9.7% (lowest in CSMBS patients). But when CXR was excluded, the proportion of appropriateness was raised up to 66.7%. In both original and new criteria, there was no difference in proportion of providing appropriate health examination among health insurance scheme.

Among 3 physicians’ predisposing factors (age, gender and attitude), age of the physician was the only factor that had statistical significant association with patterns of health examination service (*P*-value = 0.016). And among 5 physicians’ enabling factors (specialty, working experience, average OPD case a physician served per hour, knowledge about health examination service and number of beds of the hospital), the only factor that statistical significant associated with patterns of health examination service was average OPD case a physician served per hour (*P*-value = 0.038). There was no association between physicians’ reinforcing factor, quality development system of the hospital, and patterns of health examination service (*P*-value = 0.205).

There was no statistical significant difference between type of health insurance scheme and patterns of health examination service. And when patterns of health examination service was analyzed separately according to different types of patients’ health insurance scheme, the factors that consistently statistical significant associated with patterns of health examination still were only age of physician (*P*-value = 0.015 – 0.024) and average OPD case a physician served per day (*P*-value = 0.021 – 0.038).

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When all independent variable were put in model of multiple logistic regression, the only factor constantly influencing patterns of health examination service was age of physician. The result indicated that physicians who were younger than or equal to 30 years old had 12.6 times higher providing appropriate health examination service than physicians who were older than 30 years old.

6.2 Recommendations

6.2.1 Recommendations for implementation

From the finding in the study, the following points of recommendations could be beneficial for the further implementation regarding appropriateness of health examination service.

1. Regarding to the low proportion of physician providing appropriate health examination service

a) Increase distribution of guideline and traditional continuing medical education (CME), especially CME that focuses on specific guideline recommendations (such as CXR, EKG, vaccination), may improve their knowledge level.

b) Arranging a training program for screening nurses or paramedics to help physicians in providing some health examination service procedure such as asking for health risk, weight-height-blood pressure measurement, BMI calculation and Visual Acuity (V/A) measurement and also counseling technique to reduce patients' health risk are important.

c) Motivation strategies that utilize audit and feedback such as chart review by academic committee or peer review by the physician themselves may increase awareness and appropriateness of practice pattern. But technique to convince them and let them decide by themselves has to be considered as well.

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d) Implement at organization level may be more influential and effective than addressing at physician level. Since high turnover rate of the physicians, any implementation program on physician possibly will not sustainable. Reminder system such as fact sheet or check list for health examination patient to fill in when they are waiting for their physicians may very useful. The presence of recommended health examination services on the fact sheet serves as “cues” for both patients and physicians. The fact sheet should consist of at least 3 parts. Part I for patient to fill in by themselves, ask about their health status and health risks such as current and past illness, current medication, drug or food allergy, smoking status, alcohol consumption, raw food digestion, risk for STD, risk for some chronic diseases (i.e., Diabetes, Hypertension, cardiovascular disease), risk for family history of some important diseases (i.e., coronary heart disease, Diabetes, Hypertension, cancer), early symptom of common cancer, etc. Part II for screening nurses to fill in some health examination procedures that they can provide to patients such as weight, height, BMI calculation, BP and V/A. And Part III for physicians to summarize their patients’ health risks evaluation and necessary laboratory investigation.

The benefits of this fact sheet not only for more convenient and more appropriate performance of physicians but also for patient themselves to recognize their own health risk and prepared themselves for discussion with their physicians. Hospital can use this fact sheet as a component of OPD card for comparison and long term evaluation as well.

e) Patients-directed interventions may also be a means to improve physician guideline awareness and adherence. Public health education such as public lectures in schools or temple and public education via mass media, especially about financial loss from over investigation in unnecessary procedures during health examination service, may increase patient awareness and lead to more compliance of physicians on standard guideline.

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f) Organize a seminar to discuss about health examination service problem and find out the solution for the problem. Physicians in community hospital, screening nurses, health examination expert and community representatives should be asked to join the seminar.

2. Regarding to age of physician, which is not only significant associated with but also the only influencing factors of the appropriateness in patterns of health examination service. A training program, especially for physician age more than 30 years, aiming to re-orientate and up date their knowledge about health examination service is recommended. The program should contain new knowledge in the recommendation and some common pitfalls such as no health risk assessment did not provide vaccination, providing CXR to asymptomatic people, providing resting EKG to low risk and asymptomatic people age less than 40 years old or providing tumor marker measurement.

3. Regarding to the significant association between average case a physician serve per hour and the appropriate patterns of health examination service

a) Promoting Primary Health Care service at Health Center or Primary Care Unit (PCU) can reduce number of patients come to community hospital.

b) Organize special clinic at community hospital such as clinic for Diabetes, Hypertension and separate general OPD cases from special clinic cases may reduce overloading of cases at general OPD. Special clinic for health examination patients might be helpful as well.

c) Constantly emphasizing on health promotion and prevention service can reduce number of OPD case in long term. Since people will know how to prevent themselves from diseases and know how to cope with their simple diseases (i.e., common cold, low back pain) correctly by themselves instead of go to see health personals.

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4. Regarding to very poor knowledge of the physician about health examination services in some issues such as CXR, Urine analysis and clinical breast examination, a training program or CME specifically in these particular issues may useful. Reminder systems for physicians emphasizing on these procedures also helpful.

6.2.2 Recommendations for policy maker

1. Ministry of Public Health (MOPH) should properly promote health examination to all level of health care service. The same health examination package for every health insurance schemes which is practical and based on standard evidence-based guideline should be developed. Finally, a “comprehensive” health examination service system should be created to improve the provision of appropriate health examination service.

2. Medical school should develop a training program about health examination since undergraduate period since most of the new-graduated physicians will be positioned in community hospitals in which updating knowledge during working there is too late and quite difficult.

3. Colleges of medical specialty especially in the field of primary care such as family medicine, preventive medicine or even internal medicine should set a standard of training centers or hospitals for resident training. Hence, future physicians, especially primary care physicians, should be trained in settings with good health examination service system and should be exposed to positive role models to rise up their attitude towards health examination.

4. Provincial Public Health Offices should develop and implement some reminder systems to every hospital in the province to improve provision of appropriate health examination service.

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6.2.3 Recommendations for future study

1. This study based on the practice of physician in community hospital only. Future study should cover higher hospital level such as provincial hospital and medical school hospital, since they have higher technology and much more patients willing to go there for health examination.

2. Since context of providing health examination service in other regions may differ from these three provinces, generalization of the results from this study is limited. Future study in other regions or as the whole country level is interesting.

3. The standard guideline used in this study may be changed in the future when more publications have been released. The criteria of appropriateness have to be modified according to the new guideline as well.

4. The obtained data in this study relied completely on physician self-reporting of practice pattern. If future study is conducted in hospital with better data collecting system, the role of “chart review” as secondary data is interesting.

5. Future efforts should be designed to explore all other variables that may affect patterns of health examination in both physicians’ and patients’ site of System Model of Clinical Preventive Care especially personal health habits, self efficacy, patient satisfaction and patients’ expectation.

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APPENDIX

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APPENDIX A

SUPPORTING DATA

Table 1 Number and percentage distribution of respondents by attitude towards health examination service classified by detailed attitude score

Statements	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
	n (%)	n (%)	n (%)	n (%)	n (%)
1. Health examination is an important part of health service system to promote quality of life	36 (38.7)	45 (48.4)	8 (8.6)	4 (4.3)	0 (0)
2. Health examination should be provided to every adult from the age of 20 years old for at least once a year.	14 (15.1)	39 (41.9)	18 (19.4)	19 (20.4)	3 (3.2)
3. Well-trained nurses can help physicians in providing some health examination procedures	32 (34.4)	56 (60.2)	3 (3.2)	1 (1.1)	1 (1.1)
4. While providing health examination service, physicians should pay more attention on screening for health risk than laboratory investigation	37 (39.8)	47 (50.5)	7 (7.5)	2 (2.2)	0 (0)
5. Physician should provide not only history taking and physical examination but also laboratory investigations in health examination service.	18 (19.4)	53 (57.0)	18 (19.4)	4 (4.3)	0 (0)
6. If possible and no budgeting constrain, we should provide screening test to early diagnose all detectable diseases.	19 (20.4)	24 (25.8)	20 (21.5)	24 (25.8)	6 (6.5)

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Table 1 Number and percentage distribution of respondents by attitude towards health examination service classified by detailed attitude score (cont.)

Statements	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
	n (%)	n (%)	n (%)	n (%)	n (%)
7. To upgrade your hospital, you should provide package of health examination for the people.	14 (15.1)	32 (34.4)	27 (29.0)	15 (16.1)	5 (5.4)
8. Annual health examination for Civil Servant Medical Benefit Scheme patients nowadays consumes time and budget more than benefit gained.	6 (6.5)	10 (10.8)	19 (20.4)	48 (51.6)	10 (10.8)
9. Screening for health risks without laboratory investigation leads to dissatisfaction of the patients.	19 (20.4)	48 (51.6)	22 (23.7)	4 (4.3)	0 (0)
10. For the highest benefit of Civil Servant Medical Benefit Scheme patients, they should receive all of the health examination in the government's list.	5 (5.4)	29 (31.2)	22 (23.7)	33 (35.5)	4 (4.3)
11. People with different payment system should receive the same health examination procedure.	34 (36.6)	44 (47.3)	8 (8.6)	4 (4.3)	3 (3.2)
12. Promoting health examination to public causes physicians more burden.	4 (4.3)	21 (22.6)	16 (17.2)	39 (41.9)	13 (14.0)

Note: * = positive statement

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Table 2 Number and percentage distribution of respondents by the correct answer based on knowledge about health examination service

Knowledge items	n	%
How often to provide the following health examination procedures to asymptomatic patients		
Blood pressure measurement in age < 35 years old	91	97.8
Resting EKG checking in age < 40 years old	33	35.5
CXR	3	3.2
Thyroid function test	68	73.1
Urine analysis	16	17.2
Td vaccine	56	60.2
PSA level measurement	49	52.7
Total cholesterol level in age < 35 years old	24	25.8
Fasting plasma glucose level in age > 45 years old	16	17.2
AFP level measurement	47	50.5
Hemoglobin typing	78	83.9
Digital Rectal Examination in age > 40 years old	35	37.6
CEA level measurement	51	54.8
CA 19-9 level measurement	54	58.1
Clinical Breast Exam in age > 40 years old	17	18.3
CA 125 level measurement	55	59.1
V/A in age > 40 years old	51	54.8
Ultrasound intra pelvic region	51	54.8
Stool occult blood test in age > 40 years old	62	66.7

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Table 3 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic CSMBS patients

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Asking					
Smoking status	8.6	9.7	19.4	35.5	26.9
Alcohol consumption	7.5	11.8	19.4	36.6	24.7
Physical exercise	8.6	15.1	26.9	32.3	17.2
Change in weight	18.3	32.3	18.3	22.6	8.6
Raw food digestion	49.5	28.0	17.2	4.3	1.1
Family planning	32.3	36.6	21.5	6.5	3.2
Family history of serious disease	29.0	28.0	20.4	10.8	11.8
History of STD	30.1	31.2	28.0	4.3	6.5
Addiction	28.0	22.6	23.7	17.2	8.6
Risk for DM	14.0	17.2	24.7	22.6	21.5
Risk for atherosclerotic disease	15.1	16.1	24.7	21.5	22.6
Risk for traffic-related injury	49.5	30.1	11.8	5.4	3.2
Risk for TB infection	26.9	30.1	25.8	10.8	6.5
Symptoms of CA	17.2	29.0	22.6	21.5	9.7
Check					
Weight	2.2	0	0	2.2	95.7
Height	21.5	14.0	12.9	6.5	45.2
Blood pressure	1.1	0	0	3.2	95.7
Provide					
BMI calculation	20.4	22.6	19.4	6.5	31.2
U/A	4.3	7.5	14.0	12.9	61.3
Stool exam	46.2	28.0	11.8	4.3	9.7
Pap test	11.8	20.4	28.0	25.8	14.0
Td vaccine	78.5	14.0	5.4	1.1	1.1
Rubella vaccine	82.8	11.8	3.2	1.1	1.1

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Table 3 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic CSMBS patients (cont.)

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Provide					
U/S or CT scan	88.2	9.7	2.2	0	0
AFP	94.6	2.2	3.2	0	0
CEA	96.8	2.2	1.1	0	0
CA 19-9	96.8	2.2	1.1	0	0
CA 125	96.8	2.2	1.1	0	0
PSA	93.5	5.4	1.1	0	0
CXR for screening CA lung	1.1	4.3	7.5	30.1	57.0
Resting EKG in age < 40	23.7	32.3	17.2	11.8	15.1

Table 4 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic SSS patients

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Asking					
Smoking status	9.7	11.8	18.3	33.3	26.9
Alcohol consumption	8.6	12.9	19.4	35.5	23.7
Physical exercise	11.8	15.1	25.8	32.3	15.1
Change in weight	17.2	32.3	21.5	22.6	6.5
Raw food digestion	50.5	26.9	18.3	3.2	1.1
Family planning	31.2	37.6	23.7	5.4	2.2
Family history of serious disease	29.0	29.0	17.2	11.8	12.9
History of STD	29.0	32.3	31.2	3.2	4.3

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Table 4 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic SSS patients (cont.)

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Asking					
Addiction	28.0	19.4	26.9	18.3	7.5
Risk for DM	15.1	15.1	25.8	20.4	23.7
Risk for atherosclerotic disease	16.1	15.1	26.9	19.4	22.6
Risk for traffic-related injury	48.4	31.2	11.8	5.4	3.2
Risk for TB infection	25.8	30.1	28.0	9.7	6.5
Symptoms of CA	17.2	28.0	25.8	19.4	9.7
Check					
Weight	2.2	0	0	3.2	94.6
Height	24.7	14.0	17.2	5.4	38.7
Blood pressure	1.1	0	0	4.3	94.6
Provide					
BMI calculation	23.7	26.9	20.4	5.4	23.7
U/A	5.4	10.8	16.1	9.7	58.1
Stool exam	48.4	26.9	11.8	4.3	8.6
Pap test	14.0	20.4	30.1	21.5	14.0
Td vaccine	78.5	14.0	5.4	1.1	1.1
Rubella vaccine	82.8	11.8	3.2	1.1	1.1
U/S or CT scan	88.2	9.7	2.2	0	0
AFP	94.6	2.2	3.2	0	0
CEA	96.8	2.2	1.1	0	0
CA 19-9	96.8	2.2	1.1	0	0
CA 125	96.8	2.2	1.1	0	0
PSA	93.5	5.4	1.1	0	0
CXR for screening CA lung	3.2	6.5	10.8	31.2	48.4
Resting EKG in age < 40	28.0	30.1	16.1	10.8	15.1

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Table 5 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic universal coverage scheme patients

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Asking					
Smoking status	9.7	8.6	21.5	32.3	28.0
Alcohol consumption	8.6	11.8	19.4	34.4	25.8
Physical exercise	9.7	16.1	26.9	32.3	15.1
Change in weight	17.2	32.3	21.5	21.5	7.5
Raw food digestion	48.4	29.0	17.2	4.3	1.1
Family planning	30.1	36.6	23.7	6.5	3.2
Family history of serious disease	29.0	26.9	18.3	12.9	12.9
History of STD	29.0	30.1	31.2	5.4	4.3
Addiction	25.8	19.4	26.9	20.4	7.5
Risk for DM	14.0	16.1	21.5	24.7	23.7
Risk for atherosclerotic disease	16.1	15.1	25.8	20.4	22.6
Risk for traffic-related injury	48.4	30.1	12.9	4.3	4.3
Risk for TB infection	25.8	30.1	25.8	11.8	6.5
Symptoms of CA	17.2	28.0	22.6	22.6	9.7
Check					
Weight	2.2	0	0	3.2	94.6
Height	26.9	16.1	12.9	5.4	38.7
Blood pressure	1.1	0	0	4.3	94.6
Provide					
BMI calculation	25.8	30.1	15.1	6.5	22.6
U/A	7.5	9.7	17.2	8.6	57.0
Stool exam	49.5	26.9	10.8	4.3	8.6
Pap test	12.9	22.6	29.0	21.5	14.0
Td vaccine	78.5	14.0	5.4	1.1	1.1
Rubella vaccine	82.8	11.8	3.2	1.1	1.1

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Table 5 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic universal coverage scheme patients (cont.)

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Provide					
U/S or CT scan	88.2	9.7	2.2	0	0
AFP	94.6	2.2	3.2	0	0
CEA	96.8	2.2	1.1	0	0
CA 19-9	96.8	2.2	1.1	0	0
CA 125	96.8	2.2	1.1	0	0
PSA	93.5	5.4	1.1	0	0
CXR for screening CA lung	4.3	8.6	11.8	29.0	46.2
Resting EKG in age < 40	30.1	29.0	15.1	10.8	15.1

Table 6 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic fee for service patients

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Asking					
Smoking status	9.7	10.8	19.4	32.3	28.0
Alcohol consumption	8.6	11.8	18.3	35.5	25.8
Physical exercise	11.8	15.1	25.8	29.0	18.3
Change in weight	17.2	33.3	19.4	21.5	8.6
Raw food digestion	48.4	29.0	16.1	5.4	1.1
Family planning	30.1	38.7	22.6	5.4	3.2
Family history of serious disease	29.0	26.9	19.4	11.8	12.9
History of STD	30.1	29.0	32.3	4.3	4.3

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Table 6 Percentage of physicians providing each health examination procedure classified by frequency of providing services for asymptomatic fee for service patients (cont.)

Health examination procedures	Proportion of physician (%)				
	Frequency of providing services				
	Very few (<10%)	Some (25%)	Half (50%)	Most (75%)	Almost all (90%)
Asking					
Addiction	25.8	22.6	25.8	18.3	7.5
Risk for DM	14.0	16.1	22.6	23.7	23.7
Risk for atherosclerotic disease	16.1	14.0	25.8	21.5	22.6
Risk for traffic-related injury	48.4	29.0	12.9	6.5	3.2
Risk for TB infection	25.8	29.0	28.0	10.8	6.5
Symptoms of CA	16.1	28.0	23.7	22.6	9.7
Check					
Weight	3.2	0	0	2.2	94.6
Height	24.7	16.1	15.1	5.4	38.7
Blood pressure	1.1	1.1	0	4.3	93.5
Provide					
BMI calculation	23.7	30.1	16.1	6.5	23.7
U/A	6.5	10.8	17.2	8.6	57.0
Stool exam	46.2	29.0	10.8	4.3	9.7
Pap test	12.9	19.4	31.2	21.5	15.1
Td vaccine	78.5	14.0	5.4	1.1	1.1
Rubella vaccine	81.7	12.9	3.2	1.1	1.1
U/S or CT scan	88.2	9.7	2.2	0	0
AFP	94.6	2.2	3.2	0	0
CEA	96.8	2.2	1.1	0	0
CA 19-9	96.8	2.2	1.1	0	0
CA 125	96.8	2.2	1.1	0	0
PSA	93.5	5.4	1.1	0	0
CXR for screening CA lung	4.3	4.3	12.9	28.0	50.5
Resting EKG in age < 40	25.8	33.3	12.9	12.9	15.1

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Table 7 Average number of "level A" procedures the physicians provided classified by each health insurance scheme

Health insurance scheme	Average number of "level A" procedures the physicians provided to most of their patients	SD	Range
CSMBS	8.4	4.1	0-20
SSS	8.0	4.1	0-19
UC	8.1	4.1	0-20
Fee for Service	8.1	4.2	0-21
Average of 4 scheme = 8.2 procedures			

Table 8 Proportion of physicians provided appropriate health examination service classified by health insurance scheme when both CXR and EKG were excluded from the original criteria

Health insurance scheme	Health examination service			
	Original criteria		Exclude CXR and EKG from criteria	
	Appropriate n (%)	Inappropriate n (%)	Appropriate n (%)	Inappropriate n (%)
CSMBS	9 (9.7)	84 (90.3)	89 (95.7)	4 (4.3)
SSS	14 (15.1)	79 (84.9)	85 (91.4)	8 (8.6)
UC	17 (18.3)	76 (81.7)	85 (91.4)	8 (8.6)
Fee for service	14 (15.1)	79 (84.9)	84 (90.3)	9 (9.7)

Note: CSMBS = Civil Servant Medical Benefit Scheme, SSS = Social Security Scheme, UC = Universal Coverage Scheme (30 baht scheme)

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Table 9 Association between gender of physician and providing Pap test to 75% or more of their patient, classified by each health insurance scheme.

Health insurance scheme	N = 93 n	Provided Pap test to 75% or more of their patients (Appropriate) n (%)	Provided Pap test to not more than half of their patients (Inappropriate) n (%)
CSMBS			
Male physicians	56	18 (32.1)	38 (67.9)
Female physicians	37	19 (51.4)	18 (48.6)
	$\chi^2 = 3.431$	df = 1	*P*-value = 0.064
SSS			
Male physicians	56	18 (32.1)	38 (67.9)
Female physicians	37	15 (40.5)	22 (59.5)
	$\chi^2 = 0.686$	df = 1	*P*-value = 0.407
UC			
Male physicians	56	17 (30.4)	39 (69.6)
Female physicians	37	16 (43.2)	21 (56.8)
	$\chi^2 = 1.616$	df = 1	*P*-value = 0.204
FFS			
Male physicians	56	17 (30.4)	39 (69.6)
Female physicians	37	17 (46.0)	20 (54.0)
	$\chi^2 = 2.334$	df = 1	*P*-value = 0.127

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APPENDIX B
QUESTIONNAIRES

PATTERNS OF HEALTH EXAMINATION SERVICES
PROVIDED BY PHYSICIANS IN COMMUNITY HOSPITALS
OF NAKORNSRITHAMMARAT, TRANG AND PATTALUNG
PROVINCES

This questionnaire is prepared for thesis writing for Master of Primary Health Care Management course (M.P.H.M.) at the ASEAN Institute for Health Development, Mahidol University. This study intends to achieve better understanding about patterns of health examination provided by the physicians in community hospital.

Please answer every question by yourself and **do not** write your name on the questionnaire. Your answer will be kept completely confidential and not exposed to any other purpose.

Thank you for your participation.

Dr. Kraisorn Tohtubtiang.
M.P.H.M. student
ASEAN Institute for Health Development,
Mahidol University

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Part I General Information

1. Year of birth. .....

2. Gender ☐ Female
☐ Male

3. Year of graduated from medical school. .....

4. How long did you work in this hospital? ..... year .....month

5. Have you got any board certification or diploma of the following course?
(You can answer more than 1, if no please skip to question 6)
☐ General Practice
☐ Family Medicine
☐ Internal Medicine
☐ Surgery
☐ Obstetrics-gynecology
☐ Preventive Medicine
☐ Master of Public Health (M.P.H.)
☐ Other (Please specify).....

6. Do you provide health examination service?
☐ Yes
☐ No

7. How many hour you work at General OPD per day (in average)?
..... hour/day

8. How many OPD cases you served in an hour at General OPD?
.....cases/hour

9. What size is your hospital?
☐ 10 beds ☐ 30 beds
☐ 60 beds ☐ 90 beds

10. What kind of quality development system your hospital used?
☐ ISO
☐ HA (Hospital Accreditation)
☐ HPH (Health Promoting Hospital)

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Part II Health examination procedures

In the past year, how often you perform these following health examination procedures to your asymptomatic adult (age > 20) patients, in each type of patients' health insurance scheme?

1 = perform to very few or none of your patient (< 10%)

2 = perform to some of your patient (~ 25%)

3 = perform to half of your patient (~ 50%)

4 = perform to most of your patient (~ 75%)

5 = perform to almost all or all of your patient (>90%)

***** Not include compulsory health examination required by relevant organization such as health examination before being employed or for driving licenses.

****** = If the screening nurses did these procedures for you, please check as you did it by yourself.

Procedures	**Health insurance scheme**																				
	CSMBS					**SSS**					**UC**					**Fee for Service**				
Ask about																					
Smoking status	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Alcohol consumption	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Exercise	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Change in body weight	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Raw food ingestion	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Family planning	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Serious disease and cause of death in family member	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Risk for STD	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Drugs abuse	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

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In the past year, how often you perform these following health examination procedures to your asymptomatic adult (age > 20) patients, in each type of patients' health insurance scheme?

1 = perform to very few or none of your patient (< 10%)

2 = perform to some of your patient (~ 25%)

3 = perform to half of your patient (~ 50%)

4 = perform to most of your patient (~ 75%)

5 = perform to almost all or all of your patient (> 90%)

***** Not include compulsory health examination required by relevant organization such as health examination before being employed or for driving licenses.

****** = If the screening nurses did these procedures for you, please check as you did it by yourself.

Procedures	**Health insurance scheme**																				
	CSMBS					**SSS**					**UC**					**Fee for Service**				
Asking																					
Risk for DM (i.e., delivered > 4,000 g baby or family history of DM)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Risk for atherosclerotic disease (i.e., family history of Ischemic Heart Disease or stroke)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Traffic safety (safety helmet, seat belt or not drive when consumed alcohol)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Risk for TB infection (close contact with TB patient > 25 hours per week)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
warning sign of common cancer (i.e., abnormal bleeding, unintended weight loss, chronic wound, mass or lump)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

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Procedures	Health insurance scheme																				
	CSMBS					SSS					UC					Fee for Service				
Weight measurement	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Height measurement	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
BMI calculation	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
BP measurement	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
U/A	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Stool exam	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Pap test	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
dT vaccine (diphtheria, tetanus)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Rubella vaccine	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Ultrasound or CT scan	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
AFP (for screening CA liver)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CEA (for screening CA colon)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CA 19-9 (for screening CA pancreas)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CA 125 (for screening CA ovary)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
PSA (for screening CA prostate)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CXR for screening CA lung, TB	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
EKG in age < 40 years old	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

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Part III Attitude toward health examination services

Do you agree with these following statements about health examination?

Please check in the box.

Statements	strongly agree	agree	Un-certain	disagree	strongly disagree
1. Health examination is an important part of health service system to promote quality of life					
2. Health examination should be provided to every adult from the age of 20 years old for at least once a year.					
3. Well-trained nurses can help physicians in providing some health examination procedures					
4. While providing health examination service, physicians should pay more attention on screening for health risk than laboratory investigation					
5. Physician should provide not only history taking and physical examination but also laboratory investigations in health examination service.					
6. If possible and no budgeting constrain, we should provide screening test to early diagnose all detectable diseases.					

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Part III Attitude toward health examination services (Cont.)

Do you agree with these following statements about health examination?

Please check in the box.

Statements	strongly agree	agree	Un-certain	disagree	strongly disagree
7. To upgrade your hospital, you should provide package of health examination for the people.					
8. Annual health examination for Civil Servant Medical Benefit Scheme patients nowadays consumes time and budget more than benefit gained.					
9. Screening for health risks without laboratory investigation leads to dissatisfaction of the patients.					
10. For the highest benefit of Civil Servant Medical Benefit Scheme patients, they should receive all of the health examination in the government's list.					
11. People with different payment system should receive the same health examination procedure.					
12. Promoting health examination to public causes physicians more burden.					

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Part IV: Opinion regarding health examination service

In your opinion, how often should we provide these following health examination procedures to asymptomatic adults?

Please check in the box.

Health examination procedure	Every year	Every 3-5 years	Every 10 years	Should not provide
Blood pressure measurement in age < 35 years old				
Resting EKG checking in age < 40 years old				
CXR				
Thyroid function test				
Urine analysis				
Td vaccine				
PSA level measurement				
Total cholesterol level in age < 35 years old				
Fasting plasma glucose level in age > 45 years old				
AFP level measurement				
Hemoglobin typing				
Digital Rectal Examination in age > 40 years old				
CEA level measurement				
CA 19-9 level measurement				
Clinical Breast Exam in age > 40 years old				
CA 125 level measurement				
V/A in age > 40 years old				
Ultrasound intra pelvic region				
Stool occult blood test in age > 40 years old				

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BIOGRAPHY

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