Summary

Annual Report 2004

InVS: Its Role and Responsibilities

The National Institute for Public Health Surveillance (InVS) is a public agency under the supervision of the Minister of Health. Its duties are to monitor the health status of the population and to alert the public authorities in the case of public health threats.

InVS mobilizes, leads, and coordinates a public health network made up of government departments, other health agencies, public and private healthcare facilities, healthcare professionals, research institutes, health insurance funds, laboratories, and public interest groups involved in health surveillance, at the national and regional level.

Annual Report 2004

Over the years health alerts have come to fill an increasingly large place in the work of health surveillance. In other words, the ultimate aim of surveillance of the population's health status—the essential object of public health monitoring—is evolving into the ability to alert public authorities of the need to activate an action plan aimed at controlling a risk.

The national plans against heat waves and avian influenza thus foresee that InVS will declare an alert and thereby trigger the plan's provisions. Concern about identifying these threats as quickly as possible for early appropriate intervention by the public authorities is certainly legitimate: protection of citizens is a duty of the State. An increasing diversity of presumed or emerging risks associated with various technologies, climate change, human migration, and international exchanges of every type lend substance to sometimes vague threats. These threats reinforce the role of InVS in its task of anticipation, prospective risk analysis, and especially in its responsibility for activating alerts.

Is early warning the sum total of health surveillance today? Surely not. Restricting health surveillance to alert functions would be a grave error, comparable to that of organizing medicine or a healthcare system around emergencies alone.

There can be no alert system separated from a duty of surveillance. Surveillance serves as the foundation for the quality of expertise, which in turn guarantees the quality of the data collection and analysis. Dysfunctions of organs or organisms can only be interpreted if we know their underlying physiology: Pasteur's work would have been impossible if Claude Bernard had not preceded him.

The enlargement of health surveillance responsibilities, delineated in the Public Health Policy Act of 9 August 2004, highlights both the importance of reinforcing surveillance of the most vulnerable populations and the need to identify the risk factors for their health. InVS must thus assemble all of the necessary data—not only health, but also demographic and social.

Health surveillance today also fulfills an essential function —the assessment of health policies. The task of assessment enriches the objectives of health surveillance, is nourished by its results. The boundaries of health surveillance thus extend from anticipation of risks to assessment of the policies to control them. As far ahead as possible, health surveillance must anticipate and foresee the risks likely to constitute a public health threat. Modeling them should then make it possible to forecast their possible consequences. Such prospective monitoring is essential to the management of emerging risks, such as avian influenza or some environmental, climatic, or toxic risks.

This identification of current and future risks engenders new activities and new directions for health policies, and their impact in terms of reduction of risks or health consequences must be measured—the developing task of evaluation. Surveillance thus makes it possible to establish result indicators, which are today essential for evaluation of policy effectiveness.

Thus the considerable diversity of the surveillance systems necessary not only for anticipation and alert but also for evaluation presupposes a methodological analysis appropriate to new needs, a strategy capable of innovative methods for data collection to enhance and maximize the value of these accessible data. This is what InVS is doing through its evaluation of its information systems— developing a master plan. Meeting the full extent of our responsibilities of health surveillance also requires meeting the challenge of mastering information and communication systems.

Pr Gilles Brücker
Executive director,
National Institute for Public Health Surveillance

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InVS at the Service of Public Health Policy

InVS at the Service of Public Health Policy

Introduction

Public health policy is booming in France. Until now, the lack of a clear frame of reference has resulted in dispersing —and rendering ineffective—the efforts of the many policy participants. Today, public health policy is clearly the government's responsibility, at both the national and regional levels. The National Assembly debates and votes on its objectives, annually verifying their implementation and assessing their progress every five years.

A - A New Context

Since the 1990s, Parliament has created health agencies (public organisms) to carry out operational tasks, thereby seeking to refocus the duties of the Ministry of Health on the definition of health policies and drafting of regulations.

The new Public Health Policy Act, enacted 9 August 2004, continues in this direction. The Ministry sets the directions for the next five years, in accordance with the objectives voted by Parliament. The act delineates and strengthens the duties of operating agencies such as InVS.

L. no. 2004-806: the new Public Health Policy Act

> *L. no. 2004-806, concerning public health policy, was enacted on 9 August 2004. The last—and only previous—public health act in France dates back to 15 February 1902. It imposed smallpox vaccination, mandatory reporting of some infectious diseases, and a variety of other measures.*

Why a New Public Health Act?

France has a healthcare system considered to be one of the best in the world. Nonetheless health indicators reveal two weaknesses:

• premature mortality (before 65 years)

• health inequalities: between occupational categories and social classes, between regions, etc.

These findings are attributable to specific types of disease and causes of death (including cardiovascular and metabolic diseases and accidents) that are difficult to treat successfully. They underline the importance of effective prevention and demonstrate that it remains inadequate in France, at both the individual and collective levels.

Defining Objectives

Based on this observation, the new public health statute sets the following objectives:

• reduction of avoidable mortality (deaths) and morbidity (diseases)

• preservation and improvement of quality of life of handicapped or otherwise dependent (not fully autonomous) people

• reduction of inequalities in access to healthcare

• development of prevention by identifying risk factors, the proportion of persons concerned, existing management, etc., at the population level, to improve the organization and follow-up of prevention

• consideration of all types of health determinants together (environmental, physical, occupational, and social).

The future impact of these objectives on the population's health will measure their achievement.

How Can this Impact Be Measured?

This impact must be measured by defining specific health objectives and establishing indicators to monitor and assess them annually and every five years.

The State thus serves as the sponsor and general contractor for public health policy. Parliament also plays an essential role by approving the objectives set for this policy.

Action Plans and Programs

Action plans and programs are then established to attain the specific health objectives set by L. 2005-806. This organization of public health actions is not an innovation, but it is reinforced by the new statute.

The plans and programs will be monitored yearly and evaluated every five years by the High Council of Public Hygiene (CSSP), according to the cross-sectional or specific indicators established for each objective. These assessments will make it possible to judge the relevance and overall coherence of the plans and programs to the principal public health issues.

Prevent and Manage Health Crises

The health crises of recent years (contaminated blood, Creutzfeldt-Jakob disease—CJD, severe acute respiratory syndrome—SARS, and the summer 2003 heat wave) demonstrated the urgency of improving the health security system. This amelioration is a major aspect of the work implemented by the Public Health Policy Act of 2004.

Title III of the statute covers the prevention and management of health crises and plans, in particular, for the reorganization of various health agencies. InVS is one of these, and its mandates are increased and delineated.

What Does Public Health Policy Cover?

- surveillance and observation of the population's health status and its determinants
- prevention and control of epidemics
- prevention of diseases, injuries, and disabilities
- improvement of the population's health status and the quality of life of ill, handicapped, or dependent persons
- provision of health information and education to the population and organization of public debate on issues related to health and health risks

- identification and reduction of possible health risks associated with environmental factors, working conditions, transportation, food, and the use of goods and services likely to alter health
- reduction of health inequalities by health promotion and improved access to diagnosis and care throughout the country
- quality and safety of health care and health products
- organization of the healthcare system and its capacity to meet needs for prevention and management of diseases and handicaps
- demographics of health professionals

Multiyear Strategic Plans (2004-2008)

These plans organize sets of consistent actions and programs. They deal with health problems that require coordinated activities by multiple participants over several years:

- national plan against cancer (2003-2007)
- national plan to limit the effects of violence, risk behaviors, and addiction
- national environmental health plan
- national plan to improve the quality of life for people with chronic diseases
- national plan to improve the management of rare (orphan) diseases

and

- occupational health plan.

Ongoing Plans and National Programs

These plans or programs, established in or after 2001, are under way or have been renewed:

- cardiovascular disease prevention and control
- diabetes management
- asthma management
- national program against AIDS
- national program against hepatitis
- young people's health
- prevention of speech and language disorders and other cognitive problems in children
- health of the elderly
- health of people who are economically vulnerable or marginal
- end-of-life and palliative care
- pain control
- national nutrition-health program
- control of nosocomial infections
- national plan for antibiotic efficacy.

InVS: Reinforcement of its Role

Increased Alert Responsibilities

InVS's primary mandate remains the surveillance and permanent observation of the population's health status. It fulfills this mandate with the support of public and private actors who form a national public health network.

The legislature has now attributed a second duty to InVS: health watch and health "*vigilance*". The statute defines vigilance: "*The Institute is responsible for [...] prospectively detecting risk factors likely to modify or alter the health of the population or of some of its components, suddenly and widely*".

In spelling out this previously more tacit responsibility, the law increased the alert duties of InVS, which is thus involved still more deeply in improving the anticipation of health threats. The statute thus assigns InVS "*to study and identify for each type of risk the most fragile or threatened populations*".

The new act's reinforcement of its alert duties requires InVS to analyze in more detail the ways of identifying health threats that justify the creation or reinforcement of alert procedures and the information systems necessary to optimize these procedures.

Strengthening Alert Procedures

In 2004, InVS began to reinforce its alert capacity by adding to its disease surveillance systems a nonspecific alert system based on data from hospital and prehospital emergency medical services. Daily mortality data are also monitored along with, when necessary, data from civil defense services, the army health department, and funeral homes.

Reinforcement of the alert coordinating unit (CCA) improved the efficiency of the internal organization. This office analyzes the nonspecific emergency data, coordinates information from different scientific departments, and produces a daily alert bulletin to provide direct information to the Minister of Health and the Directorate-General of Health (DGS).

New Information Tools

To successfully carry out its health watch and alert duties, InVS is responsible for "*establishing information systems that speed up its use of scientific, climate, health, demographic, and social data, especially morbidity and mortality*".

The alert indicators InVS is to develop should enable the authorities "*to begin prevention activities early in case of health threats and start appropriate management once the health crisis has begun*".

To complete the data described above, InVS will have new sources of information, which should be operational within the next three years:

• electronic death certificates, including the portion listing cause of death

• reports of every imminent or presumed health threat relayed by public officials and healthcare professionals

• finally, adverse events in the field of health that meet a broader definition: accidents associated with healthcare administered during examination, treatment, or prevention.

Links to all such data producers will be studied and managed as part of an information system master plan. Development should be completed in 2005 and implemented in the years that follow.

Broader Field of Intervention

The new law requires InVS to assess, list, and analyze some types of data that were previously beyond its jurisdiction. In addition to the surveillance of vaccination coverage, InVS is now responsible for assessing vaccination policy, based on information from various sources that it must coordinate and complete.

Similarly, working with the "*workplace accidents and occupational diseases*" branch of the national health insurance fund and the statistics departments of the Ministries of Labor and of Health, InVS now collects data about workplace accidents, occupational diseases, and diseases considered to be occupational, and health risks at work.

Finally, InVS is conducting a three-year experiment intended to set up a system for collecting and analyzing reports of accidents other than nosocomial infections associated with diagnostic, therapeutic, and preventive health care.

Key Role in Implementation of National Plans and Programs

InVS is involved in the development, annual follow-up, and assessment (at the end of five years) of the activities conducted as part of the national plans and programs.

It collects the epidemiologic data, defines the indicators for follow-up and assessment of each health program in which it is involved, helps to establish public health priorities, and participates in developing guidelines for prevention and control of diseases.

Beyond its in-house work, InVS relies on a network of partners who produce and analyze epidemiologic data. It works in cooperation with the ministries concerned by the various plans and programs (for example, the Ministries of Health, Labor, and the Environment).

It has 16 branches—regional epidemiology bureaus (CIRE)—that relay its work at the regional level.

With its new mandates and the enlarged participation of different correspondents, InVS now has a decisive role in health alert and surveillance.

B - InVS Participation in National Public Health Plans and Programs

The public health objectives set by L. 2005-806 require the design and implementation of a wide range of preventive and control activities. These have been programmed as five-year strategic plans (2004–2008), in accordance with the law (cf. page 6). Earlier multiyear programs, which began in 2001, are still in progress. Together these respond to the basic public health issues currently faced by France.

The new statute also stresses the need to improve anticipation of emergencies and crises. Elaboration of several preparedness and response plans for epidemics and disasters will meet these requirements.

InVS, a government agency acting in different domains (infectious diseases, environmental and occupational health, chronic diseases and injuries, and international health), places its epidemiologic expertise at the service of the public authorities, furnishing the knowledge and indicators needed for the establishment, follow-up, and assessment of these plans and programs.

Strategic Plans

National Plan against Cancer

Definition and Objectives

Cancer, the second leading cause of death in France (1 of every 4 deaths) and the leading cause of death before the age of 65, is a major public health issue.

The national plan against cancer (2003-2007) lists 70 items organized around major themes, including the reinforcement of prevention activities, improvement of screening organization, and upgrading quality of care. The plan's target is to reduce cancer mortality by 20% within five years.

Role of InVS

The first three measures of this plan, in its section on prevention, set as their objective "to improve our understanding of the course of the disease." They involve InVS in the following activities:

- assisting and overseeing the cancer registries and developing a national surveillance system

- developing regional epidemiologic analyses and other assistance for regional health policies within InVS

- setting up a partnership with the International Agency for Research on Cancer (IARC), concerning surveillance measures, comparisons, and monitoring.

In 2004, the cancer unit of the department of chronic diseases and injuries (DMCT) continued to support the cancer registries. Subsidies in 2004 by InVS and the national institute for health and medical research (INSERM) financed the operating expenses of the teams responsible for case collection and analysis in all cancer registries. InVS also provided financial support for the creation of new registries:

- in Gironde, the Bordeaux Institute of Public Health, Epidemiology and Development (ISPED) set up a new registry;

- in Ile-de-France and Nord, InVS commissioned the regional epidemiology bureaus to launch two cancer registry projects;

- in Limousin, InVS funded the cancer registry at Limoges University Hospital Center (CHU) to improve the representativeness of the registries across France.

To enhance cancer registry data, InVS, working with a group of experts, has proposed a multisource system that also uses data from the Medical Information Systems Program (PMSI) and from pathologists. This system will begin with thyroid cancers. Its procedures, validated by a steering committee in November 2004, will be tested in two regions (Ile-de-France and Nord-Pas-de-Calais).

Finally, as part of the national plan against cancer, which places screening at its core, InVS participated in organized cancer screening programs:

- evaluation of breast cancer screening: production of data by district, study of the impact of organized screening on mortality, study of the associations between participation in screening and socioeconomic level (breast cancer screening in 2004 was assessed from individual rather than aggregate data)

- brainstorming with the national technical group set up at DGS for the implementation of organized cervical cancer screening

- working with the national DGS technical group on colorectal cancer screening to assess the 22 district pilot programs established between 2002 and 2004.

National Environmental Health Plan

Definition and Objectives

To meet the commitments made by France at the 3rd interministerial conference on the environment and health,

organized in 1999 by WHO (World Health Organization) Europe, the Ministers of the Environment, Health, Labor, and Research developed a national environmental health plan (PNSE).

This first such plan in France is based on the fundamental influence exerted on human health and development by the quality of environmental compartments (air, water, soils) and environmental changes (such as climate change and biodiversity).

Forty-five different activities are underway to meet three priority objectives between 2004 and 2008:

- guarantee the quality of air and water

- prevent diseases of environmental origin, including cancer

- provide better public information and protect vulnerable populations (children and pregnant women).

Role of InVS

A steering committee asked different groups to define the objectives to be met by 2008, based on the recommendations of an expert committee.

InVS worked with the committee and led the section on children's health. It also contributed to finalizing the PNSE by providing its expertise in various domains of environmental health, especially lead poisoning.

One of ten activities proposed by InVS was selected: the EFESE (French study of the environment and child health) cohort. Elaboration of this proposal, coordinated by InVS, is to start in 2005 and the project itself will begin in 2008; it will be conducted in close partnership with INSERM and the national institute for demographic studies (INED). This cohort of 10 000 children will be followed from conception to adulthood to provide answers to three series of questions:

- At what age and at what levels do children absorb different pollutants (such as pesticides, heavy metals, and solvents)?

- How often and at what stage of growth do health effects occur (developmental disorders, asthma, allergy)?

- What is the type and strength of the relation between exposure and its effects (for examples between heavy metals and neurobehavioral development)?

EFESE will be preceded by a three-year (2005-2007) preparation stage to set up the protocol.

Of the 12 priorities outlined in the PNSE, some are directly associated with programs being planned by the InVS department of environmental health (DSE) and will therefore begin in 2005 or soon thereafter:

- reduce the incidence of legionellosis by 2008 (AFSSA/InVS/INERIS program)

- learn more about the determinants of indoor air quality and strengthen regulations in this domain

- strengthen our capacity for health risk assessments of dangerous chemical substances

- reinforce basic knowledge of the environmental and societal determinants of population health and the development of new methods in environmental sciences

- improve prevention of childhood lead poisoning and screening and management of children with lead poisoning

- delineate the national plan against cancer.

National Plan to Improve the Management of Rare (Orphan) Diseases.

Definition and Objectives

In Europe, diseases are considered to be rare when their prevalence is less than 1 case per 2000 persons. Nearly 7000 rare diseases have already been identified.

It is estimated that more than 3 million people in France have a rare disease. Their rarity means that healthcare professionals are often unfamiliar with them; this can lead to lengthy diagnostic processes and contradictory diagnoses, a source of distress for patients and their families as well as a cause of delay in management.

The government therefore decided to make rare diseases one of the five major priorities of the new Public Health Policy Act. The National Plan for Rare Diseases (2004-2008) aims to "ensure equal access to diagnosis and treatment" by concrete and structured measures.

The plan focuses on 10 themes:

- learning more about the epidemiology of rare diseases

- recognizing their specificity

- developing information about them

- training healthcare personnel to improve their ability to identify them

- organizing screening and access to diagnostic tests

- improving access to and quality of care

- continuing existing efforts promoting orphan drugs

- responding to these patients' needs for support

- promoting research

- developing national and European partnerships.

Role of InVS

InVS (DMCT) headed the working group on the epidemiology of rare diseases. This group's work concluded with the draft of the first theme of the plan ("learn more about the epidemiology of rare diseases").

InVS is setting up and coordinating epidemiologic surveillance of rare diseases, which does not currently exist in an organized form.

This surveillance will eventually include:

- elaboration of specifications for the transfer of epidemiologic data from approved reference centers

- methodological support for the establishment of databases and registries of rare diseases

- analysis of the mortality due to rare diseases, based on death certificates from the center for death statistics and epidemiology (CepiDc, part of INSERM)

- definition of criteria to set priorities for increasing surveillance of rare diseases over the five years to come.

In particular, InVS will conduct specific surveillance of some rare diseases (incidence, prevalence, effect on mortality, morbidity, quality of life, and patient management networks). Progressive implementation of all of these objectives will begin in 2005.

As part of its rare disease surveillance, InVS coordinates the national "FranceCoag" network, a system created in 2002 to take over nationwide monitoring of persons with hemophilia. The network team joined DMCT in January 2004. Its objective is to include and follow all patients with hereditary defects in blood coagulation in France (including the overseas districts). It seeks to determine patients' geographic distribution and to describe their disease course, concomitant diseases, and use of coagulation factors. It should also serve as the basis for health surveillance that will enable swift investigation of any newly identified agents suspected of transmission by coagulation factor preparations, provide information about the risk factors of developing inhibitors and their management procedures, and assess the feasibility, tolerance, and effect of standardized prophylactic treatments, especially primary prophylaxis.

Occupational Health Plan

Definition and Objectives

The occupational health plan (PST), developed in 2004 under the direction of the Minister of Labor Relations, proposed four objectives for 2005-2009. This plan is part of the government's overall social cohesion plan: occupational health is an essential right of workers. It is interwoven with other governmental policies, in particular the PNSE, and it details some of the latter's activities for the workplace, according to the guidelines of the scientific steering committee that drafted it.

The plan was developed in cooperation with the social partners included in the High Council of Occupational Risk Prevention. It enlists the participation of government, health-care professionals, companies, and unions.

Aimed at reducing occupational risks, this plan proposes to:

- develop knowledge of workplace hazards, risks, and exposures
- reinforce the reliability of their inspection and control
- reorganize the joint steering committees for occupational health
- encourage companies to promote occupational health.

The plan defines 23 concrete activities to be conducted over the next five years to meet these objectives.

Role of InVS

It is unfortunately true that the public system of scientific health risk assessment does not devote sufficient attention to the workplace and most especially neglects the analysis of risks induced by chemical substances.

To correct this, the occupational health plan is reorganizing the workplace health security system. A public agency will be responsible for occupational health and product risk assessment issues, while InVS is charged with implementing surveillance of the population's health status in relation to work. InVS thus participates in the first objective of the PST ("develop knowledge of hazards, risks, and exposures in the workplace").

The agency devoted to occupational safety and health should, according to the PST, begin operations in 2005 and should rely from the outset on ten high-level experts to launch a process of expert assessment of dangerous substances.

At the same time, the InVS department of occupational health (DST) requires more resources to meet the mandates assigned to it by this plan. Meetings with the office of labor relations (DRT) have already set epidemiologic surveillance of occupational risks as a high priority, especially:

- acceleration of implementation of a tool to centralize and analyze statistics on work-related accidents and occupational diseases, in association with the government's statistics departments (office of research leadership and statistical studies, at the Ministry of Labor—DARES—and the department of research studies, evaluation and statistics at the Ministry of Health—DREES), and health insurance funds, as defined in the new Public Health Policy Act
- work and funding for the development of sentinel networks of occupational physicians, such as the pilot network in the Loire River region, established in 2002 by InVS
- acceleration of the establishment of surveillance systems, including the elaboration of tools that can be applied in the general population to assess occupational exposure, such as those established by InVS as part of the Matgene proposal for job-exposure matrices. Matrices are already available for asbestos, wood, and leather; others are underway for substances such as flours, petroleum solvents, and textile fibers.

In July 2004, Claude Bernard University of Lyon, the national transportation institute, and InVS created the UMRESTTE laboratory (combined epidemiologic research and transportation-work-environment surveillance unit) in Lyon. It has enabled occupational exposure assessment at the DST to expand rapidly. This development should continue in the five years to come.

Additional resources should also be allocated to the constitution and follow-up of a workers' cohort representative of the French labor force, which is currently in preparation. This should meet the requirements of the occupational health plan: that InVS develop real long-term surveillance of the working population. This kind of proposal demands substantial human and logistic resources: cooperation between teams and institutions is needed. Finally, the production of the health indicators essential to the assessment and monitoring of this plan should be assigned to InVS.

Other National Plans and Programs

Action Program for Type II Diabetes

Definition and Objectives

This action program for the prevention and management of type II diabetes began in 2001. It is designed around five objectives:

- prevent diabetes by development of nutritional policies
- strengthen diabetes screening
- guarantee high-quality care to all persons with diabetes
- improve the organization of care
- help people with diabetes to become more involved in their health.

Role of InVS

InVS participates in fulfilling the fourth objective: the organization of "epidemiologic follow-up of diabetes to adapt care to population needs".

This involves the implementation of a specific surveillance system to:

- describe the epidemiology of diabetes
- monitor demographic indicators
- analyze morbidity rates
- assess the quality of life of persons with type II diabetes.

Working with the national health insurance fund for salaried workers (CNAMTS), the national association of diabetes network coordination (ANCRED), and the French diabetics association (AFD), InVS has been conducting the ENTRED study (national representative sample of diabetics in France) since 2001.

Its objectives are to:

- describe and assess (relative to known standards) and monitor the health status of diabetes patients, as well as the methods and results of their management
- help to assess diabetes networks by providing reference populations for comparison with the diabetic populations handled by the networks.

The ENTRED study thus contributes to quantifying two objectives of the new public health act:

- provide at least 80% of persons with diabetes with surveillance corresponding to good clinical practice guidelines, including ophthalmoscopy and screening for risk of foot complications by 2008
- reduce the frequency and severity of diabetes complications, especially cardiovascular.

InVS participates in the decisions of the monitoring committee for this action program.

It contributed to the elaboration of two new parts of this program, beginning in 2005, and will participate in their follow-up:

- the protocol to improve prevention of foot injuries in diabetics, currently being tested in some diabetes networks. To obtain reference data, InVS is currently using hospital data from the PMSI to estimate the number and incidence of amputations.
- experimental screening for diabetic retinopathy with nonmydriatic retinography, with the images transmitted to authorized centers for reading.

In addition to ENTRED, InVS is continuing the epidemiologic tasks that are part of the action program for prevention and management of type II diabetes and will conduct a second national survey of individual food intake (following the 1999 survey) as part of the national nutrition health program (PNNS).

This survey, planned for 2006, will include a laboratory portion (fasting blood glucose examination) that will make it possible to estimate the prevalence of diabetes, the number of persons aware of their disease, and the prevalence of precursor stages of diabetes and to analyze dietary and environmental risk factors.

National Program against HIV/AIDS and Sexually Transmitted Diseases

Definition and Objectives

This program (2005-2008) is one of the priorities of the public health statute; it continues the strategy and activities developed during the first national plan against HIV-AIDS, from 2001 through 2004.

To achieve a more consistent public policy, the new plan includes other sexually transmitted diseases (STDs) for the first time. It stresses the importance of reinforcing activities around priority groups (redefining strategies of intervention and screening incentives) and beginning new STD prevention strategies in the general population. The program also takes up the objectives set by the new law:

- reduce the incidence of AIDS cases by 20% in the next five years

- reduce the incidence of gonorrhea and syphilis and the prevalence of chlamydia infection

- offer systematic chlamydia screening to all women at risk by 2008.

This program complements the plans and programs for intravenous drug users, prisoners, and prostitutes of the national program against hepatitis viruses B and C and the program against HIV/AIDS for immigrants and foreigners living in France.

Role of InVS

The surveillance systems and behavioral surveys established by InVS several years ago have contributed substantially to the development of this national program against HIV/AIDS and STDs. The epidemiologic and behavioral data make it possible to identify the priority groups and regions for intervention and to assess progress towards meeting the program's objectives.

Since 2003, InVS has reinforced the existing HIV surveillance system by establishing mandatory HIV reporting and monitoring new infection. STD surveillance has also been strengthened by the collection of additional information about infected persons (gonorrhea, syphilis), surveillance of venereal lymphogranulomatosis of the rectum, and a national survey of chlamydia infections. In 2004 InVS also conducted vast national studies to estimate the prevalence of co-infection with HCV or HBV (HIV/HCV/HBV coinfection survey) among homosexuals (Presse Gay/ANRS survey), drug users (Coquelicot/ANRS survey), people seeking screening, and people seropositive for HIV.

InVS is therefore a participant in its own right in this program and participates in the program monitoring committee, together with the DGS, the hospitalization and healthcare organization office (DHOS), the decentralized health bureaus, other agencies (ANRS and INPES), and advocacy groups.

National Plan against Hepatitis Viruses B and C

Definition and Objectives

A first four-year plan against hepatitis C was launched in 1999. Revised and updated in 2002, before its conclusion, it now takes hepatitis B into account as well and defines new prevention and management strategies based on both epidemiologic and healthcare data.

This new plan (2002-2005) sets five goals:

- reduce transmission of HBV and HCV

- screen persons with these diseases

- improve care and access to care

- strengthen clinical research

- reinforce surveillance and assessment.

Role of InVS

InVS helps implement these plans by furnishing epidemiologic data that define, assess, and monitor the efficacy of the prevention and management measures used in the plans. InVS sits on the program strategy committee and its working groups.

Accordingly, at the outset of the first plan, InVS developed a national system of epidemiologic surveillance of hepatitis C, based on two networks that collect data continuously:

- a surveillance network of 257 private and public medical laboratories, located throughout France—the Rena—HCV network

- a surveillance network of new patients

- 26 volunteer Hepatitis C reference centers, which are hepatology departments in university hospital centers, responsible for organizing care of persons infected with hepatitis C virus.

In 2003, InVS reinforced surveillance of hepatitis B by setting up mandatory reporting of acute hepatitis B.

Several surveys and studies round out these surveillance data. A new national prevalence survey was conducted in 2003-2004 for hepatitis B and hepatitis C, in partnership with CNAMTS, the technical support and training center for the CNAMTS health examination centers (CeTAF) and 26 of these centers. It allowed us to estimate the current prevalence of HCV infection, the prevalence of HBV infection markers in the population of France (excluding overseas departments and territories) (aged 18-80 years) and the percentage of persons infected who have already been screened and to describe their management. Other studies document current risk factors for recent infection by HCV: the risks of infection (particularly in healthcare settings, in episodes of nosocomial infection), the frequency and determinants of practices that risk transmission of HCV and HBV in drug users, and the effect of the risk-reduction policy for drug users.

Finally, as part of the assessment of the anti-HBV measures, InVS participated in 2004 in the public hearing on the possibility of a relation between vaccination against HBV and multiple sclerosis, organized by the French drug agency (AFSSA), the French agency for health accreditation and evaluation (ANAES, which has become the High Health Authority, HAS), and INSERM.

InVS was thus able to report the first HBV data based on mandatory reporting, the results of the 2003-2004 prevalence survey, and an updated analysis of the benefits and risks of hepatitis B vaccination.

These surveillance data and survey results (and their use in expert assessments) will help to assess hepatitis B and C control and management measures in France, assessments essential to improve programs against these viral diseases.

National Nutrition-Health Program

Definition and Objectives

Begun in 2001 by the Ministry of Health for an initial period of five years, PNNS 2001-2005 aims to improve the health status of the population by improving nutrition.

More specifically, PNNS set 9 priority objectives for nutrition (including food intake and physical activity, as well as clinical and laboratory markers) and nine nutrition objectives related to specific problems of specific populations (pregnant women, the elderly, children and adolescents, the poor, etc.).

Role of InVS

The Nutritional Epidemiology Surveillance Unit (USEN), a unit co-sponsored by InVS, University of Paris XIII, and the Conservatoire National des Arts et Métiers was created at the outset of this program.

Given that nutrition is a factor of either risk or protection for many chronic diseases, USEN has organized a surveillance system of the population's:

• food intake

• nutritional status

• physical activity.

It has participated in the elaboration of the PNNS and helped implement its objectives. Its surveys and analyses orient the public health activities planned for the PNNS: public service campaigns to promote eating fruit and vegetables, as well as physical activity and food guidelines for both the general public and healthcare professionals.

USEN uses predefined indicators to assess the efficacy of the public health activities aimed at meeting the plan's objectives.

To conduct these evaluations, USEN selects tools and measurement methods, either relying on existing models or creating new tools. Some tools are quite difficult to implement within the framework of nutritional surveillance, which monitors complex and diversified behaviors, including eating and exercising. Moreover these behaviors must often be described by the subjects themselves.

Among USEN's priorities is a national survey, in preparation since 2001 as a collaboration between InVS and AFSSA.

This survey will begin in 2006 and will question a representative sample of 4000 adults and 2000 children living in metropolitan France. The data collected will make it possible to describe all of the indicators of the plan's priority objectives and assess their performance.

Another InVS/USEN intervention involves obtaining data about public health questions concerning particular populations among whom data collection requires special procedures:

• these include the very poor. The plan's objective is to "combat vitamin and mineral deficiencies and malnutrition." Between November 2004 and May 2005, USEN surveyed persons receiving food aid. The study is producing the first data of this kind available to government agencies and charitable organizations; the early analyses will be available by the end of 2005;

• in 2006, another specific nutritional objective—preventing malnutrition in the elderly—will be the topic of a survey of elderly persons living in institutions. It will be conducted in collaboration with the ministry for the elderly, as part of the "Age Well" program, launched in 2003.

The PNNS objectives were extended through 2008, and some have been taken up again specifically in the new public health statute. USEN will continue to participate in the follow-up and epidemiologic assessment of these activities.

Nosocomial Infection Control Program

Definition and Objectives

The nosocomial infection control program 2005-2008 sets five objectives:

• promotion of research

• modernization of prevention policies and methods for controlling nosocomial infections

• improvement of healthcare professionals' practices (good practice guidelines, assessment of practices, training)

• optimization of the collection and use of information about nosocomial infections

• better information for patients and better communication about nosocomial infections.

This program, which follows a first plan that covered 1995-2000, relies on the organization of nosocomial infection control established over the past 15 years: nosocomial infection control committees (Clin) within each healthcare facility, the five nosocomial infection control coordination centers (CClin) established in 1992, and the alert network for the investigation and surveillance of nosocomial infections (RAISIN), which has linked InVS and the coordinating centers since 2001.

Role of InVS

A primary focus of the new program is to elaborate "summary indicators" to serve as a tool for oversight and communication. This tool will bring together indicators of nosocomial infection control that can be applied to all healthcare facilities, public and private. They will make it possible to follow progress, adapt actions and resources, and inform users at each establishment.

InVS worked together with all of the participants concerned, including some thirty hygiene experts, to develop these indicators. A synthesis of the conclusions of this work and of the consultations of patients' representatives and of hospital federations was submitted to the Minister of Health at the beginning of 2004. From these submissions the Ministry selected five indicators that can measure efforts to improve quality of care and prevention of nosocomial infection in healthcare facilities: incidence of specific surgical site infections, incidence of methicillin-resistant *Staphylococcus aureus* (MRSA) infections, a composite indicator of nosocomial infection control activities, consumption of alcohol-based disinfection products, and antibiotic use.

InVS participated in drafting the specifications of these indicators for a pilot program in 36 public and private facilities: the COMPAQH (coordination for measurement and improvement of hospital quality) project, being implemented by INSERM and the Aquitaine coordination committee for clinical quality assessment under the aegis of DHOS and HAS.

These indicators will be set up progressively and eventually generalized to all healthcare facilities.

Data from the voluntary networks that monitor nosocomial infection and antibiotic resistance, coordinated by RAISIN since 2001, will also contribute to the program's fourth objective and enable us to assess the impact of the 2005-2008 program.

National Plan for Antibiotic Efficacy

Definition and Objectives

The national plan for antibiotic efficacy (2001-2005) was made necessary by the worrisome antibiotic resistance statistics in France: 50% of pneumococci are resistant to penicillin and 20% of staphylococci to methicillin. This plan succeeds a series of hygiene and nosocomial infection control activities and stresses the importance of preserving the efficacy of antibiotics.

It is designed around seven themes:

- improve information
- disseminate tools to aid professionals
- improve the appropriate use of antibiotics in hospitals
- improve the exchange of information between private and hospital practitioners
- reinforce training and continued medical education
- improve surveillance of consumption and resistance
- improve the national coordination of these activities.

Role of InVS

To "improve the surveillance of use and resistance," InVS has reinforced and developed new systems for the surveillance of resistance.

RAISIN's program for the surveillance of hospital-acquired multidrug-resistant bacteria (nosocomial infections) has been harmonized with these to enable acquisition of comparable national data, which are currently being disseminated.

The Labville network for the surveillance of resistance in the community tested remote transmission of community-based laboratory data. This innovative surveillance will provide real-time data on the evolution of bacteria resistance in the community, a topic for which few data have been available. Labville is currently implemented in 69 laboratories.

In 2004, InVS participated in the development of resistance databases—of pneumococci isolated from invasive infections, with the national reference center (CNR) for pneumococci, and of staphylococci, enterococci and *Escherichia coli* isolated in septicemia with the national observatory for the epidemiology of bacterial resistance to antibiotics (ONERBA). France's participation in the European antimicrobial surveillance system (EARSS) allows us to put antibiotic resistance in France in perspective and compare it with the situation in other European countries.

Other resistance surveillance activities in 2004 were part of specific studies (consumption of antibiotics in French hospitals and clinics in 2001 from a national prevalence survey, study of the strains of *staphylococcus* producing PVL, Panton-Valentine leucocidin, strains of glycopeptide-intermediate *S. aureus*). Six episodes of infections due to multidrug-resistant germs, including a national epidemic of beta-lactam-resistant *Acinetobacter baumannii* infection, were investigated in 2004, after they were reported to InVS.

Preparedness and Response Planning for Epidemics and Disasters

National Heat Wave Plan

The national heat wave plan (PNC) was created in 2004, following the murderous heat wave during the summer of 2003. InVS is involved in this plan at two levels:

- in collaboration with Météo-France, it designed the national heat wave and health alert system (SACS) that is included in the PNC;

- it also developed the recommendations for actions in case of high temperatures, the checklist forms, and the four levels of alert that make up the system:

  - vigilance (level 1): a climate and health monitoring system, established by InVS and Météo-France, is in effect from 1 June through 30 September;

  - alert (level 2): when InVS informs the Minister of Health of the possible onset of a heat wave in the next three days, the health command post (PC Santé) is mobilized and decides whether or not to raise the alert to level 2; if so, the information is then passed to the districts where crisis management groups are activated;

  - intervention (level 3): PC Santé and/or the Minister of Health activates level 3 on InVS's recommendation and requests the prefect to activate the various plans;

  - requisition (level 4): if the situation worsens, or if collateral effects appear (drought, electricity blackouts), the Ministries of the Interior and Defense refer the question to the Prime Minister who decides, when appropriate, to requisition resources necessary for management of the crisis.

The four levels of the PNC rely on the upstream alert system, which is based on biometeorologic indicators that determine alert activation. These indicators were defined after analysis of daily data from the past 30 years (1973-2003) and of the relation between meteorologic and mortality data in 14 cities across the country.

The system sets a double heat wave alert threshold for each district based on elevated excess mortality (by 50% or 100%). It corresponds to a three-day average of maximum and minimum temperatures.

Beginning in 2005, during the vigilance period (1 June through 30 September), InVS will be responsible for:

- monitoring the indicators forecast by Météo-France for the previous day, the same day, and the next three days, comparing them with district thresholds, and determining if these thresholds are likely to be crossed

- proposing activation of level 2 or 3 to the Ministry of Health, for the districts where the forecasts indicate these thresholds will be exceeded. InVS, via the CCA, shall transmit an alert bulletin to the Ministry of Health, the DGS, and the districts concerned;

- reinforcing health surveillance when an alert is declared: mortality and morbidity data (ER visits, ambulance calls,

district fire and rescue service, funeral homes, death reports) must be collected and analyzed daily by the regional epidemiology bureaus once level 2 is activated.

An increase in these indicators detects a health impact that requires reinforcement of the prevention measures already implemented.

Influenza Pandemic Plan

Definition and Objectives

The influenza pandemic plan, published in 2005, aims at early detection of the appearance of any new influenza virus* to contain its dissemination in the prepandemic phase and limit its overall social impact during the pandemic phase.

This plan foresees a variety of activities according to the alert level. These aim to:

- monitor the disease before and during the pandemic

- care for and manage persons infected by the virus

- contain its dissemination and protect the community from its effects

- develop the necessary information and communication tools.

In accordance with the WHO alert phases, the influenza pandemic plan foresees two principal alert phases: the prepandemic (interpandemic preparedness levels) phase (subdivided in several levels), and the pandemic period.

Role of InVS

As a member of the Influenza Committee at the Ministry of Health, InVS participated in the plan's development.

Regardless of the phase, InVS maintains constant national and international monitoring. For the national plan, InVS aids healthcare workers and the district emergency medical service call centers ("15" centers) in classifying suspected new influenza cases as either possible or excluded. InVS has set up a clinicoepidemiologic committee of clinicians and virologists that can be mobilized when necessary to classify a difficult case.

In the prepandemic preparedness period, InVS will set up measures of epidemiologic and health surveillance to detect new cases as quickly as possible. If a new case is detected in France, an investigation will seek co-exposed subjects who might require prompt treatment. If human-to-human transmission appears, the investigation will seek the case's contacts to take the appropriate control measures (prophylaxis and isolation).

This new influenza virus, capable of inducing a major international epidemic (pandemic) may be a hybrid virus (human/bird) that can replicate in humans without encountering defenses because we lack the relevant antibodies.

During the pandemic phase, InVS will monitor the epidemiology of the disease, determining which groups are most exposed and monitoring the impact of control measures. As part of pandemic preparedness, DGS asked InVS to estimate the likely extent of an influenza pandemic in France and to measure the epidemiologic impact of different strategies against it. InVS developed a statistical risk analysis model to fulfill this request. DGS also asked for estimates of the weekly number of hospital admissions, hospital days, and deaths likely to be associated with the pandemic.

Conclusion

InVS and the 100 Public Health Objectives

An appendix to the Public Health Act lists an array of 100 objectives and assorted indicators to be reached by 2008. Although these objectives are given as an approximate guide and are not ranked, they constitute summary indicators for monitoring most of the strategic plans and public health programs described above. They are supplemented by other indicators for objectives not yet covered by plans, especially in the domain of chronic diseases.

For InVS, this array is the guiding thread of our work. Together with DGS and DREES, InVS has participated in setting up the indicators for this follow-up: definition of indicators to monitor and determination of the most relevant levels (national or regional) and frequency (every 1, 2, or 5 years) of data collection. By 2008 InVS will contribute to the provision of information and indicators for nearly half the topics covered in the 100 objectives.

This follow-up and surveillance will make it possible to assess the improvement in the health status of the French population and hence the impact of the public health policies to which InVS contributes its epidemiologic expertise.

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Synthesis of Health Surveillance Data

Synthesis of Health Surveillance Data

Introduction

Each year, the surveillance data InVS produces enrich the knowledge available to promote public health and public policies for the prevention and control of diseases.

The data presented here are not exhaustive, but rather representative of what InVS did during 2004. We note that they provide information for the public health plans and programs described in the first section.

Epidemic investigation remains one of InVS's primordial functions. The examples presented concern vulnerable populations, such as newborns and hospital patients.

Finally, the credibility of InVS is based on the scientific quality of its work, and its methods and approaches must regularly be assessed and reoriented. The most recent changes involve modeling and the comparison of data from different sources.

A - Surveillance Programs

"Epidemiologic surveillance is a continuous and systematic process of data collection to analyze a health problem and its determinants at the population level."

The epidemiologic surveillance projects that produced significant results in 2004 included some set up several years ago and others that are more recent, but are designed to become permanent and provide information about developments and trends.

Surveillance of People with Diabetes

The ENTRED study (2001-2003) was conducted as a partnership between its sponsor, ANCRED, and the health insurance fund and InVS, which financed it. Further support came from AFD.

InVS conducted the analysis. Recently published results describe:

• the prevalence of macrovascular complications and vascular risk factors reported by persons with treated diabetes (living in France) and by their physicians

• the prevalence, quality of screening, and management of diabetic retinopathy (microvascular complication of diabetes, the leading cause of blindness in those younger than 65 years in industrialized countries) and peripheral neuropathy (leading cause of nontraumatic amputation of the foot);

• elderly patients with diabetes: since 54% of diabetics are 65 years or older, we analyzed these patients separately to assess their characteristics, health status, and management.

Methods

During the last trimester of 2001, 10 000 adults were randomly selected among beneficiaries of the salaried workers' health insurance fund who received reimbursement for insulin or oral antidiabetic treatment. The study included five components:

• an analysis of reimbursement data from 2001 through 2003 for all 10 000 subjects, published in 2003

• a mail questionnaire sent to all 10 000 subjects in 2002

• a mail questionnaire of the physicians of the patients who responded

• a hospital survey of the frequency and causes of hospitalization, conducted in 2002

• a mortality survey, to be conducted shortly.

The recent analyses covered the 3648 diabetes patients who completed the detailed questionnaire and the 1718* physicians who responded to the medical questionnaire. To take into account the characteristics of those who did not respond, the crude and corrected prevalences of macrovascular complications were estimated by two methods: 1) figures obtained from those who responded to the survey,

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* Physicians were questioned only if their patients responded to the survey and provided their address.

and 2) weighting by the inverse of the response rate according to sex, age, and antidiabetes treatment (one or multiple oral antidiabetics, insulin alone, or insulin with oral antidiabetics). The reimbursement data available for respondents and non-respondents allowed us to compare these groups. Analyses of elderly persons with diabetes considered the reimbursements of 5350 elderly patients and questionnaires from 2349 patients and 1052 physicians.

Prevalence of Macrovascular Complications and Vascular Risk Factors

Results

17% of those questioned reported at least one ischemic complication (angina, myocardial infarction, or coronary revascularization). 20% of their physicians reported that the patient had developed at least one macrovascular complication (the same three plus cerebrovascular accident). Although the prevalence of ischemic complications increased with age and diabetes duration, 14% of cases had these early during the course of their diabetes.

93% of the persons questioned reported at least one vascular risk factor other than diabetes (smoking, overweight, hypertension, and hypercholesterolemia); 69% of these patients reported at least two, and 31% at least three. Overweight and obesity were the most common vascular risk factors, with 40% of the subjects overweight and 34% obese.

87% of the physicians reported that their patients' blood pressure was elevated (equal to or greater than 130/80 mmHg, the new standard). Half the patients had dyslipidemia, but LDL cholesterol was not measured in 39%. Only 24% were reimbursed for at least one albuminuria test (indicator of vascular risk and early renal damage). Nonetheless, the physicians reported they were globally satisfied with the monitoring of vascular risk factors and glycemic levels among their patients with diabetes. The physicians did not consider dietary management sufficient, however.

Nearly all physicians (92%) reported that they were familiar with the official guidelines for management of these patients.

Prevalence and Quality of Screening and Management of Diabetic Retinopathy and Peripheral Neuropathy

Results

3.4% of subjects reported blindness in one eye and 14.5% reported laser treatment for diabetic retinopathy. Their physicians' estimates were lower (1.4% for blindness in one eye, 4.5% for laser treatment, and 9.9% for diabetic retinopathy).

43% had received reimbursement for a consultation with an ophthalmologist. The same proportion reported undergoing an ophthalmoscopy. This time, their physicians' estimates were higher (65% of their patients were thought to have had an ophthalmological examination), but only one third reported receiving a report from the ophthalmologist.

6% of patients reported perforating foot ulcers and 1.4% amputation. Here again, their physicians' estimates were much lower (respectively, 1.5% and 1%). These differences may be explained by overreporting by patients, but also by the frequent absence of accurate response from physicians who are unaware of the condition of their diabetic patients' eyes and feet.

These data appear to underestimate the prevalence of diabetic retinopathy and neuropathy and to reflect the inadequacy of screening for microvascular complication and therefore of early prevention of further complications.

Characteristics, Health Status, and Management of Elderly Persons with Diabetes

Results

More than half the people with diabetes are older than 65 years and nearly a quarter are more than 75.

Vascular risk is greater among elderly diabetics than in the general elderly population: 63% of those older than 75 years have hypertension (compared with 44% of the general population of that age). Of those questioned, 45% of men and 48% of women reported dyslipidemia (compared with 16% and 19%, respectively).

Management of the diabetic elderly does not meet ANAES guidelines: only 5.3% have been reimbursed for at least one of the seven reimbursable medical or laboratory procedures recommended by ANAES for monitoring of diabetes patients.

Recommendations

Half of those with diabetes die of cardiovascular disease. It is therefore essential to strengthen secondary and tertiary prevention of diabetes by measuring and assessing vascular risks, from diagnosis or even before, at prediabetes stages.

The new public health act calls for a reduction in the frequency and severity of diabetes complications, especially cardiovascular. The law also aims to ensure that by 2008 at least 80% of diabetics receive monitoring that meets guidelines, including ophthalmoscopy and screening for foot risks. Nonetheless, the ENTRED study demonstrates the continuing inadequacy of screening and of the management of ophthalmologic and podologic risks.

Management of diabetes among the elderly today is associated more with tertiary than secondary prevention activities. It therefore does not meet ANAES guidelines, nor is it appropriate for current life expectancy. Control of vascular risks, especially blood pressure, is essential for maintenance of cognitive functions and mobility among the elderly. Analysis of the ENTRED data continues to provide further information about quality of life, life expectancy, and causes of death among elderly diabetics.

Prevention requires adequate information: AFSSAPS is currently updating its guidelines concerning drug treatment of diabetes. These must be clear. They must also be widely disseminated among physicians who provide health care for patients with diabetes (92% are general practitioners) to improve management of the vascular risks and complications of diabetes.

Specific activities must be conducted among specific populations. The disadvantaged, for example, undergo screening and management less often than others, and persons at an earlier disease stage have specific needs. Finally, the quality of life of the elderly can be optimized if they receive management adapted to their life expectancy.

InVS stresses, finally, the importance of reproducible methods to continue surveillance and characterization of the course of complications and changes in medical practices (vascular risk level, early screening, and management of complications).

Surveillance of People with Hemophilia

Method

An open observational cohort (called the FranceCoag cohort) was set up in January 2003 and transferred to InVS at the start of January 2004. It is made up of patients with hereditary disorders of coagulation proteins, recruited in the 40 specialized treatment centers throughout France (including the overseas districts).

In December 2004, the FranceCoag cohort included nearly 3300 patients—approximately 57% of the 5800 patients expected.

Follow-up of these patients provides information about their geographic distribution and the course of their disease, comorbidities, and coagulation factor use. More specifically, this cohort also contributes to:

- ongoing surveillance that allows the rapid investigation of any newly identified agents that may be transmitted by coagulation factor preparations

- learning the risk factors for development of inhibitors and procedures for managing them

- assessing the feasibility, tolerance, and effect of standardized prophylactic treatments (especially primary prophylaxis).

Within this cohort, patients with severe hemophilia who have received no treatment at inclusion (treatment-naive) constitute the PUPS (previously untreated patients) subcohort. In December 2004, 162 children were included in the PUPS subcohort (dynamic cohort with 30-40 PUPS children born each year in France).

Results

During 2004, the FranceCoag network coordinating center:

- continued inclusion and follow-up of patients with hemophilia in the FranceCoag cohort and the PUPS subcohort

- inspected some fifty hemophilia treatment centers to validate the exhaustiveness of inclusions (fundamental to any effective surveillance), monitor protocol compliance, assess and improve the quality of the transmitted data, and contribute to the network's leadership and cohesion

- organized five meetings of the policy committee, bringing together representatives from various project partners to determine the network's strategic directions

- entered all data collected during 2003 and some from 2004, thus catching up on the delay accumulated since the project began in January 2003

- developed an electronic form that should eventually permit the secure transmission of patient data from the hemophilia treatment centers, planned to begin in July 2005, after approval by the national commission for information technology and privacy (CNIL)

- assessed, at the request of the DGS, the utility of resuming establishment of a DNA bank, based on what already exists in five European countries, the United States, Canada, and Australia. Such a library will be established during winter 2005-2006.

During 2004, three studies analyzed data from the FranceCoag network (results of the first two should be published in 2005):

- assessment of the application of the September 1992 recommendation about vaccination against hepatitis A virus of seronegative persons with hemophilia

- assessment of the consumption of substitution treatments among persons with hemophilia and the factors associated with it

- study of thrombosis markers and their modulatory effect on the hemophilia phenotype (study underway).

Perspectives

In 2005, the FranceCoag network must aim for complete patient coverage and continue data quality control in the participating centers.

Highly secure transmission of patient data by internet will begin and be generalized to all 40 treatment centers.

The first descriptive statistical report of the cohort will be produced at the end of 2005.

Tables presenting the first aggregate data from the network will be posted at webFC, the FranceCoag network website, to provide feedback to participating clinicians and patients.

As part of the plan for improving quality of life in patients with chronic diseases, these patients will be surveyed about this topic.

Finally, the procedures for setting up a DNA bank will be defined so that blood samples can be collected by the beginning of 2006.

Surveillance of Meat Industry Workers

Health and Work in the Brittany Meat Industry

The meat industry (slaughter and cutting of large animals, beef, pork, and poultry) currently faces problems with its workforce (substantial absenteeism and turnover, poor public image, etc.) and their health.

The numerous risks and constraints at work to which employees are exposed may explain these problems. They include:

• daily use of knives and dangerous machines

• use of constraining or uncomfortable movements and postures

• frequent risk of slipping and falling

• exposure to humidity, cold (temperature between 0 and 6 °C), noise, biological agents, and substantial organizational restrictions.

This unpleasant difficult setting may be responsible for the onset of diverse occupational disorders, including musculoskeletal, infectious, and skin diseases, effects of exposure to noise and cold, and malaise at work.

To determine prevention activities appropriate to this industry, a working group of occupational physicians, prevention counselors at the agricultural workers' insurance fund (MSA),

and outside scientific experts developed a procedure to describe the causes of failure and the factors of success for employment in this field.

Four complementary approaches were developed:

• psychodynamic

• biographic

• ergonomic

• epidemiologic.

We present here a summary of the last of these approaches. Conducted in collaboration with the DST at InVS, its objective is to describe the employees' perceived health status (physical and psychological) and to study its association with their job constraints (physical, organizational, and psychosocial).

Method

This cross-sectional epidemiologic study measured employees' health and working conditions over a short period. It covered 6000 employees in four districts of Brittany.

A self-administered questionnaire was used to collect data from the overall employee population (administrative, sales, production, and maintenance). A larger (slightly more than 1000 employees) subsample of production employees (in contact with meat) completed the questionnaire, answered other questions, and was examined as part of their annual visit to the occupational physician.

The questionnaire included social and demographic variables as well as variables describing the job and its organization. Work-related psychosocial factors were described with Karasek's questionnaire (psychological demand, decision latitude, and social support at work), completed by two questions about rewards (salary, promotion) and satisfaction with the resources available for the work. Perceived health was measured by the Nottingham Health Profile (NHP). *

Results

Approximately 3000 employees responded to the mail questionnaire. The sample is representative of all employees in terms of sex, age, and distribution by type of meat (beef, pork, and poultry).

The vulnerability of this population is shown clearly from the low levels of perceived physical and psychological health generally and the high level of musculoskeletal disorders in particular.

The prevalence of poor perceived health was higher for the six dimensions of the NHP (except for social isolation in women) than in other workplace surveys (such as the

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The six dimensions of the Nottingham profile are: pain, energy, emotional reactions, sleep, social isolation, and physical mobility.

multisector survey of health, work, and aging, ESTEV **) and was mostly notably elevated for pain. This poor perceived health was worse in women and increased with age. Moreover, all dimensions of health were perceived to be worse in production employees than among non-production workers.

The results underline the association between some psychosocial factors or aspects of work organization and poor perceived health. The psychosocial factors most frequently associated with poor perceived health included high demand at work, insufficient resources to do good quality work, and low prospects of promotion. Early age at first job and work hours that disrupt sleep rhythms (especially for women) were also associated with poor perceived health.

Perspectives

The data collected offer interesting perspectives for planning prevention activities. To define these activities better, these results were compared with those obtained from the other three approaches. All the results were consistent. This study also allowed us to plan epidemiologic surveillance of the health status and working conditions of meat industry employees. This will be conducted not only among the employees included in this study, by repeating the data collection later, but also among other employees in this industry, through a job-exposure matrix of physical and organizational exposures, constructed by the occupational physicians and prevention counselors who participated in this study.

Surveillance of Mortality by Occupation

There is currently little information available about the impact of occupational factors on the health of the working population. DST is accordingly developing epidemiologic surveillance systems intended to provide diverse indicators about occupational risks in the French population.

It has developed a program of occupational-based mortality surveillance, called COSMOP (cohort for the surveillance of mortality by occupation); its objective is to describe systematically, by occupation, the frequency of different causes of death and their change over time.

COSMOP is designed to identify the sectors and occupations at elevated risk and to orient prevention activities.

Methods

COSMOP is based upon the permanent demographic sample (see sidebar) of the national statistics institute (INSEE), a 1/100° sample representative of the French population. INSEE has transmitted to InVS social, demographic, and occupational information about 322 030 men and 332 368 women aged 16 years or older in 1990.

InVS selected from this initial sample the individuals who provided complete occupational information and reported paid work at least once in the four censuses from 1968 through 1990. Of this group, 35 968 men and 13 797 women died between 1968 and 1999. CepiDc records provided the reported cause for 97 % of these deaths.

Mortality for each industry, both overall and by cause, was systematically compared to that of all other industries. These analyses were conducted separately for men and women.

> The INSEE demography department administers the permanent demographic sample (EDP), which is based on the 1968 census. For each sample subject, INSEE has collected and accumulated all data from public records and four censuses (1968, 1975, 1982, and 1990).

Results

Men in all the industrial sectors (except electric and electronic manufacturing) show a trend of excess mortality, which concerns cancers, noncancer diseases, and violent deaths, depending on the industry.

Mortality in the tertiary or service industry does not differ from that in other industries, with two exceptions: the retail food and hotel-restaurant industries, where we observed an excess of deaths from gastrointestinal cancers, some non-cancer diseases, and violent deaths.

Men in the agriculture sector appear to die less often than those in other industries of cancer and ischemic heart disease but at excess rates for non-cancer diseases and suicide.

The low percentage of women, especially in the industrial sector, makes comparisons about them unreliable. While a difference is seen in domestic services, where women die at excess rates from non-cancerous diseases, the results are essentially the same as those for men in the service industry (with the same trend observed in the hotel-restaurant industry) and agricultural sector (lower mortality from cancer and excess deaths from non-cancerous diseases and suicide).

** ESTEV, a survey method. In: Derriennic F, Touranchet A, Volkoff S. Âge, travail, santé. Études sur les salariés âgés de 37 à 52 ans. Enquête Estev 1990. Editions Inserm 1996.

Perspectives

The EDP has some disadvantages for use in surveillance of mortality by occupation:

• While it has advantages for this type of analysis, especially because it is representative of the French population, its size is too small to show associations in relatively small industries, for rare causes of death, or for the study of mortality by occupation among women.

• Moreover, the absence of information about the occupational history of these individuals between censuses and before 1968 results in neglecting a part of their occupational activities, especially the oldest, and prevents any study of the risk of death as a function of time actually spent in a given industry.

These limitations suggest the need for another source of data to construct a regular description of different causes of death by occupation and monitor their changes over time. This vast dynamic cohort representative of salaried employees, also managed by INSEE, is based on employers' annual social data reports (DADS) and is used to produce regular statistics about employment.

Recommendations

Although COSMOP, like other surveillance programs of this type, does not allow us to deduce causal relations between given occupational activities and disease onset, it has offered the first indicators of mortality in France by type of occupation and by cause. Monitoring their changes over time and comparing them with current knowledge of occupational risk factors will make it possible to identify possible health problems associated with the workplace.

Accordingly InVS recommends that this type of program be perpetuated to meet the need for surveillance.

Follow-up of Employees and Rescue Workers at the AZF Factory

After the explosion on 21 September 2001 at the AZF chemical plant in Toulouse, an epidemiologic surveillance program began to assess its effects on the health of AZF employees and rescue workers.

In September 2002, a cross-sectional survey assessed the material, physical, and psychological consequences to these subjects and their short-term healthcare use. This survey also made it possible to collect the data necessary for a later analysis of their causes of death.

Working with the health examination center of Toulouse as well as the CeTAF of health examination centers, InVS set up a cohort of volunteer employees and rescue workers in May 2003 to assess the intermediate-term (5-year) health impact and occupational outcome of this cohort.

Cross-sectional Survey

Method

The Toulouse metropolitan area was divided into two areas:

• the nearby zone, which covered the explosion site and the area within a three-kilometer radius

• the distant area, defined as the rest of the Toulouse metropolitan area.

This cross-sectional survey was conducted among two groups:

• adults working in the Toulouse metropolitan area on the date of the explosion

• professional and volunteer rescue workers of the Haute-Garonne district.

The data were collected by self-administered questionnaires, which made it possible to assess direct (physical, psychological) and indirect (residential, work) consequences and subjects' access to care.

Posttraumatic stress* was measured with the revised "Impact of Event Scale."

The initial results concern the 6013 workers in the area near the explosion who completed the questionnaire.

Initial results of the Cross-Sectional Survey

Approximately 24% of men and 20% of women working in the nearby area were injured, and 3% and 2%, respectively, were hospitalized.

The prevalence of posttraumatic stress was 12% among men and 18% among women in our sample.

The survey revealed a difference according to socio-occupational category: manual and office workers, artisans, and shopkeepers were more affected by posttraumatic stress (respectively 19.8% and 17.4%) than managers (5.5%), intermediate white-collar occupations (9.6%), or technical and supervisory employees (14.4%).

Similarly, those who were injured had posttraumatic stress more often than those who were not.

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*Symptoms of posttraumatic stress are: sense of reliving the event in memories or thoughts, avoiding places reminiscent of the event, irritability, insomnia, etc.

Cohort study

At the end of the cross-sectional survey, 5000 persons volunteered to participate in a five-year longitudinal follow-up.

The inclusion phase involved a health work-up (clinical examination and other testing, especially sensorineural) and the collection of another self-administered questionnaire (mental health and occupational history) of cohort members. The inclusion phase ended in June 2004 with more than 3000 volunteers participating. The sex ratio is close to 1 and mean age is 44 years. The data are currently under analysis.

The annual follow-up will also use self-administered questionnaires. The first year began in May 2004 and ended in June 2005

This cohort study allows us to explore the use of two databases to follow up subjects for future national occupational cohorts: Erasmus, a database of the national health insurance fund, which records healthcare use for salaried workers, and the DADS database of the national pension fund, to follow workers' occupational histories. Access to this database is being discussed with the national commission for information technology and privacy.

Perspectives

The initial results of the cross-sectional survey are being examined in more detail to identify the associations between the immediate physical consequence of the explosion, social and occupational factors, and posttraumatic stress, as well as their interaction with other factors of vulnerability.

The longitudinal study makes it possible to assess long-term consequences, especially on mental health and social and occupational variables. It will also make it possible to experiment with implementation and follow-up procedures for a cohort of workers.

Surveillance of Self-Employed Workers

ESPrI Program: Epidemiologic Surveillance of Self-Employed Workers

Little is known about occupational diseases among self-employed workers, who are covered by a special health insurance fund. "Independent" occupations (artisans, shopkeepers, professionals, consultants, etc.) receive no occupational medical surveillance and have no coverage for occupational diseases. In addition, the current legal provisions for post-retirement medical follow-up (article

D. 461-25 of the Social Security Act) do not apply to these occupations.

Accordingly, the national health insurance fund for self-employed workers (CANAM) decided to set up a surveillance system of self-employed occupations exposed to occupational hazards. This program, named ESPrI (epidemiologic surveillance of self-employed workers), is coordinated by the InVS DST.

Objectives

ESPrI has two specific objectives:

- the medicosocial objective is intended to identify those self-employed occupations (in priority artisans) exposed to carcinogens (especially asbestos) during their career so that they can receive medical follow-up;

- the epidemiologic objective is to follow up the cohort thus established, with a regular description of exposures and their changes over time, description of health events, and studies of morbidity and mortality.

Method

Beginning in 2005, a pilot surveillance system will be established in the regions of Aquitaine, Limousin, and Poitou-Charentes, which cover 12% of France. Its procedures follow those used in the post-retirement follow-up asbestos study in health examination centers (Espaces) (2001), which developed and assessed a procedure for identification of retirees from the salaried workers' fund who had been exposed to asbestos. They are also based on the guidelines of the consensus conference (1999) on the medical and clinical follow-up of persons exposed to asbestos.

Approximately 1200 persons, all recently retired artisans (men and women), make up the population included in the pilot system during the first year. The study will:

- collect work history from the artisans selected, with a self-administered mail questionnaire

- provide expert assessment of their occupational exposure to asbestos on the basis of the information collected

- offer medical follow-up with a baseline work-up by the physician of their choice (general practitioner or specialist) when asbestos exposure is found.

Practical Organization and Provisional Calendar

The pilot program is organized around three regional insurance funds (Bordeaux, Niort, and Limoges), the occupational disease department of Pellegrin Hospital (Bordeaux), and an InVS coordinating center (Bordeaux).

InVS will assess the pilot system during 2006 after the first year of operation and will make recommendations to CANAM about the generalization of the system by 2007 to all self-employed workers and about the extension of surveillance to other carcinogens.

Surveillance of Avian Influenza in Asia

Surveillance of Avian Influenza A (H5N1) in Vietnam and Cambodia

Background

In January 2004, a strain of type A influenza virus (H5N1), responsible for epizootics, was identified in avian outbreaks in Vietnam and reported to the OIE (World Organization for Animal Health). In the following weeks, infected bird outbreaks were identified in eight countries of Southeast Asia: Thailand, Vietnam, China, Cambodia, Indonesia, Laos, South Korea, and Japan.

Also in January 2004, human cases of avian type A influenza (H5N1) were identified among children hospitalized in Hanoi, Vietnam.

Missions to Vietnam and Cambodia

InVS seconded two epidemiologists to WHO to participate in the missions of GOARN (Global Outbreak and Alert Response Network)—an international network to respond to epidemics, coordinated by WHO. From 29 January to 26 February, InVS contributed to two epidemiologic support missions, one to Vietnam, one to Cambodia.

In Vietnam, the multidisciplinary international mission intervened to support the health authorities to:

• develop and implement appropriate surveillance

• investigate human cases suspected of bird flu

• set up tools to improve knowledge about the human forms of avian influenza.

In Cambodia, the support team for the WHO Phnom Penh office, an epidemiologist from InVS and a virologist from the Institute Pasteur of Paris, provided support in particular to:

• set up a system for reporting and investigating suspected cases

• help the Pasteur Institute of Cambodia develop laboratory diagnostic techniques

• orient measures to control the animal and human cases

• prepare a plan for response to the onset of human cases.

Conclusion

These two international missions helped to strengthen InVS's contribution to the WHO alert and response network and participated in investigations to improve scientific and epidemiologic knowledge of the human forms of this bird flu. They also obtained information necessary to the adaptation of control measures in France and to the development of French plans to respond to an influenza pandemic.

Surveillance of Transmissible Subacute Spongiform Encephalopathies

Inventory: 11 Years of Surveillance of Transmissible Subacute Spongiform Encephalopathies (TSSE)

A first national network of epidemiologic research on Creutzfeldt-Jakob disease (CJD) was created in 1992 at INSERM's initiative. It had a double objective: research (CJD incidence and risk factors) and epidemiologic monitoring. Several years later, to increase vigilance in the context of the second "mad cow disease" episode during the second half of 2000, the national network for surveillance of Creutzfeldt-Jakob and related diseases (RNS-CJD), coordinated by InVS, took over and strengthened the earlier network.

Surveillance in France

The general surveillance procedures changed little between 1992 and 2002. They follow a clearly defined protocol: INSERM U360 centralizes all reports of suspected CJD from all network partners—neurologists, neuropathologists, medical and genetic laboratories, as well as mandatory reporting of suspected CJD. The epidemiologic, clinical, genetic, and neuropathologic data of each suspected case are collected according to standardized protocols. Each reported case is followed until a final diagnosis and etiological classification. Prion typing may be requested by an authorized laboratory for the cases that are difficult to classify.

Epidemiologic surveillance is based on diagnostic criteria (possible, probable, or confirmed) and etiological classification (sporadic, genetic, and acquired forms). Each month, INSERM U360 transmits to InVS the number of deaths per year and per type of CJD; these data are published on the InVS website. In December 2004, the RNS-CJD published a report on the epidemiologic surveillance of CJD from 1992 through 2002.

Perspectives

Epidemiologic surveillance of CJD must be made permanent because of the complexity of the disease, the diversity of exposures, the limited time passed since its emergence, and the uncertainties of the evolutionary potential of prion diseases.

Coordination, leadership, and support for this national CJD surveillance network must therefore be planned for the long term (by decade) and provided by InVS and INSERM.

Figures

Between 1992 and 2002, 991 deaths by CJD (confirmed or probable) were recorded for all of France (including the overseas districts and territories): 805 sporadic cases (81%), 91 iatrogenic (9%), 80 associated with growth hormone treatment (8%), 89 familial cases (9%) and 6 cases of vMCJ*.

A first crisis occurred in 1996 at the time of the identification, in Great Britain and then in France, of the variant Creutzfeldt-Jakob disease (vCJD) due to the BSE (bovine spongiform encephalopathy) agent.

B - Studies of the 2003 Heat Wave

"A study is a specific procedure to analyze a health problem and its determinants. In some cases, the repetition of studies at regular intervals can constitute a surveillance system."

At the request of the Ministry of Health, InVS, in collaboration with INSERM, began several studies in the weeks after the summer 2003 heat wave to identify the heat-related risk factors for mortality among the elderly. The objective of these studies was to define the profiles of the most vulnerable persons in order to guide prevention programs.

Risk Factors for Death for Elderly People Living at Home

> Nearly all (91%) those who died during the heat wave, between 1-15 August, were elderly, aged 65 years or older, and 35% of them lived at home.

Method

We conducted a case-control study to identify the risk factors for mortality among the elderly living at home during the heat wave.

The study matched 259 pairs of cases and controls. The cases were people who died between 8-13 August of causes other than accidents, surgical complications, or suicide. The controls were people who survived the heat wave, matched to cases by sex, age group, and place of residence.

The variables analyzed included social and demographic characteristics, specific behavior during the heat wave, social and family environment, mobility, health status, and characteristics of housing and environment (within a 200-meter radius).

Results

The results of three multivariate analyses showed that the principal risk factors for death were socioeconomic status, mobility, underlying disease (cardiovascular, neurological, or psychiatric), quality of residential insulation, bedroom on the top floor (below the roof), and elevated temperature

(index of the surface temperatures for a 200-m radius around the home, measured by satellite).

Some adaptive behavior had protective effects (dressing lightly, use of cooling techniques and devices).

Recommendations

The results, consistent with those of other studies, highlight the importance of individual behavior for protection against heat and the need to improve the immediate environment to maximize prevention.

They lead to the following recommendations:

• pay particular attention to vulnerable persons (very elderly, mobility-impaired, obese, ill, etc.)

• promote preventive behaviors and educate the population

• take measures to improve thermal insulation, protection against the sun, residential airflow in homes, and plant cover in urban areas.

The latter recommendation, which can be effective only in the intermediate or long term, merits more detailed consideration in view of the global warming that augurs repetition of longer and hotter heat waves.

Risk Factors for Death among the Institutionalized Elderly

Method

To identify the risk facts for death associated with individual behavior and with the institution among the mobility-impaired elderly living in retirement homes, we conducted two simultaneous surveys:

• an "institution" survey (175 pairs of institutions with low and high mortality) that examined their architectural characteristics, equipment, environment, and the number and qualifications of employees

• an "individual" survey (314 pairs of cases and controls selected from 172 of the 175 establishments), which collected information about variables including demography (age, sex, and socioeconomic status), mobility, health status, drug intake, social contacts (visits and accessible media), room characteristics, individual behavior, and so on.

Both studies used a case-control methodology.

Results

Institution survey: the principal risk factors were the legal status of the institution (for example, public/private, profit/not-for-profit), a high percentage of residents older than 94 years, location in an urban environment (surrounded by buildings at least 3 floors high), and residents on intravenous "drips" outside the heat wave period.

Showers more than once a week were associated with better prognosis for survival.

Methodological limitations prevented an assessment of the role of architectural factors.

Individual survey: the principal individual risk factors were social and demographic characteristics, health status (mobility and drug intake), and adaptive behavior during the heat wave.

The persons able to move around and dress themselves, able to adapt their behavior to the heat, and with access to at least one form of media or with at least one living child had a lower risk of death.

Despite the rarity of air conditioning, the surveys showed that access to it was protective.

Recommendations

The surveys showed how little latitude was available to nursing home staff faced with additional work caused by the heat wave. It also showed that they were unaware of the appropriate steps to be taken during heat waves and thus could not provide effective prevention or treatment.

Organizational and adaptive measures (more medical staff, air conditioning, availability and encouragement of showers) and training for the medical staff about the behavioral adaptations necessary during heat waves, could have had a real influence on survival prognosis if they had been in place beforehand.

Individual and Behavioral Factors That May Have Affected the Health of the Elderly

Methods

The first surveys quantified the excess mortality during the summer 2003 heat wave, demonstrated that its principal victims were the elderly, and identified individual risk factors in this population.

For the next task—assessing its impact on morbidity—InVS, working with INSERM, turned to two existing cohorts of elderly persons.

The Paquid and Three Cities cohorts have both collected substantial quantities of individual information, including factors identified as possibly associated with heat effects. A study of each cohort examined the association between morbidity (perceived and real) associated with the heat and an assortment of different variables (social and demographic characteristics, mobility, health status, residence, and adaptive behavior).

> **Paquid Cohort:** created in 1998 by ISPED, composed of a randomized sample of 3777 subjects aged 65 years or older, designed to study cerebral and functional aging.
>
> **Three Cities Cohort:** created in 1999 by INSERM, composed of a randomized sample of 9294 subjects aged 65 years or older, designed to analyze the relations between cardiovascular diseases and dementia.

Results

The vast majority of subjects behaved appropriately during the heat wave (leaving home and opening windows at appropriate times, using a fan, eating fruit, and paying attention to the prevention messages disseminated by the media).

The study showed that the heat wave affected not only mortality but also perceived morbidity among the elderly. It also showed that actions as simple as opening windows to air the home reduced heat-related morbidity. The health risk from heat was greater among people with limited mobility, who were dependent on others for such actions.

Recommendations

These survey results, combined with those from other studies, especially those about the effects of adaptive behavior, suggest that simple measures, taken at the individual level, effectively protect the elderly against the effects of heat. Those with impaired mobility, less likely to be able to adopt these appropriate behaviors, should be the object of increased surveillance.

Infant Morbidity Requiring Hospitalization

Method

The study compared the number of daily admissions of infants during the 2003 heat wave with the same data from 2000-2002 to determine whether there was an

increase in infant morbidity during this period. A first estimate was based on PMSI hospitalization data. Six cities were selected according to their size and the impact of the heat wave, defined by excess mortality (Paris, Lyon, Dijon, Tours, Lille, and Marseille), and 20 public and private (not-for-profit) hospitals participated.

The descriptive analysis concerned only the total admission data of children younger than 15 years, for the period from 1-20 August 2003. Comparisons were conducted separately for all children and then by age groups (0-1 year, 2-5 years, and 6-14 years).

> PMSI is intended to conduct medicoeconomic analyses of hospital activity for organizational and funding purposes. Continuous collection of standardized data makes it possible to describe hospitalization in health-care facilities.

Results

The results showed no evidence of increased hospitalization among children younger than 2 years or for those 6-14 years (except in Lille, where pediatric admissions had decreased in the preceding years). There was a moderate augmentation —4-15%—in admissions for children aged 2-5 years.

Recommendations

The minimal change in admissions seen in this study offers evidence that parents, made aware of the effects of heat and informed of appropriate preventive measures, were able to protect their children.

Nonetheless, the higher figures for the 2-5 year-old age group, probably considered less fragile and therefore less protected, show that it is important to stress that preventive measures during a heat wave should be applied to all children younger than 6 years, because their bodies, regardless of their age, do not adapt easily to heat.

C - Investigations

"Epidemiologic investigation is based on studies conducted in real time and in the field, intended to examine the circumstances in which a given health problem occurs, to analyze its determinants in order to be able to reach conclusions, and to make recommendations for its control and prevention."

In 2004, as always, InVS investigations most often concerned epidemics of infectious origin. The work on two nosocomial infections illustrates this procedure especially well. In addition, an epidemic among newborns in Mayotte (in the Indian Ocean) was diagnosed as beriberi and discovered to be due to a nutritional deficiency.

Beriberi Epidemic in Mayotte

Between 4 April and 4 May 2004, pediatricians at the Mamoutzou Hospital Center in the overseas district of Mayotte observed an unusually high number of infant deaths. These children, aged 1 to 3 months, had no notable medical history: cardiorespiratory distress appeared brutally and was rapidly fatal.

Early on, the pediatricians proposed the hypothesis of beriberi (deficiency of vitamin B1, that is, thiamine), and InVS sent a field mission for an epidemiologic investigation. The objectives of this mission were to document this health phenomenon with precision, identify its risk factors, and suggest control measures.

Method

The method consisted of an emergency reporting system based on a case definition with three probability levels (suspected, probable, and confirmed cases), and a reporting channel.

A standardized case report form was drafted and transmitted to all physicians on the island. They were to complete the form for every child meeting the case definition and fax it to the Mayotte Health and Welfare Bureau. InVS and the public health physician there were responsible for analyzing these data, which described the epidemic in terms of time, place, and people.

An analytic case-control study was conducted among 21 mothers of affected children and 40 control women. Local health educators interviewed the mothers at home, using a standardized questionnaire about sociocultural, clinical, dietary, and environmental factors.

The investigators also looked for infectious, toxic, or other cofactors known to be associated with beriberi.

Results

The InVS investigation identified 32 cases of beriberi, 20 of them fatal, in children between 4 April and 13 July 2004. 85% of the mothers were Comorian. They had lived on the island for an average of six years. Clinical signs suggestive of beriberi during pregnancy or just after birth were reported by 44%.
Analysis of the case mothers' diets showed they were less diversified than those of the control mothers during pregnancy and after birth. It also showed that the case mothers had eaten more *oubou* (boiled rice) than the control mothers and had used less milk-based formula.

None of the cofactors sought were found.

An emergency campaign of vitamin B1 supplementation controlled the epidemic.

Recommendations

The epidemic of beriberi in infants in Mayotte showed dietary deficiencies due to economic and cultural factors.

The control measures stopped the epidemic, but did not resolve the underlying dietary and nutritional problems, which may therefore produce other health emergencies.

InVS recommended:

- continued thiamine supplementation of pregnant women and infants until intermediate- and long-term measures are developed and put into place

- continuation of specific beriberi surveillance (monitoring the epidemic course and appearance of any new cases and assessing the effectiveness of the supplementation campaigns)

- reinforcement of prevention measures and promotion of a varied diet among pregnant women and nursing mothers in Mayotte

- studying the feasibility of supplying the island with rice of better nutritional quality than that currently available

- documenting the prevalence of *lalavi* (a term from the Mayotte dialect Shimaore that designates a sensorimotor polyneuropathy suggestive of beriberi) and other possible vitamin and nutritional deficiencies among the pregnant women of the island

- preparation of a population-based study of nutritional behavior and practices in Mayotte to assess the population's nutritional status

- identification of all possible deficiencies and appropriate adaptation of prevention campaigns and strategies

- application of these results to setting up a specific prevention strategy for beriberi in Mayotte, as well as a much broader strategy for management of the serious nutritional problems Mayotte faces.

Nosocomial Infections by Multidrug-Resistant Bacteria

Late in 2003, InVS received reports from several hospitals of case clusters of infections or colonizations by a species of multidrug-resistant bacteria *(Acinetobacter baumannii)* and issued a nationwide alert. These bacteria, frequently resistant to numerous antibiotics, are responsible for nosocomial infections in units that treat vulnerable patients. They produce an enzyme (extended-spectrum beta-lactamase, or ESBL, VEB-1 type) that makes them resistant to all beta-lactams. They remain sensitive to two antibiotics: imipenem and colistin. RAISIN (alert network for the investigation and surveillance of nosocomial infections) conducted a nationwide investigation.

Method

The investigation relied on the nosocomial infection reporting system, which involves hospital hygiene teams, district health and welfare bureaus (DDASS), the CClin, and InVS. It also involved the expert laboratory at Bicêtre UHC.

The system was reinforced by informing bacteriology laboratories across the country of the characteristics of

this particular strain and urging healthcare facilities to report their cases. The CClin distributed specific recommendations of measures to prevent and control transmission of these bacteria.

Two types of cases were defined:

• probable case: any patient infected or colonized since April 2003 by a strain of *A. baumannii* with an antibiotic resistance profile identical to that of the epidemic strain

• confirmed cases: those for which VEB-1-type ESBL production was confirmed by the expert laboratory.

Among these cases, colonizations (isolation of the bacteria in a patient with no clinical signs of infection) were distinguished from infections (isolation of bacteria from patients with clinical signs).

Results

By June 2004, 54 healthcare facilities in 15 districts and 8 regions had reported 290 probable cases of infection or colonization by ESBL-producing *A. baumannii*, diagnosed between April 2003 and May 2004. By the time of the report, 34 (11%) patients had died. Most had previously been in critical condition in the intensive care unit, and these deaths cannot all be attributed to the infection.

• 88% of the cases were identified by the reporting system and 12% by the Bicêtre UHC laboratory.

• 75% were documented clinically: 33% were infections and 67% colonizations.

• 95% of the strains were confirmed to produce ESBL VEB-1. All the strains studied were still sensitive to imipenem.

Contribution of Reporting and Laboratory Expertise

After January 2004, the number of new cases reported each month fell regularly; the RAISIN coordination committee gradually lifted the alert, while maintaining strict vigilance around several residual outbreaks. InVS continues to collect reports and can at any moment reactivate the surveillance recommendations. At the same time, the expert laboratory remains available to healthcare facilities to confirm the resistance mechanisms of isolates.

These measures and this nationwide investigation demonstrate the usefulness of the reporting system for the detection and control of infections in hospitals. More recently, a similar system permitted us to alert healthcare facilities about the emergence of a new multidrug-resistant strain of *Klebsiella pneumonia* in a hospital in the Paris region.

Nosocomial Infections
by *Enterobacter Sakazakii*

Reporting and microbiological expertise also played an essential role in the detection and control of case clusters of nosocomial infections by *E. Sakazakii*.

Reports and Alerts

On 10 December 2004, while InVS and CClin were investigating the death of a premature infant (in a hospital in Auvergne) associated with infection by *E. Sakazakii*, another report of nosocomial infection with this bacteria in three newborns came from a hospital in the Paris metropolitan region.

The simultaneous but geographically disparate reports of this infection suggested a common and potentially widely distributed source of contamination, and a nationwide investigation began immediately to identify this source. It found that these children had all drunk milk from the same brand of powdered formula, but from three different lots.

Preventive and informational measures were taken immediately: the lots were recalled; the DGS issued a press release intended for the general public; a free emergency telephone number was set up; InVS sent notifications through the European alert network, EWRS (Early Warning and Response System) to the public health institutes and health authorities of member states. At the same time, the CClin, all DDASS, and all healthcare facilities with maternity, neonatology, or pediatrics wards were instructed to report all cases of nosocomial *E. Sakazakii* infection to InVS.

A week after the national alert, on 17 December 2004, InVS had received reports of four infections (including two deaths) and five digestive colonizations by *E. Sakazakii* in five different hospitals between 25 October 2004 and 13 December 2004.

All these children had had milk-based formula from the brand already identified. All lots still on the national market were recalled and analyzed. *E. Sakazakii* was identified in several of them.

Contribution of Reporting
and Microbiological Expertise

The data transmitted to InVS enable it to detect case clusters dispersed across the country and not recognized at the local level.

The report of two deaths, one in Auvergne and one in the Paris area, enabled the speedy identification of the source of these infections and implementation of control measures.

These control measures probably prevented new cases in France and even beyond. The producer withdrew all lots distributed worldwide and suspended production of this formula.

This procedure also launched a reevaluation of the hygiene conditions surrounding bottle preparations in all hospitals reporting this infection, by the CClin working with the hospital hygiene teams and the DDASS. AFSSA will soon issue specific guidelines for the preparation, handling, and storage of baby bottles.

Investigation of an Epidemic of Hepatitis A

In November 2004, several cases of hepatitis A were reported in a nursery school in Puy-de-Dôme (63). After the first report to Puy-de-Dôme education officials and then to the DDASS, the information arrived at the Auvergne regional epidemiology bureau.

With InVS, it conducted an epidemiologic investigation to describe the epidemic, determine its scale, identify its source, and implement appropriate control and prevention measures.

Method

This investigation comprised three complementary components—epidemiologic, microbiologic, and environmental. The epidemiologic survey was conducted among persons working or otherwise frequently at the school or belonging to a household with a child attending the school. It was a retrospective cohort study.

The microbiological survey used saliva samples, which the national reference center for hepatitis A virus (Paul-Brousse Hospital in Villejuif) tested for total antibodies and IgM. Finally, the environmental investigation examined the general hygiene of the school facilities, its operations, and sanitary equipment.

Results

Between 20 November 2004 and 7 January 2005, 29 cases of hepatitis A virus infection were identified. Ten were asymptomatic and 21 were associated with the school. The case distribution on the epidemiologic curve suggests a limited common source of infection, but none was identified.

Responsive measures

This epidemic led to the following control and prevention measures: hygiene measures in the school, information meetings, vaccination of persons likely to transmit the disease, and active surveillance of cases by local physicians and laboratories.

The follow-up of this epidemic continued through February 2005. This investigation shows the usefulness of saliva tests in studying hepatitis A virus transmission, by facilitating identification of asymptomatic forms.

D - New Approaches

InVS must produce health surveillance data of high scientific quality, within appropriate deadlines, and at a reasonable cost.

Accordingly constant methodological improvements are necessary. These depend on support from what others produce, effective and pedagogical communication, and using new skills and techniques, such as biomathematics.

HIV Infection and Acute Hepatitis B: Two New Diseases for Mandatory Reporting

In 2003, InVS set up a new system of mandatory disease reporting (MDR) aimed at meeting two goals:
- maximizing protection of people's anonymity
- improving surveillance of mandatory-reporting diseases.

The new system now includes HIV and acute hepatitis B so that we can estimate their incidence, follow their changes over time and in space, identify the populations infected, assess the impact of prevention policies, and, where appropriate, adapt them.

HIV infection

Results

From January 2003 through March 2004, InVS received 3349 reports of new HIV infections (3333 adults and 16 children). 49% of the newly diagnosed people lived in Île-de-France (the Paris metropolitan region) and 7% in the French West Indies (Guadeloupe, Martinique, and French Guyana). 43% were women, and mean age at diagnosis was 36.3 years. More than half the cases (57%) were infected through heterosexual relations, 21% by homosexual relations, and 2% by injection drug use.

Recommendations

Read with the AIDS surveillance data, these results show that the populations most affected by HIV in France are male homosexuals and people (especially women) from sub-Saharan Africa.

Among homosexuals, data collected from behavioral surveys (Presse-Gay, Baromètre Gay) and surveillance of sexually transmitted diseases (STD) indicate a resumption of risk behaviors.

Populations from sub-Saharan Africa, often disadvantaged, have inadequate access to HIV screening. Prevention activities among these populations must be reinforced.

The low proportion of drug users among the new diagnoses confirms the impact of risk reduction policies but monitoring and prevention activities must continue, especially since other indicators show that HCV infection continues to spread in this population.

Virologic surveillance of HIV was implemented at the same time as its mandatory reporting and is paired with it. It provides the following additional information:
- 32% of the newly discovered cases of HIV between January 2003 and March 2004 had been acquired within the previous six months;
- 2.3% of the diagnoses concern infections by HIV-2;
- 50% of the HIV-1 infections are due to the non-B subtype.

Acute Hepatitis B

Results

From 1 March 2003 through 1 March 2004, InVS received 418 reports of hepatitis cases, 158 (38%) of them acute hepatitis B.

The sex ratio for these 158 cases was 2.95 (118 men/40 women). Distribution by age group was similar for men and women, with most cases observed in the 30-39 year age group (28.5% of all cases and 22% of the men), followed by the 40-49 year age group (24.7% of all cases and 20% of the men).

Recommendations

These initial data must be interpreted prudently, especially in terms of trend analysis. They nonetheless show that vaccination has affected and probably lowered the incidence of acute hepatitis B. That is, this incidence appears lower than that estimated at the beginning of the 1990s. Because of their widespread vaccination between 1994 and 1998, young adults aged 20-30 years are no longer the age group hit hardest.

Sensitizing Health Authorities to Surveillance: the Example of Legionellosis

Epidemic in Nord-Pas-de-Calais

Since 1976, the year of the first legionellosis (severe respiratory disease due to legionella bacteria) epidemic, which occurred during a conference of American military veterans), numerous epidemics have been described in North America and western Europe. The first epidemic in France was identified in 1998. Since this date, epidemic episodes and alerts about case clusters have multiplied. Between 5 November 2003 and 22 January 2004, the Nord-Pas-de-Calais region faced an unprecedented legionellosis epidemic, with 86 confirmed cases. This epidemic was the largest ever described in France in terms of duration, geographic scale, or number of cases. Its scale may be explained in part by its occurrence in a population made vulnerable by silicosis.

All these events, especially the Nord-Pas-de-Calais epidemic, contributed towards increasing the awareness of healthcare professionals, public officials, and health authorities about the need for stronger surveillance and for risk reduction activities. Different initiatives have thus been proposed, mobilizing simultaneously the national government and national and local health authorities:

- implementation of a government plan for legionellosis prevention 2004-2008

- organization of a legionellosis seminar by InVS

- revision of the manual for the investigation and management of legionella risks.

Government Plan for Legionellosis Prevention

Developed by the Ministries of Health and of the Environment and made public in June 2004, this plan aims to cut the number of legionellosis cases in half by 2008.

It is intended to improve the identification, containment, and surveillance of possible sources of contamination, with special attention to the most common sources of legionellosis epidemics (cooling towers and hot water networks). The legionellosis plan will reorganize the intervention of government departments in the case of epidemics and improve knowledge of the bacteria and the disease.

To coordinate the research and studies necessary for this purpose, InVS, the French agency for environmental safety and health (AFSSE), and the national institute for environmental and industrial risks (INERIS) set up a legionellosis concerted action (LCA) to facilitate funding various research projects in areas ranging from microbial ecology and bacteria-host relations to improved detection methods, clinical epidemiology, and reservoir control.

Legionellosis Seminar

On 21 September 2004, InVS organized a seminar that brought together the various actors involved in dealing with legionellosis epidemics, that is, representatives of the relevant Ministries (Health, Environment), the relevant district offices (DDASS, DRIRE), agencies (InVS, Cire, AFSSA, INERIS), the legionella CNR, and experts in the field (including the Paris hygiene laboratory and the Pasteur Institute of Lille).

The development of knowledge in recent years and the availability of new tools (such as modeling, microbiology, and environmental analyses) necessitate the sharing of various experiences. This feedback toward our partners of approximately ten episodes of case clusters allowed us to discuss the lessons to be drawn from them in terms of organization, to improve management of alerts and microbiological and environmental expertise, and to envisage new directions for research.

At the conclusion of this seminar it appeared that regular meetings would allow deeper assessment of specific aspects, including plume modeling and assessment of new microbiological tools.

Revision of the Investigation Guide for One or Several Cases of Legionellosis

Published in 1996, this practical guide was intended to sum up knowledge of legionellosis and recommend the action to be taken to improve prevention in each case.

New knowledge and experience acquired in recent years in the management of alerts and investigations of case clusters made a revision necessary. A new manual for the investigation and management of legionella risks has been drafted by the Ministry of Health, InVS, and the Ministry of the Environment (available July 2005).

Comparison of Several Data Sources: the Example of Mesothelioma

On 30 March 2001, *Le Point* magazine published the results of an analysis of mesothelioma cases based on PMSI data: it reported 1366 cases treated during 1998 in public and private healthcare facilities. This figure suggests that the national mesothelioma surveillance program (PNSM), which reported between 609 and 811 cases that year, is underestimating asbestos hazards. Asbestos is the cause of most cases of mesothelioma, which is in turn by far the most frequent type of pleural cancer.

A study thus compared the data recorded in 1998 and 1999 by the PNSM and those recorded in the anonymized hospital discharge summaries (RSA) of the PMSI for the same period and geographic zone. This study was also intended to determine the extent to which PMSI data could be used for epidemiologic surveillance of pleural mesothelioma.

National Mesothelioma Surveillance Program (PNSM)

This program began on 1 January 1998 with three principal objectives:

• to estimate the national incidence of pleural mesothelioma in France

• to study occupational and nonoccupational risk factors and the fraction of mesotheliomas attributable to occupational asbestos exposure

• to analyze reporting and recognition procedures for occupational diseases, to improve compensation.

Supported by networks of partners, the PNSM was set up in 21 districts. All possible cases of pleural cancer or suspected pleural mesothelioma are supposed to be reported to PNSM. The diagnosis is certified by a group of expert pathologists or by specialists when there are insufficient or no samples available for pathologists to test.

An initial assessment estimated the national incidence to be between 609 and 811 cases, of both sexes, during 1998, with a ratio of approximately 4 men to every woman.

Medical Information Systems Program (PMSI)

Since 1991, all healthcare facilities are required to assess and analyze their activity. They must furnish these data to PMSI, which thus constitutes a medical-administrative database of the activity of healthcare facilities through records of all hospitalizations. This database is constructed on an anonymous basis and contains anonymized discharge summaries that supply information on reasons for admission and diagnoses.

Method

The first stage of the analysis requires identifying from the PMSI database the possible multiple admissions of patients with pleural mesothelioma, to identify the duplicates (the same person hospitalized several times for the same disease during the year). The prevalent cases recorded in the PMSI, database were also estimated, that is, the patients treated for mesothelioma during the year under consideration (regardless of date of diagnosis); this therefore included the cases for which diagnoses were known earlier. These data were then crossed with those of the known PNSM subjects, according to an indirect matching method (age and municipality and/or district of residence). Thereafter, a case-by-case validation in the Loire-Atlantique district compared the PMSI and PNSM data according to specific identification criteria.

Results

These methods of grouping possible multiple admissions ("unduplicating") for the same patient were effective because of the rarity of the disease: in 1998, the 1263 hospital admissions selected concerned 506 different subjects, 230 of whose diagnoses were coded as pleural mesothelioma; in 1999, the 1263 hospital admissions selected concerned 474 different subjects, 232 with diagnoses coded as pleural mesothelioma.

Matching the two files for 1998 showed that 70% of the PNSM cases and 37% of the PMSI cases had common demographic characteristics. In 1999, there figures were 68% and 28% respectively.

This case-by-case validation verified that the unduplicating procedure was globally satisfactory. The comparison with the cases recorded in the PNSM was best when the municipality of residence was available in both databases. Moreover, beyond some imprecision and diagnostic coding errors, consultation of the medical files showed that most of the cases identified in the PMSI and not recorded in the PNSM were prevalent cases.

Conclusion

Comparison of PNSM and PMSI data showed the latter's limitations. It is unreliable as the sole data source to assess mesothelioma incidence for the following reasons:

- imperfect exhaustiveness
- impossibility of distinguishing new and prevalent cases
- diagnostic imprecision and coding errors
- two-year delay before national data are available.

The PMSI is nonetheless a complementary source of information that should be routinely consulted and compared with PNSM data at the regional level.

Infectious Risks: What Modeling Adds

InVS uses modeling as one of the different surveillance tools that can—both beforehand and afterwards—estimate infectious risks and assess prevention strategies and actions to deal with these risks.

In Theory

Modeling is a method for estimating the probability of the occurrence and development of a given phenomenon. It is based on the description and estimation of variables that affect the phenomenon, based on past occurrences. Modeling thus makes it possible to describe, explain, and predict a particular phenomenon by giving it a mathematical form*. In this way it can under some conditions foresee the course of the epidemiology of a disease and estimate the impact of different interventions.

In Practice

InVS uses this tool especially to compare the effect of different control or prevention strategies or actions aimed at infectious diseases. These tools are sometimes elaborated in international collaborations, which make it possible to pool both data and mathematical expertise and provide larger comparisons.

Modeling has been applied to four infectious risks: influenza, HCV transmission by caregivers to patients, salmonellosis, and transmission of West Nile virus by blood donations.

Estimate of the Impact of an Influenza Pandemic and Analysis of Strategies

Several countries have conducted modeling to measure the impact of a possible influenza pandemic. This modeling can roughly estimate the number of cases, hospitalizations, and deaths that might occur in such a situation.

France has designed a statistical risk analysis model that includes Monte-Carlo simulations. It can not only estimate the epidemiologic effect of a flu pandemic in France, but also compare the impact of several interventions (prophylactic or curative antiviral treatment; influenza and pneumococcal vaccinations). This work was useful for preparing the national influenza pandemic plan and helped to identify and quantify the needs for antiviral drugs to be stocked.

Study of the Effect of Different Screening Strategies for Hepatitis C Virus (HCV) in Healthcare Personnel

The objective of this study was to assess the effect of different strategies for screening for HCV among healthcare personnel to prevent viral transmission to their patients. This study, based on Monte-Carlo simulations, used three types of information: medical demography, HCV prevalence among healthcare providers, and virus transmission during accidents with blood exposure. It allowed us to estimate the number of transmissions avoided for each of the screening strategies, compared with no screening.

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* *There are nonetheless reservations about the use of modeling. Mathematical models always simplify reality; moreover, the values used for the variables are most often based only on hypotheses. The results must therefore be used with prudence.*

Evaluation of the Association between the Anti-Salmonella Policies in Poultry Husbandry and the Reduced Number of Human Salmonellosis Cases in France

To assess the relation between the decrease in the number of cases of salmonellosis (*Salmonella enteritidis* and *Salmonella typhimurium*) in humans (33% between 1997 and 2001 according to the salmonella CNR) and the control measures implemented in 1998 in poultry farms, InVS used time series modeling—series of data describing the course over time of the number of cases of a disease.

This modeling clearly showed that these measures against salmonella in poultry farms led to the reduction in the number of human cases of salmonellosis from both *S. enteritidis* and *S. typhimurium*.

Estimate of the Risk of West Nile Virus by Blood Transfusion in the Var district during Summer 2003 (August-September)

This risk was estimated by an extension of Schreiber's method. It considers that the risk results from two probabilities: that a blood donor was infected by West Nile virus during an epidemic episode (incidence) and that this donor will give blood during the period when the virus is circulating in his blood. This risk was estimated by calculating incidence in two ways: from a seroprevalence survey among blood donors in the Var and from the data of an investigation in the Var in 2003. Both sets of results were consistent. The risk of transmission of West Nile virus by blood transfusion was estimated at 6 per 100 000 during the period that the virus circulated in the Var in 2003.
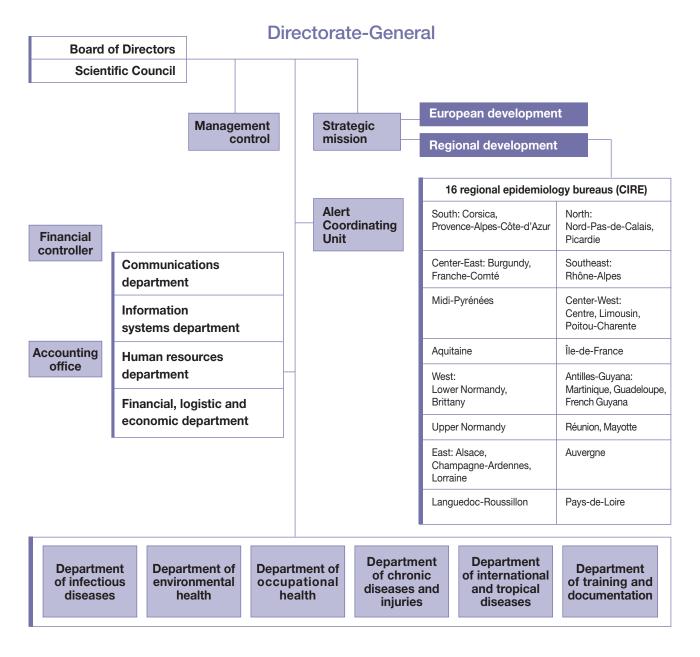
3

Appendixes

Appendixes

A - Organization and Organizational Chart for the National Institute for Public Health Surveillance

Professor Gilles Brücker is the director of the InVS. It is organized in six scientific departments and four agency-wide service departments. The organization has a strategic mission. It also has a Board of Directors (22 members) and a scientific council (17 members).

InVS carries out its activities in the regions through 16 regional epidemiology bureaus (CIRE), under the scientific supervision of InVS and physically placed within the regional health and social affairs bureaus (DRASS): Dijon, Fort de France, Paris, Lyon, Marseille, Lille, Nancy, Rennes, Toulouse, Bordeaux, Saint-Denis de la Réunion, Rouen, Orléans, Nantes, Montpellier, and Clermont-Ferrand.

InVS is developing a network to collaborate with many partners who play a role in the surveillance of the health status of the French population (including government departments, health professionals, national reference centers, disease registries, welfare agencies, hospitals, and regional health observatories).

Directorate-General

| Board of Directors |
| Scientific Council |

| Management control | | Strategic mission | | European development |
| | | | | Regional development |

| Financial controller |

| Accounting office |

| Communications department |
| Information systems department |
| Human resources department |
| Financial, logistic and economic department |

| Alert Coordinating Unit |

16 regional epidemiology bureaus (CIRE)

South: Corsica, Provence-Alpes-Côte-d'Azur	North: Nord-Pas-de-Calais, Picardie
Center-East: Burgundy, Franche-Comté	Southeast: Rhône-Alpes
Midi-Pyrénées	Center-West: Centre, Limousin, Poitou-Charente
Aquitaine	Île-de-France
West: Lower Normandy, Brittany	Antilles-Guyana: Martinique, Guadeloupe, French Guyana
Upper Normandy	Réunion, Mayotte
East: Alsace, Champagne-Ardennes, Lorraine	Auvergne
Languedoc-Roussillon	Pays-de-Loire

| Department of infectious diseases | Department of environmental health | Department of occupational health | Department of chronic diseases and injuries | Department of international and tropical diseases | Department of training and documentation |

Scientific Departments

Department of Infectious Diseases (DMI)

(65 permanent personnel) is divided into five specific units:

- HIV, HCV, and sexually transmitted diseases
- enteric and food-borne infections and zoonoses
- vaccination-avoidable infections
- nosocomial infections and antibiotic resistance
- airborne infections (legionellosis, tuberculosis), imported diseases.

It also hosts two European programs: the European HIV-AIDS surveillance program, EuroHIV, and the tuberculosis surveillance program, EuroTB.

Department of Environmental Health (DSE)

(50 persons) is organized in three functional units:

- the methods and investigations unit, which, beyond methodological development, provides technical support for the regional epidemiologic teams and responds to extreme climate events
- the risk knowledge and surveillance unit, which includes all of the national and international epidemiologic surveillance programs (air and health, toxic products and substances, and health, allergic and asthma diseases)
- the information systems and statistics unit.

Department of Occupational Health (DST)

(25 persons) is composed of three units:

- surveillance of occupational health
- tool development
- industrial hygiene.

The DST is responsible for the epidemiologic surveillance of occupational risks: occupational cancers (especially asbestos-related mesothelioma), musculoskeletal disorders, occupational asthma, and mental health in the workplace. It is establishing basic tools that will make it possible to assess mortality by occupation and exposures associated with occupational factors.

Department of Chronic Diseases and Injuries (DMCT)

(25 persons) is organized into three units and three programs:

- the cancer unit, providing cancer surveillance and evaluation of screening programs.
- the nutritional epidemiology surveillance unit (USEN), a mixed unit staffed by personnel from InVS and from the institute for nutritional sciences and techniques (ISTNA)
- the everyday accidents surveillance unit (household, sports, and hobbies)
- the cardiovascular disease surveillance program
- the diabetes surveillance program
- the FranceCoag network, which monitors coagulation defects.

This department provides, jointly with INSERM, the technical secretariat for the national disease registries committee.

Department of International and Tropical Diseases (DIT)

(7 persons)
Its missions are principally cross-sectional:

- manage international surveillance for early detection of health events occurring abroad that might affect France
- monitor tropical diseases such as malaria and dengue (metropolitan France and overseas districts)
- participate in activities and missions of the global epidemic alert and response network coordinated by WHO
- develop collaborations with analogous institutions in partner countries and conduct technical assistance activities at the request of the Ministry of Foreign Affairs.

Department of Training and Documentation (DFD)

(15 persons) is organized in two units:

- the documentation unit, which makes available to all InVS personnel and to its network of correspondents, the documents necessary for their work
- the training unit, which runs a tutorial program in field epidemiology and the IDEA course, in association with the National School of Public Health. It also organizes InVS participation in numerous training programs, university-based and otherwise. DFD also coordinates the Eurosurveillance project (bilingual newsletter of infectious disease surveillance in Europe).

Agency Service Departments

Communications Department

(12 persons) In collaboration with the Directorate-General, scientific departments, and agency service departments, it develops the external and internal communications policies for the Institute.

Its work is divided among three units:

- the editing–publishing unit, which sees to the production of the assorted media in which InVS disseminates content

- the *Weekly Epidemiologic Bulletin* (BEH)

- the external communication unit (including press relations, *Prevalence*, editorial responsibility for the Institute's website) and internal (Intranet).

Financial, Logistic, and Economic Department

(25 persons) is divided into two sections, one unit, and management control.

- the budgetary and accounting section, which develops the budget and ensures its execution

- the logistics section: purchasing, procurement, and logistics, which develops a purchasing policy ensuring the quality of competitive procedures and manages InVS real estate and the daily life of the establishment

- the program management unit, which works with the activity programs from their initial conception and ensures the legal aspects of their implementation and follow-up, especially all contracts and agreements

- the management control section, which functions as an interface between the Directorate-General and this department.

Information Systems Department

(20 persons) has two units:

- the administration and operations unit, which manages the computer and telephone systems, maintains them, and plans their future development

- the design and development unit, which ensures the consistency of the systems, develops surveillance applications, and administers and develops the internet and intranet sites as well as the databases necessary for health surveillance activities.

Human Resources Department

(9 persons) helps to ensure that the institute has a skilled and competent staff, through its hiring, training, and continuing education policies. It is prepared to aid each employee in the management of his or her career and formulates, with the communications department, the in-house communications policy that ensures the agency's cohesiveness. It assists management in reaching decisions about human resource policies (including social policy, mobility, and evaluations).

Strategic Mission and the Alert Coordinating Unit

This unit reports directly to the director, and its staff represent him in a wide variety of settings. It implements regional development and coordinates European activities and the construction of the national public health network. It also conducts the follow-up and evaluation of the initial departmental contracts, in association with the department, and prepares subsequent contracts. It is also charged, together with the information systems department, to develop the master plan for the information systems.

The Alert Coordinating Unit is responsible for the cross-sectional management of the Biotox plan and of vague alerts of undetermined origin. It works in liaison with all of InVS's departments and it manages the surveillance system for nonspecific events based on emergency room and mortality data. It produces the daily alert bulletin, which is transmitted to the Minister of Health and the Director-General of Health.

B - Publications 2004

InVS publishes the results of its work in a variety of formats (public reports, journal articles, guides, manuals, etc.). The list below includes only the scientific reports published by InVS in 2004.

- Résistance aux antibiotiques des bactéries commensales isolées chez les éleveurs de porcs, France 2001.

- Résultats de l'Enquête permanente sur les accidents de la vie courante, années 1999-2001. Réseau Epac. Décembre 2003. Rapport et synthèse.

- Results of the Permanent Study on Home and Leisure Injuries (Epac) – Synthesis

- Parcours sociomédical des personnes originaires d'Afrique subsaharienne atteintes par le VIH, prises en charge dans les hôpitaux d'Île-de-France, 2002.

- Investigation de cas de rougeole en région Provence-Alpes-Côte d'Azur. Janvier-juin 2003.

- Enquête noyades 2002. Analyses complémentaires.

- Surveillance of tuberculosis in Europe-EuroTB. Report on tuberculosis cases notified in 2002.

- HIV/AIDS Surveillance in Europe - Surveillance du VIH/sida en Europe n°69, Mid-year report 2003.

- Étude des conséquences d'une exposition aux rayonnements ionisants sur la santé des personnes ayant séjourné à l'école Marie Curie de Nogent-sur-Marne (Val-de-Marne).

- Froid et santé. Eléments de synthèse bibliographique et perspectives. Rapport d'investigation.

- Morbidité et mortalité dues aux maladies infectieuses d'origine alimentaire en France.

- Cas groupés de coqueluche dans une maternité.

- *Staphylococcus aureus* de sensibilité diminuée aux glycopeptides (Gisa) dans les hôpitaux en France, 2000-2001.

- Leptospirose en France métropolitaine. Été 2003.

- Enquête sur les lieux de consultation et les caractéristiques des personnes prélevées pour recherche de *Chlamydia trachomatis* dans les laboratoires appartenant au réseau Renachla.

- Surveillance épidémiologique de la mortalité et investigation d'agrégats spatio-temporels en entreprise. Principes généraux et données nécessaires.

- Bilan des Plans régionaux pour la qualité de l'air. Prise en compte des aspects sanitaires. Bilan des études d'impact de la pollution atmosphérique urbaine réalisées.

- Impact sanitaire de la vague de chaleur d'août 2003 en France. Bilan et perspectives. Octobre 2003.

- Analyse de la survenue de deux cas de leucémie à Vauhallan (Essonne). Rapport d'investigation.

- Insecticides organochlorés aux Antilles : identification des dangers et valeurs toxicologiques de référence (VTR). Etat des connaissances.

- Cas groupés de fièvre typhoïde liés à un lieu de restauration à Paris. Octobre–novembre 2003.

- Épidémie de gastro-entérite en Isère. Novembre 2002.

- Investigation de cas groupés de légionellose. Montpellier, juillet-août 2003.

- Aluminium : quels risques pour la santé ? Synthèse des études épidémiologiques. Volet épidémiologique de l'expertise collective InVS-Afssa-Afssaps.

- Étude de l'imprégnation par le mercure de la population de Sinnamary.

- Étude de la couverture vaccinale suite à la campagne de vaccination contre le méningocoque C dans les Landes, les Pyrénées-Atlantiques et les Hautes-Pyrénées en 2002.

- Système d'alerte canicule et santé (Sacs) 2004. Rapport opérationnel.

- Surveillance épidémiologique des donneurs de sang homologues en France entre 1992 et 2002.

- 65 questions-réponses sur les incinérateurs et les dioxines. Plaquette et guide.

- Situation et évolution des apports alimentaires de la population en France. 1997-2003

- Confrontation des données du Programme national de surveillance du mésothéliome (PNSM) et du PMSI. Rapport d'étude.

- Évaluation de l'impact sanitaire de la pollution atmosphérique urbaine. Agglomération de Toulon. Impact à court et long terme.

- Évaluation de l'impact sanitaire de la pollution atmosphérique urbaine. Brest et Nantes. Impact à long terme.

- Étude des traitements antibiotiques à partir de l'enquête de prévalence nationale 2001. Réseau d'alerte, d'investigation et de surveillance des infections nosocomiales (Raisin).

- Surpoids et obésité chez les enfants de 7 à 9 ans. France, 2000.

- Étude de faisabilité 2002. Réseau Labville pour le développement d'un système électronique de surveillance nationale de la résistance aux antibiotiques à partir des laboratoires de ville.

- Étude sur la surveillance dans le champ de la santé mentale. Rapport final.

- Description et gravité des lésions traumatiques selon les classifications AIS 1998 et IIS 1994.

- Syndrome respiratoire aigu sévère. L'épidémie de Sras en 2003 en France. Rapport sur la gestion épidémiologique du Sras par l'InVS.

- HIV/AIDS Surveillance in Europe. Surveillance du VIH/sida en Europe n°70. End-year report 2003.

- Étude du surpoids, de l'obésité et des facteurs associés au surpoids chez les élèves de 6e scolarisés dans les collèges publics du département de Haute-Savoie. Septembre 2003.

- Vague de chaleur de l'été 2003 : relations entre température, pollution atmosphérique et mortalité dans neuf villes françaises. Rapport d'étude.

- Surveillance des bactériémies nosocomiales en France, résultats 2002.

- La maladie de Creutzfeldt-Jakob en France, 1992-2002.

- Surveillance épidémiologique de l'Armada de Rouen. 28 juin au 6 juillet 2003.

- Épidémie de dengue à Saint-Martin (Guadeloupe). Rapport d'investigation.

- Surveillance de la rougeole en France. Bilan et évolution en vue de l'élimination de la maladie.

- Surveillance épidémiologique des noyades. Enquête noyades 2003. 1er juin - 30 septembre 2003.

- Évaluation du lien entre la politique de lutte contre les salmonelles dans les élevages de volailles et la diminution du nombre de cas de salmonelloses chez l'homme en France.

- Étude des facteurs de risque de décès des personnes âgées résidant à domicile durant la vague de chaleur d'août 2003.

- Évaluation des risques sanitaires des sous-produits de chloration de l'eau potable. Caractérisation des dangers : effets sanitaires et valeurs toxicologiques de référence.

- Estimation de l'exposition des populations aux polluants présents à l'intérieur des habitations.

- Volet medico-social du Programme national de surveillance du mésothéliome. Bilan 1999-2003.

- Surveillance dans le domaine de la reproduction et de la périnatalité.

- Troubles musculo-squelettiques : le premier problème de santé au travail en France. Le réseau de surveillance épidémiologique des TMS dans les Pays de la Loire. Forum international travail santé 2004.

- Épidémie de béribéri infantile à Mayotte. Rapport d'investigation. 25 mai - 25 juin 2004.

- Réseau expérimental de surveillance épidémiologique des troubles musculo-squelettiques dans les Pays de la Loire. Surveillance en population générale du syndrome du canal carpien dans le Maine-et-Loire en 2002.

- Prévention et prise en charge de la tuberculose en France. Synthèse et recommandations du groupe de travail du Conseil supérieur d'hygiène publique de France (2002-2003).

C - Acronyms and Abbreviations

A

AFSSA French food safety agency (Agence française de sécurité sanitaire des aliments

AFSSAPS French drug agency (Agence française de sécurité sanitaire des produits de santé)

AFSSE French agency for environmental safety and health (Agence française de sécurité sanitaire de l'environnement)

AIDS Acquired immunodeficiency syndrome

AMPI Health insurance fund for self-employed workers

ANAES National agency for health accreditation and evaluation (Agence nationale d'accréditation et d'évaluation en santé)

ANCRED National association of diabetes network coordination

ANRS National agency for AIDS and viral hepatitis research (Agence nationale de recherche sur le sida et les hépatites virales)

C

CANAM National health insurance fund for self-employed workers (Caisse nationale d'assurance maladie des professions indépendantes)

CCA Alert coordinating Unit (Cellule de coordination des alertes)

CClin Nosocomial infection control coordination centers (Centre de coordination de la lutte contre les infections nosocomiales)

CépiDc Center for death statistics and epidemiology (Centre d'épidémiologie des causes médicales de décès)

CeTAF Technical support and training center for the CNAMTS health examination centers (Centre technique d'appui et de formations, pour des centres d'examen de santé de la CnamTS)

CIRE Regional epidemiology bureaus (Cellule interrégionale d'épidémiologie)

CJD Creutzfeldt-Jakob disease

Clin Nosocomial infection control committee (Comité de lutte contre les infections nosocomiales)

CNAM National conservatory of arts and trades (Conservatoire national des arts et métiers)

CNAMTS National health insurance fund for salaried workers (Caisse nationale d'assurance maladie des travailleurs salariés)

CNIL National commission for information technology and privacy (Commission nationale de l'informatique et des libertés)

CNR National reference center (Centre national de référence)

COMPAQH Coordination for measurement of hospital quality and its improvement (Coordination pour la mesure de la performance et l'amélioration de la qualité hospitalière)

COSMOP Cohort for the surveillance of mortality by occupation (Cohorte pour la surveillance de la mortalité par profession)

D

DADS Annual social data reports (Déclaration annuelle des données sociales)

DARES Office of research, leadership and statistical studies, Ministry of Labor (Direction de l'animation, de la recherche, des études statistiques)

DDASS District health and welfare bureau (Direction départementale des affaires sanitaires et sociales)

DGS Directorate-General of Health (Direction générale de la santé)

DHOS Hospitalization and healthcare organization office (Direction de l'hospitalisation et de l'organisation des soins)

DMCT Department of chronic diseases and injuries (Département des maladies chroniques et traumatismes)

Dom-Tom Overseas districts and territories

DREES Department of research studies, evaluation and statistics of the Ministry of Health (Direction de la recherche, des études, de l'évaluation et des statistiques)

DSE Department of environmental health (Département santé environnement)

DST Department of occupational health (Département santé travail)

E

EARSS European antimicrobial resistance surveillance system

EDP Permanent demographic sample

EFESE French study of the environment and child health (Étude française sur l'environnement et la santé de l'enfant)

ENTRED National representative sample of diabetics

ESBL Extended-spectrum beta-lactamase

ESPrI Epidemiologic and surveillance of self-employed workers

ESTEV Survey of health, work, and aging

EWRS Early warning and response system

F

FranceCoag Surveillance network of bleeding diseases

G

GOARN Global outbreak alert and response network

H

HAS High Health Authority

HCSP High Council of Public Hygiene

HCV Hepatitis C virus

HIV Human immunodeficiency virus

I

IARC International Agency for Research on Cancer

INED National institute for demographic studies (Institut national d'études démographiques)

INERIS National institute of the environment and industrial risks (Institut national de l'environnement et des risques industriels)

INPES Prevention and health education institute (Institut national de prévention et d'éducation pour la santé)

INSEE National statistics institute (Institut national de la statistique et des études économiques)

INSERM National institute for health and medical research (Institut national de la santé et de la recherche médicale)

InVS National institute for public health surveillance (Institut de veille sanitaire)

ISPED Institute of public health, epidemiology and development (Institut de santé publique, d'épidémiologie et de développement)

L

LCA Legionellosis concerted action

LDL Low-density lipoproteins

M

Matgene General job exposure matrix

MR Mandatory reporting

MRD Mandatory reporting diseases

MRSA Methicillin-resistant *Staphylococcus aureus*

N

NHP Nottingham health profile

O

OIE World Organization for Animal Health

ONERBA National observatory for the epidemiology of bacterial resistance to antibiotics (Observatoire national de l'épidémiologie, de la résistance bactérienne aux antibiotiques)

P

PMSI Medical information systems program

PNC National heat wave plan

PNNS National nutrition-health program

PNSE National environmental health plan

PNSM National mesothelioma surveillance program

PST Occupational health plan

PUPS Previously untreated patients

PC Santé Command Post health

R

RAISIN Alert network for the investigation and surveillance of nosocomial infections

RNS-MCJ National network for surveillance of Creutzfeldt-Jakob and related diseases

RSA Anonymized hospital discharge summaries

S

Sacs National heat wave and health alert system

SARS Severe acute respiratory syndrome

STD Sexually transmitted diseases

T

TSSE Transmissible subacute spongiform encephalopathies

U

UHC University hospital center

UMRESTTE Combined epidemiologic research and transportation-work-environment surveillance unit

USEN Nutritional epidemiology surveillance unit

V

vCJD Variant Creutzfeldt-Jakob disease

W

WHO World Health Organization