CHAPTER II

REVIEW OF THE RELATED LITERATURE

Description of Epidemiologic reporting in Thailand

Health Center is public health service office at tambon level, which has long been developed. It provides integrated primary public health services, advises public health volunteers to carry on their works and assists people in developing community public health. Health Center is a linkage between community and public health services. It is established closely to community and handle by competent personnel's who are able to do many jobs. Health Center has distinct responsible area and headed by Chief of Health Center. It is a center under the District Public Health office. The study on "Decade for Health Center Development project, 1996" found that 9,010 Health Centers were increased in tambon which no hospital had been established. percentage of the increased Health Centers are 100 of total tambons (7,255 tambons) Average staff in each center are 3.08 persons and average population to be responsible are 4,419 people per center.(Wibunponprasert,1996)

Functions of Health Center are as follow: (Ministry of Public Health, 1996)

1. Administration work i.e. Document management and correspondent and general service, finance, and account, procurement and vehicle, planning monitoring and evaluation, improvement, reporting information center, co-ordination and public relations, Tambon Advisory committee, District public

Health Co-ordinations Committee and Project on "Service System Development of Service Center and Regional Public Health office"

2. Service works i.e. Treatment, mobile public health service, health education, school sanitation, medical supplies, dental public health, mental health, family, planning maternal and child care, nutrition, sanitation and environmental health, contagious disease control, epidemiologic surveillance and health assurance card.

3. Technical work, training and supervising i.e. analyzing and technical data formulation, training for public health students, volunteers and people, dissemination technical information.

4. Primary health care and rural development promotion. I.e. Primary health care promotion, self-reliant village project promotion, campaign for good quality of life promotion through basic minimum need, community organization promotion and rural development co- ordination.

5. Other assigned tasks.

Epidemiologic Information System

Information on epidemiologic can be got from epidemiologic surveillance network system which is systematic and continual surveillance. At present public health problem condition is changeable, and any diseases can occur in general and throughout the year. Epidemiologic Division is the responsible agency at central level. It serves as a coordinating center with involved agencies on public health service nationwide. Provincial Public Health Office is the main responsible agency at provincial level; it is responsible for public health offices at lower level and submits

report on surveillance diseases to Epidemiologic Division.

Structure of Epidemiologic Surveillance Organization at Tambon Level

At tambon level, Health Center is a focal point in receiving data on disease occurrence in responsible villages. Such data are: data on disease occurrence from report form in relation to the patients who received treatment from health centers, news on local epidemic, specific diseases e.g. diarrhea or any disease which can be prevented by vaccination e.c. After receiving those data, the health officer has to examine, consolidate and analyze whether the occurrence of disease is abnormal. It abnormality occurs, data investigation has to be undertaken to find out real evidence of it in order to correctly judge health condition of the community and report to involved upper level office for information. The center also undertakes proper control and prevention of such the distribution of disease.
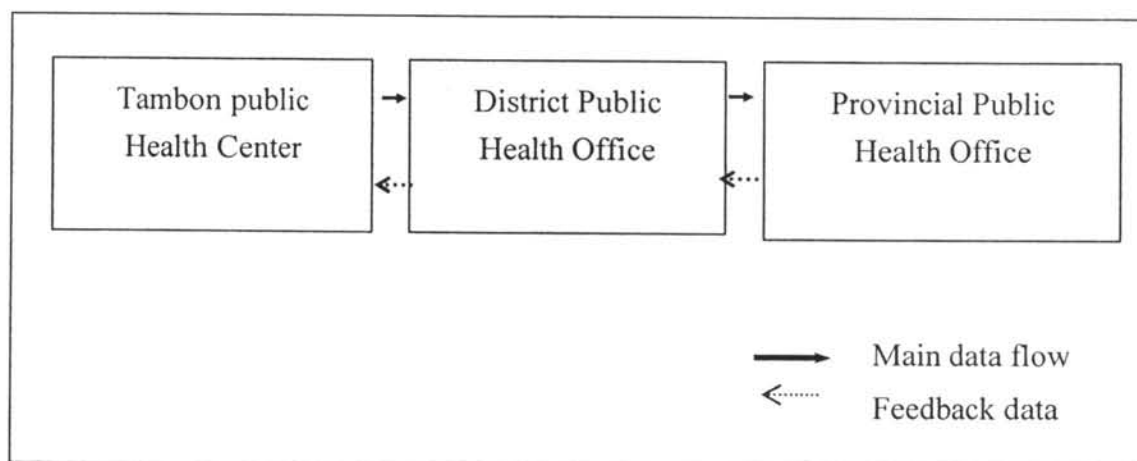

Figure 2: Diagram of Patient Referral and Health Data Flow

Public health information system (Bunthai, 1991)

Definition of Public Health Information and Related Words

1. Data: Data means facts or details of things which may be figures or matters related with something which may be used in the next step or may be used as a reference for something. It data are figures of a situation in a period of time and systematically recorded they will be statistics on that matter. In addition data can also mean news or information which is tact's from processing procedures which can be used for decision making.

2. Information: Information means data from statistic processes, which are meaningful and can be useful for users at each level. Having information on any matter leads to decreasing in uncertainty of that matter. It enables decision-maker to understand such situation better. Thus useful and valuable data for users must be information from correct and up to date data through accurately analytical process.

3. Health Information Data: Health Information Data means medical data and public health which show problems and situations on personal and community health as well as potential of government and non-government organizations on management, service provision and performance on health care. These data will be useful for administrators or involved people for effective planning, policy setting and monitoring the implementation relevant community and social need.

The information and data of public health, which is directly essential for public health affair and that can explain the public health problems are divided into 4 types as, follow (Ministry of Public Health, 1990)

1. The information and data of health status such as the data of living statistics for example birth rate, death rate and illness rate.

2. The information and data of public health such as the number of personnel, various kinds of public health, material and office hardware, land and constructions including the budget from financial resources.

3. The information and data of public health activities such as the data treatment, disease prevention, disease control and health promotion.

4. The information and data of Socioeconomic Status such as the data of geographic condition, social conditions, incomes, occupations, education, tradition and culture.

Epidemiologic Surveillance (World Health Organization)

The World Health Organization defines the meaning of epidemiologic surveillance as follows: "Surveillance is the continuous scrutiny of the factors that determine the occurrence and distribution of diseases and other condition of ill health. Surveillance is essential for effective control and prevention and includes the collection, analysis, interpretation and distribution of relevant data for action" Epidemiologic surveillance is another important activity in epidemiologic which helps us to know the level of local disease and symptoms of it through effective surveillance. If any abnormal condition occurs, it can be immediately found and controlled.

Epidemiologic Surveillance is defined as to follow to observe to and inspect the characteristic of the changing of the occurrence and the spread of the disease. To inspect the events or the problems about public health including the factors that result

in those changing continuously with systematic procedure of which the collection, the edition, the canalization and the interoperation have been done. Then the information and data will be spread to the utilizes in order to set the plan, to designate the commitment policy and to assess the measure of disease control and prevention effectively.

Objectives of Epidemiologic Surveillance in Thailand. (Ministry of Public Health, 1992)

1. To rapidly know the occurrence of disease.

2. To know other condition of disease. (e.g., symptoms, spread, trends)

3. To know the risk groups and factors of disease

The Benefits of Epidemiologic Surveillance in Thailand.

1. Searching for all disease problems or the spread at the disease of the immediate time.

2. Knowing the situation and the characteristic of the disease occurrence or the range of the problems in the community.

3. Knowing the changing of the tendency of disease occurrence.

4. Putting the importance of the public health problems in sequence.

5. Being the fundamental data for the planning of public health affairs.

6. Being the guideline for appropriate disease control.

7. Using for the assessment of the projects.

8. Identify and investigating the contamination in the environment.

9. Being the guideline for the treatment.

Steps in Implementation of Thailand are reporting system.

1. Collection: In this step data were collected and compare with other data to find out the differences, question involved people to find out more details, examine and record the data for evidence and report to information Center.

2. Analysis: All data were processed by statistic method to show characteristic of involved population.

3. Interpretation: Findings from analysis were considered carefully and summarize properly according to epidemiologic principles and biostatistics.

4. Dissemination: Interpreted data and findings from analysis will be submitted to involved people for application.

Instruments Used in Epidemiologic Surveillance

The Ministry of public Health has epidemiologic surveillance system to follow the situation of important disease reporting from public health centers of tambon, district, and provincial level to Epidemiologic Division, Ministry of Public Health. This system covers nationwide. The collection, consolidation, analysis, interpretation, and dissemination of data will be regularly done. Instrument in epidemiologic surveillance is recording system, which different forms of records are used.

They are:

1. Data collection form on epidemiologic of each patient which comprises:

   a. Report form 506: this form is used for recording information of each

patient who is diagnosed with a reportable disease. There are 34 diseases with 66 items in this form. Included in this form are personal information of patient, place, and date when the patient gets disease and other information. Main principle in recording in this report form is no need to wait for results of critical evaluation of the diagnosis (except in some specific defined diseases in order to expedite reporting and examining the distribution of the disease) report from 506 is completed at the local health center, then sent to the district health office. (see appendix A)

2. Consolidation Forms: There are many variables in epidemiology; several forms, therefore, have been used for data consolidation.

   a. E.1 Form is the first form used for recording details from report from 506 for each disease. E.1 Form is a basic data for other action on consolidation, analysis and interpretation.

   b. E.2 Form is used for data consolidation by separating number of patients of each disease from the place they got disease in each month in a year. The place where they got disease may be separated into tambon; district or province depends on the level of epidemiologic surveillance network which has to be analyzed in the next step. Result of data consolidation using this form enables us to see the spread of problems in different areas. If more analysis is undertaken, risk areas in each month can be identified.

   c. E.3 Form is used for data consolidation by separating number of patients of each disease into age group and gender in each month in a

year likes E.2 Form. It is, therefore, able to inform the spread of problems of different groups. It more analysis is undertaken, risk groups can also be identified.

d. E.4 Form is used for data consolidation by separating number of patients of each disease which has problems in surveillance areas. Numbers of patients are counted from the date they received treatment in previous week not from the date the patients got disease. This is the specific characteristic of this form. Result of data consolidation using this form is only additional number of patients who received treatment. Problem on disease distribution may or may not occur, we must examine from daily record.

e. Daily Record Form is used for data consolidation of surveillance disease by separating number of patients in the place they got disease on each day in a month. It can instantly inform abnormality of patients in each place as soon as the numbers of patients increase when comparing with number of patients at the same time of previous year.

In addition, there are more related record forms, which are not instruments for epidemiologic surveillance. They are monthly report, record form for activities using epidemiologic surveillance data

Roles of Reporters in the epidemiologic reporting system

As mentioned earlier that data got from epidemiologic surveillance network will be processed and analyzed in order to know situation of diseases and be used in public health planning. Correct, complete and reliable data leads to effective

activities. Reporters on epidemiologic patients are, therefore, recognized as the most important personnel in surveillance work. Their functions are as follows:

1. Make complete, correct and prompt report on report from 506 (and, when necessary, Form 507, which indicates corrections for the original report from 506 (Form 507 will not be considered in the proposed research – see Appendix A).

2. Submit report forms 506 and 507 to upper level organization in epidemiologic surveillance network according to schedule.

3. Record on E1, E2, E3, E4 and Daily Record Forms.

4. Disseminate data, knowledge, and information to involved people

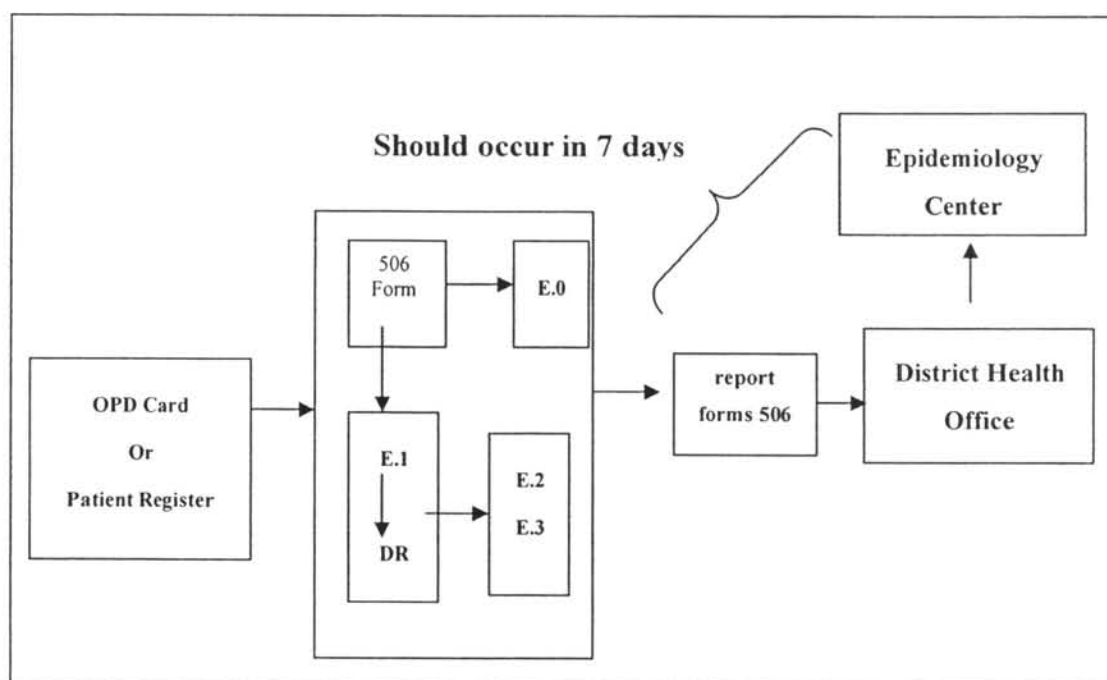5. Co-ordinate with involved people e.g. District and provincial epidemiologists etc.

Figure 3: Diagram of Referral and Epidemiologic Data Flow

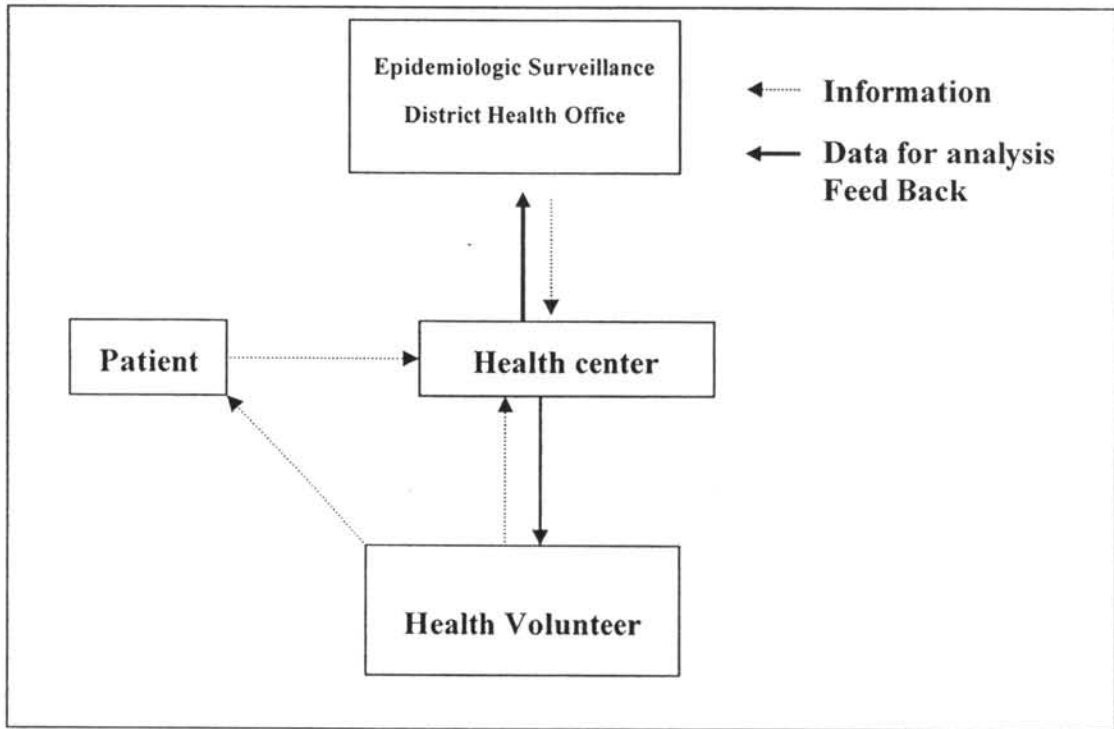(Department of Disease Control, 2003)

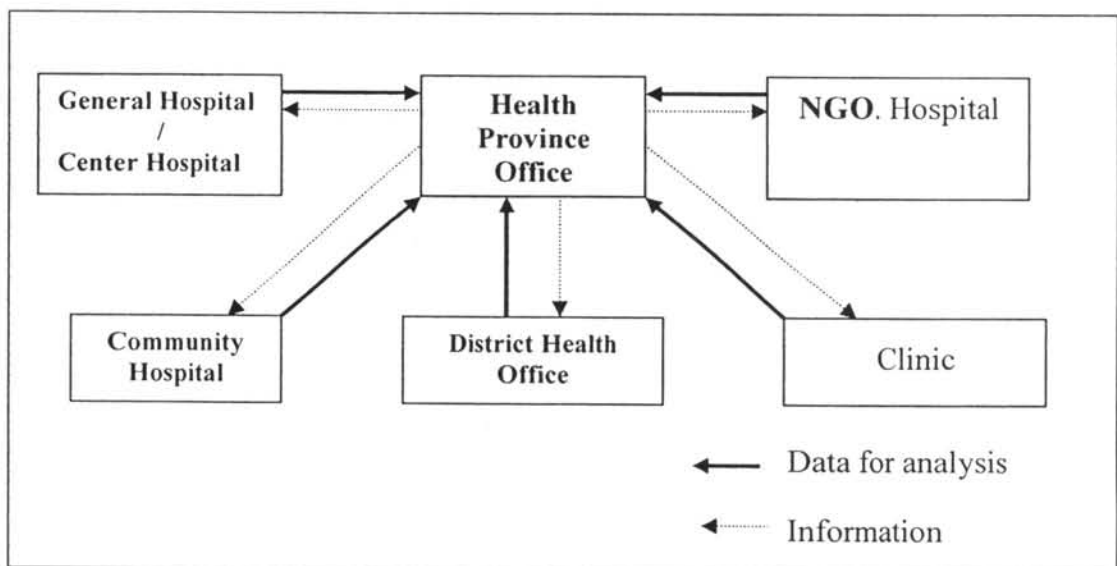Figure 4: Diagram of Referral and Health Data Flow at district and sub-district level

Figure 5: Diagram of Referral and Health Data Flow at Province level

Network of Epidemiologic Surveillance:

In the surveillance system with patient's report form (form 506) there are different levels of network where each level has responsibility office as follows:

1. Sub district Level: There is Health Station as the center. The responsibility area's information and data getting from the patient's data who receives the treatment from Health Station or through the disease occurrence information reported by Public Health Volunteers, Teachers, Community's leaders for instance, Network of District Level' task is as follows:

   a. Report the patient's initial treatment

   b. Report the disease occurrence in case the diagnosis of the disease can be done in accordance with the handbook for the infected patient in order that the Epidemiology Department can keep Surveillance by using the report form. (form 506) and sending it (form 506) respectively to the network. If there is severe disease or it is essential to prevent urgently for example the disease that can be prevented by vaccine. Severe diarrhea even though there is only one ease, the patient must be rashly sent to a hospital. For the diagnosis and treatment by a physician. Then notify to the District Pubic Health and Provincial Public Health Office in order to further the conduction.

   c. In case there is inability to diagnose the disease, send the patient to a hospital. Collect the data of the patient's sickness and symptom for the Surveillance because this may lead to the severity and highly harmfulness. Or it may be an unknown symptom or there is a lot of

patients if so notify the District Public Health or Provincial Public health. The investigation for the realities will be done in order to prevent and control the disease.

d. In normal system the collected data must be edited, analyzed, interpreted and informed continuously about the situation of local disease occurrence. Whenever there is something abnormal, the prevention and the control of the disease will be done promptly.

2. District Level: The Community Hospital and the District Pubic Health Office are responsible for the Epidemiologic Surveillance.

a. Community Hospital's Roles.

- Look after and treat the patient.

- Report the disease occurrence to the physician to diagnose the disease. After the treatment, the Health Welfare and Prevention Section will make a report of patient form (form 506) by distributing to the Network respectively in case the mentioned diseases in item 2 and item 3 of the Netsuke occur.

- Sub-district level must urgently report to the District Public Health office, the Provincial Public Health office and the Health & station which further the patient to run the same tings as Sub-district Level Network.

b. District Public Health Office's Roles

- Collect the patient's report form (form 506) from the Health Station and Community Hospital and pass to Provincial Public Health office.

- Collect, edit, analyze and interpret the data from the area Surveillance in order to realize the condition of the disease occurrence in the area. And to check the abnormality of the disease occurrence or to follow the tendency of the disease occurrence in the district level. Use the data of Epidemiology Observation to help solve the urgent problem in the area or to use it as fundamental data in district level planning.

- Support and cooperate with Network of Epidemiologic surveillance

- Cooperate and join the controlling and investigating team of disease prevention when there is a report from the network about the disease which must be investigated.

3. Provincial level: The Central hospital, General Hospital and Provincial Public Health office are the responsible sections about the provincial Epidemiologic. The Central Hospital and General Hospital have nearly the same roles as the community hospital consisting of department or teamwork of medical. They have responsibility for the Epidemiologic Surveillance in some area in cooperation with Provincial Public Health Office.

a. The Central Hospital and general Hospital's Roles.

- They have the same roles as the Community Hospital.

b. Provincial Public Healthy Office's Roles.

- Collect the patient reports form (form 506) from the Health Station, Community Hospital, General Hospital and Central

Hospital and forward them to Epidemiologic Deportment.

- Collect, edit, analyze and interpret the data from the Epidemiologic Surveillance which is collected in item one and forward the condition of the disease to the administrators and the network in District Level and Sub district Level.

- Check the abnormality and follow the tendency of the disease in order to prevent and control the disease or use it as fundamental data for the provincial level's planning.

- Support and cooperate in Epidemiologic surveillance among network.

- Cooperate and join the controlling, preventing and investigating team when the disease occurrence is reported in the area.

Factors of Interest

1. Gender: (Wonganuttraoj, 1992) The difference between genders causes different interests. Female has more patience in handicraft field of work and has more delicacy than male. Gender is connected to administrative commitment but not in service commitment or academic commitment. Gender has influence on a person's behavior as gender may be one of the factors which is related to the quality of making a report on Epidemiologic surveillance from the Health Station Report.

2. Age: (Kaewsri, 1986) Age is the important factor of a person's opinion or behavior. Different generations are likely to think differently. People

have reasons in their thoughts and conduction. It needs experience and learning skill by adjusting through the growing age. Age may be one of the factors, which is related to the quality of the report on Epidemiologic Surveillance in the Health Station Level.

3. Marital Status: (Tungsasom, 1989) Having different marital status brings to different social living. A single person has fewer burdens than a married one or the one who is a widow so there is more chance to devote himself to his work while the other one has family burden to take care of other people in the family.

4. The Highest Educational Level: Education is an important factor to develop people so that they will have power to develop the organization. People with different educational levels, have different points of view about education. This is the problem of how to increase the efficiency of the people. Moreover, the educational level can be part of the indicator of the vocational status in the society. It shows diffident ability in administration and academy.

5. Official Age and Working Experience: (Wonganutraroj, 1992) Working experience has good result in people's work but the number of working years cannot guarantee that the people with the longer time of working have more experience than people with shorter time of working. The experiences people meet each day are different; consequently, this affects the criteria people use to judge various things. People who have long experienced in work have more advantages in skill.

6. Training: Training is the process of promotion in empowering knowledge,

skills and capability to the staff of any organization so that they can carry on current task better. (Hirunto, 1982) It is essential (for the organization) that the personnel have been trained and developed because people who lack knowledge and capability often become a burden. (Santiwong, 1996)

7. Knowledge: Knowledge is just the primary behavior of learners just when it is seen, heard or memorized. This stage of knowledge can be defined as the knowledge about definition, meaning, fact, theory, rule and structure. (Suwan, 1983) It is the primary behavior that the learners can recognize or recall by seeing and hearing. This stage of knowledge is fact, rule and definition. (Paratkul, 1983) In conclusion knowledge is the ability of recognizing or recalling in addition to understanding, applying and telling the fact.

8. Point of View: Point of view or attitude is the opinion with emotion and is ready to conduct especially about the external situation. Altitude is the overall manner of a person that comes from readiness or the bias of the mind to each motivation. (Kitpredaborisut, 1984) Point of View is the readiness of a person's mind, which is formed from the opinion, and the belief of the person who is aroused with temper and feelings. It may drive this person to do one thing or another or it will probably designate the person's reaction to show fondness or disfavor towards the people, things, conduction or situation. (Maungman and Suwan, 1986) In conclusion, point of view is the people's feelings and the opinion to show satisfaction, approval or fondness, dissatisfaction, disapproval or disfavor about something or someone.

9. The number of staff in the work unit: It's one of the important factors that affects the efficiency of work unit. As for the lack of the staff will lessen the efficiency of the work unit. (Kaewkattong, 1980) But if there are adequate staff, there will be more efficiency in work. (Ponpatkul & Pongjit, 1995)

Related Researches

Garnjanee Konggate and Team (1984), studied on Quality of Report on "Patients Who Got Surveillance Diseases in All Government Health Service Centers in Middle Area, 24 Province by comparing number of report from 506 and found that average completion of report was 71.25% from hospital of Epidemiologic Center, 54.56% from general hospital 47.61% from community hospital and 56.61% from health center. Average accuracy of report was 94.25% from hospital of Epidemiologic center, 93.64% from general hospital, 94.27% from community hospital and 94.38% from health center. Promptness of reporting from the date seeing the patients till the date the report being submitted from health centers are between 22.0 – 36.90 days.

Yolwamal Tosakul (1984) studied on "Quality of Data from Report on Epidemiologic Surveillance Diseases" by comparing report from 506 and 507 with patient registration form at Epidemiologic Center of the central region of Thailand, and found that completion of report was 56.80% at tambon level, 60.25% at district level. Accuracy of reporting at tambon level couldn't be examined while accuracy of report at district level was 42.65% Promptness of reporting from tambon and district to Epidemiologic Division was 30 and 34.7 days respectively.

Wantanee Wattasurakit (1985) studied on " Disease Surveillance System in Chon Buri Province" by examining report from 506 with patient registration form of District Hospital and District Public Health Office and found that reporting from health center was complete for 51.6% Researcher couldn't find its accuracy. Time consumption in submitting reports was 48.7-57.5 days. Completion of report in district hospital was 43.2%, while its accuracy was 68.01%. It took 20.2-30.8 days in submitting reports. Problems found from this study are "Many activities have to be undertaken but there are not enough staff to carry on. "

Nongnuch Suvitwong (1986) studied quality of report on surveillance diseases of 55 Public Health Service offices in Bangkok by comparing report forms 506 with patient registration form and found that completion of report of Public Health Center (Branch Office) was 43.2%, while its accuracy was 23.8. The accuracy of report of government hospital was 20.4%. Time consumption from the date seeing the patients till the date the report forms being collected at Epidemiologic Section, Health Office, was 12.8-71.4 days, and the date the reports reached the Epidemiologic Division, Ministry of Public Health was 12.8-72.4 days The completion of reports was different by means of statistics according to type and size of health service offices. However the accuracy of reports was different by mean of statistic according to type, size and density of population in each area.

Poonsuk Siripoon (1986) tried to build effective surveillance reporting system in Siriraj Hospital by organizing training for officials from involved agencies and found that the persons with training understood more about epidemiologic work than did persons without training, as shown by mean of statistic: P-value< 0.0005. As for the completion and accuracy of reporting through report forms 506 before and

after training were not different. The time for reporting of OPD Section after training was less than before training as shown by mean of statistic: P-value< 0.0005, but there was no difference of IPD Section both before and after training: P-value> 0.05.

Garnjana Garnjanasinit and Team (1989) studied the development of information system for education management at macro level found that at present public health information system still has problems in data collection due to variety of report forms, redundancy and lack of clear definition. Officials, who collect data, are extremely busy, have bad attitude towards data collection and don't recognize the importance of data. Evaluation and analysis cannot be done quickly and accurately since they lack of knowledge and instrument for analysis. Furthermore top down policy leads to data management problem at provincial level since data gathering is only done to respond to central office. Application of data for planning at district and tambon level has been very little.

Prakrom Wuttipong and Team (1989) studied the development of information system on primary public health for management at micro at micro level and found that officials have quite a big burden on registration and reporting. They lack of knowledge on data management. There is redundancy in report forms, which make them confused. Sometimes it is difficult for them to understand report forms and difficult to collect all data. Application of collected data at all level has still been little due to the inaccuracy of it and the lack of proper indicators.

Amara Tonghong (1989) studied quality of epidemiologic data of districts which the District Public Health Co-ordination Committee are different in their complete in Lampang Province and found that there was relation between completion of report at tambon level and readiness of District Public Health Co-ordination

Committee as shown by mean of statistic data: P-value 0.049 and instant in submitting report at tambon level as shown by mean of statistic: P-value> 0.24. However, the researcher couldn't find relation among completion, accuracy and promptness with the District Public Health Co-ordination Committee's readiness as shown by mean of statistic: P-value > 0.05.

Tassanee Dolsamer (1992) studied the completion and accuracy of the processed data on Epidemiologic Surveillance with microcomputer in 6 provinces of the north-eastern region, where the computer was used to process the data continuously from April to July 1990. By checking the patient report (form 506) with print out, it is found that the completion rate of the processing was very high, 99.91%, and completion rate was related to educational level and level of training in epidemiology. It is also related to experienced time in processing data with a computer, having been trained in computer and the quantity of report forms 506 prepared by each staff of Epidemiologic Office per day including the point of view on computer operation. The accuracy of the data processing has 89.45% and related to the educational level and having been trained in Epidemiology. It is also related to the experienced time in processing data with a computer and having been trained in computer operation and the quantity of report forms 506 prepared by each staff of Epidemiologic Office per day including the point of view on computer operation except the period of time in Epidemiologic operation.

Tipporn Warit et al. (1992) studied current condition, problems and guideline for the development of Epidemiologic of the Health Station, in Chieng Mai from 26 July to 25 August 1992 found the completion, accuracy and promptness saying 42.86%, 90.00% and 36.15% respectively.

Southern Epidemiologic Center (1994) evaluated epidemiologic surveillance network in Trang Province and found that tambon public health officials who are responsible for data collection don't think about future use of data. Problems found from evaluation were as follows:

1. Reporters don't have enough time for collecting data and reporting

2. Report forms are confusing

3. Reporters don't understand definition of diseases.

4. There are quite a large number of data in tambon but only a little lf it has been applied.

5. Data collected is not reliable since it is not enough accurate and needed to be improved.

Nipawan Saritapirak and Samarn Sayumpoorujinan (1996): studied quality of report on hemorrhagic fever in central region in 1995 by studying accuracy and completion of data in community hospital, general hospital of government and hospital of epidemiologic center and found that percentage of completion of community hospital's report was 67.8 while its accuracy was 62.5 Completion of reports from hospital of epidemiologic center and general hospital of government are 89.5 while their accuracy are 80.1 There are problems on the lack of knowledge and understanding in the report and the lack of staff.

Southern Epidemiologic Center (1996): studies quality of report on hemorrhagic fever in southern region in 1995 by studying the accuracy and completion in community hospital, general hospital and hospital of epidemiologic center. It was found from the study that percentage of report's completion at community hospital was 89.49 while its accuracy was only 18.91 percentage of

report's completion at general hospital and hospital of epidemiologic center was 89.63 while its accuracy was 35.61

Prapatsorn Sunsanapittayakom (1998): Studies the effectual result of making the Epidemiologic Surveillance by Sub-district Public Health staff in Ubonratchatanee Province in 1997. It is found that the effectual result of making reports based on completion, accuracy and promptness saying 35.8%, 100% and 45.6 respectively. The effectual result on completion has, by means of statistics, related to point of view and distance. The effectual result on the promptness has, by means of statistics, related to knowledge, point of view and distance.

Preida Tae-arak et al. (1998) studied the development of information and data system for Disease Surveillance in Pitsanulok Province in 1998 was such a study of Research and Developing concluded that the system of Disease Surveillance can be improved with appropriate system which was accepted by administrators and operating staff.

Nalinee Chuaydamronk (1998) studied the factors which are related to the quality of the disease report from the Epidemiologic Surveillance at the health station level in Songkhla Province in 1998. It was found that the completion, the accuracy and the promptness saying 71.1%, 85.8% and 52.0% respectively. The factor that is relate to the quality of the report was the training in Epidemiology; other factors have no relation.

Nulprang Pratoomsri (2000) studied the completion and the accuracy of the disease report under the Surveillance with the patient report (form 506) at Health Station Level in Lopburi Proince in 2000 found the completion and accuracy saying 57.19% and 69.50 respectively. The educational bevel is related to the completion of

the report. The number of staff in the Health Station is related to the completion and the accuracy of the report.

Summary of Literature

Quality of data in surveillance report

1. Completeness: Comparing report forms 506 and found that average completion of report was 35.8 – 99.91 % from health center.

2. Accuracy: Comparing numbers of report from 506 and found that average completion of report was 69.50 – 100 % from health center.

3. Promptness: Comparing report forms 506 and found that average completion of report was 36.15-52.00 % from health center.

Factors relate with quality of data in epidemiologic surveillance report at health center level, as reported in the literature

Completeness: It is also related to

1. Knowledge on epidemiology

2. Attitude towards epidemiology

3. Educational attainment

4. Period working as government official

5. Period working on epidemiology

6. Transportation and communication

7. Receiving supervision on epidemiology

8. Number of report forms 506

9. Number of competent authorities

Accuracy: It is also related to

1. Level of health center

2. Number of competent authorities

3. Populations

Accuracy: It is not also related to

1. Age

2. Period working as government official

3. Period working on epidemiology

4. Training received on epidemiology

5. Educational attainment

6. Position

Promptness: It is also related to

1. Knowledge on epidemiology

2. Attitude towards epidemiology

3. Transportation and communication