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THE YEAR 2000 PROBLEM IN THE HEALTH SECTOR

The “Year 2000 Problem,” also known as the “Millennium Bug” or “Y2K,” has captured the world’s attention in recent years and is expected to have an impact on every aspect of social and economic life. The problem lies in the fact that computer systems that depend on date recognition may not function properly or may even cease to function with the switch to the year 2000. Computers, equipment with microprocessors, and automated control systems will be affected. This problem may interfere with the operation of health facilities, thus putting the health and safety of the population at risk.

Given the importance of the topic, its impact on the health sector, and the little time remaining to take the steps necessary to minimize the adverse impact of Y2K, the matter was taken up at the 124th Executive Committee. The Committee decided to place this topic on the agenda of the Directing Council to alert the countries to the situation, so that they prepare their health services to deal with the problem and mount an adequate response. To this end, it is recommended that the information and recommendations of PAHO in this regard be taken into account.

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1. The Year 2000 Problem or the Millennium Bug

The "Year 2000 Problem," "Millennium Bug," or "Y2K," concerns computers, computer processors, equipment with embedded "chips", and software that may not properly recognize or process dates after 31 December 1999. Common reactions of people when first told about the Y2K problem are: "It's only a computer problem." "It's only a business problem." "It won't affect me." Unfortunately, those assumptions are wrong. The Y2K problem will also affect health services.

Y2K is a problem that affects not only computers but also devices and equipment of many different varieties in both home and business. It is, in fact, a problem that exists throughout society and must be solved with community involvement and collaborations among all levels of government, private industry, and private citizens. It is a serious problem that can create inconveniences, work disruptions, and possible risks to people's health and safety. The following should be considered:

- Y2K is a real problem that may disrupt health services.
- Equipment and automated systems could be affected.
- There is a general lack of awareness about the seriousness of the problem.
- The health sector is far behind in addressing the issue.
- It is necessary to be ready.

2. Why Is There a Problem with the Year 2000 Date?

The problem stems from the use of the common short cut of using the last two digits of a year to record dates, for example "99" instead of "1999". The problem arises from a simple, yet common situation. In the early 1960s computer programmers creating the first electronic computing systems made a decision to minimize memory processor space by designating the year as a two-digit function rather than a four-digit function. Back then, computer memory was very expensive and difficult to produce. Unfortunately, that original programming has lived on in the new systems and devices used today. When encountering the Year 2000, systems using the two-digit date (00) may fail or create functional or data errors.

In this situation, a problem will develop when the date rolls over from "99" to "00" on Saturday, 1 January 2000. Many computers, computer programs, and equipment with embedded electronics with date stamp systems will recognize the date not as

1 January 2000 (leap year), but instead as 1 January 1900 (no leap year) or another date. Computers and other automated equipment which we depend on in our daily lives may not function properly when they encounter "00" in reference to the Year 2000.

3. PAHO's Response to the Y2K Problem

PAHO identified the Y2K problem and its potential impact on the equipment and services of health facilities in 1996, and in 1997 developed a technical line of work in this area. At that time it began a search for information among the Collaborating Centers working on technology assessment and the evaluation of equipment and medical devices. PAHO contacted the Emergency Care Research Institute (ECRI) and the Medical Device Bureau of Canada, with whom it began working to assist the countries.

While searching for information about the magnitude of the problem and its potential impact on the health services, the Organization, through the PAHO/WHO Representative Offices in each country, recommended alerting the health authorities to the problem, so that, when acquiring, purchasing, or accepting donations of equipment, they request that it be Y2K compliant. This recommendation has been repeated periodically and with special emphasis since the natural disasters that have occurred in the Region.

4. How May the Y2K Problem Affect Health Services?

Besides computers and computer programs, some medical devices and scientific research instruments have computers, microprocessors, or microcodes integrated into them. The majority of medical devices will function without any potential health or operational problem after 31 December 1999. Some may have a minor problem, such as displaying an incorrect indication for the year, and these will likely not significantly affect a patient's health. However, a very small number of medical devices will encounter a real problem because of the switch to the new millennium, unless they are adjusted prior to their use after 31 December 1999.

There are many situations, external and internal to the health care facilities, that may directly or indirectly impact the operation of computers and the medical and hospital equipment used by health care organizations and eventually result in: errors in the delivery of health care, the inability of suppliers to provide drugs and medical materials, and even serious and potentially lethal malfunctions of diagnostic and therapeutic equipment.

External sources of Y2K problems:

- Public and private utilities.
- Telecommunications.
- Transportation, especially urban.
- Air transportation and air traffic control.
- Industrial equipment.

Internal sources of Y2K problems:

- Clinical and surgical area:
 - life support systems;
 - medical devices and equipment.
- Support services area:
 - energy and water supply systems;
 - patient support systems;
 - security, control, and safety systems;
 - communication and transportation systems;
 - automated laboratory equipment.
- Administrative area:
 - information and financial systems;
 - supply, procurement, and storage logistics.

Although the outcomes of the problems that may occur are uncertain, the danger is real. It is up to each of us to remain informed and on top of the problem, and to be prepared for the possibilities that may become realities.

5. Does the Y2K Problem End on 2 January 2000?

There are certain other specific dates that may be troublesome. More than recognizing the correct date on 1 January 2000, the Y2K problem actually consists of five different types of problems:

- *Rollover* - The inability of a computer or application to advance from 31 December 1999 to 1 January 2000.

- *Century* - The inability to deduce the first two digits of the four-digit year given only the last two digits. For example, 14/02/01 is read as 14 February 1901 rather than 14 February 2001.
- *Leap Year* - Systems may not correctly calculate the Year 2000 as a leap year. A year is a leap year if (a) it is evenly divisible by 4 and (b) for the year marking the turn of the century, it is evenly divisible by 400. Thus, 1900 is not a leap year, while 2000 is.
- *Computation* - The computer program may not correctly determine the day of the week, leap years, Julian and other calendar dates after 1 January 2000, or accurately compute time intervals extending past 1 January 2000.
- *Transfer* - The inability to exchange information when one system or equipment is Y2K compliant and the other isn't, or when two parties use different methods to fix the problem, thereby making their systems unable to communicate.

6. What Must be Done?

6.1 Immediate Actions

- (a) Health facilities must act immediately to:
- Identify any computer, computer program, device, or equipment that requires time or date information to operate properly (date-sensitive); remember that besides medical equipment and computers used to process medical data, there are many other types of equipment such as elevators, control devices in boilers, generators, refrigeration systems, alarm systems, communication equipment, control devices for air conditioning equipment and systems, computers for administrative data processing, etc. that may have time-dependent functionality.
 - Prioritize actions, giving first priority to life support systems and equipment, second priority to devices or equipment that affect the operations of the organization, patients, personnel, clinical, and administrative and financial records/data, and finally any convenience or support device or equipment.
 - Check with the manufacturers to determine whether a device is Y2K compliant and whether it is under warranty.
 - Follow the manufacturers' instructions for testing and fixing any problems.

- Be prepared for administrative glitches affecting important data, because even the best computer systems may occasionally fail or malfunction; as a precaution, keep paper records of balances, transactions, patient records, and other important information.
- (b) A plan of action should consider the following issues:
- *Y2K documentation.* There are a large number of sources of information oriented towards health organizations. It is strongly recommended that organizations collect and organize a set of informative materials, taking into consideration the nature and characteristics of each organization. These materials should be widely distributed internally and used as background for discussions at various levels.
 - *Phasing of the plan of action:*
 - Preparation phase (June 1999 - November 1999).
 - Crisis phase (December 1999 - March 2000).
 - Critical period (31 December 1999 - 1 January 2000).
 - Post-crisis phase (March 2000 - ...).

6.2 *Activities to be Developed*

6.2.1 *Preparation phase (June 1999 - November 1999)*

- (a) Intervention plan to identify the systems and equipment susceptible to the Y2K problem and fix them before the deadline:
- Appoint a person to head the project.
 - Disseminate information and raise awareness.
 - Update inventories.
 - Locate Y2K-susceptible systems and equipment.
 - Conduct risk level classification.
 - Investigate legal status of the equipment.
 - Contact manufacturer and search for documentation.
 - Decide if testing of equipment is required.
 - Begin repair, testing, and replacement of equipment.

- (b) Contingency plan to ensure the continuous and uninterrupted operation of the health facility in order to guarantee the delivery of health services to the community.
- Define minimum acceptable level of service.
 - Define critical areas and processes.
 - Identify the critical systems and equipment required to operate continuously.
 - Identify the maximum acceptable interruption periods.
 - Establish intervention programs to minimize risks.
 - Explore alternative solutions for patient management.
 - Train staff.
 - Test the plan!

6.2.2 *Crisis phase* (December 1999 - March 2000)

For the crisis phase, it is important to:

- Have a contingency plan in operation.
- Guarantee staff presence.
- Have rapid response teams of users, administrators, and technical staff who know each piece of equipment well.
- In case of failures, have rapid assessment of risks and needs to solve the problems encountered.
- Define the options for equipment removal and replacement.
- Have a routine in place for documenting problems.

6.2.3 *Critical period* (Midnight, Friday, 31 December – Saturday, 1 January 2000)

- Maximum alert with rapid response team in place.
- Available support personnel.

6.2.4 *Post-crisis phase* (March 2000 - ...)

- Conduct performance assessment.
- Equipment and software upgrading, repair, or replacement.
- Identification and management of other technology problems.

7. **PAHO Action to Assist the Countries**

Since its adoption in 1997 as a line of action in PAHO technical cooperation, the topic has been discussed in all meetings, workshops, seminars, and missions to the countries. Under the agreement with the ECRI for the translation into Spanish and monthly publication of the technology bulletin *Monitor* in the PAHO website, the special issues *Medical Devices and the Year 2000 Problem* (January 1998) and *Strategies for Addressing the Year 2000 Problem. To Test or Not to Test?* (December 1998) have been incorporated permanently into the website. The Spanish version has been distributed to the national health authorities through the PAHO/WHO Representative Offices in the countries, and the ECRI has donated the English version of the bulletins for distribution.

PAHO has participated in the Y2K national coordinators' forums, organized by the United Nations, the Organization of American States, and the World Bank, presenting its recommendations on how to deal with the problem. PAHO has published the present paper under the title *Brief on the Year 2000 Problem (Y2K) in the Health Services*. This paper has been distributed to the PAHO/WHO Representative Offices in the countries, national authorities, and Headquarters.

Because the health sector is so far behind the other sectors in addressing this problem, the emphasis and recommendations of PAHO center on the preparation of contingency plans. In order to assist the countries in the preparation of these plans, the Organization has secured the donation of the CD-ROM *Patient-Focused Year 2000 Contingency Planning Guidebook* from the U.S. Veterans' Health Administration; this guidebook is considered one of the most complete tools for addressing the Y2K problem. PAHO has also requested the donation of 1,000 copies of the CD-ROM *Y2K Managing the Challenge* (in English, Spanish, and Portuguese) from the U.S. Department of Commerce; this is a tool for identifying medical devices that are malfunctioning and searching for solutions until the problem is fixed. This material has been distributed to the countries, and additional information on the topic continues to be sent to them on an ongoing basis.

PAHO urges the health authorities of the Region of the Americas to take serious note of its recommendations to establish contingency plans to mitigate the impact of the Year 2000 Problem—whatever its magnitude—on the health sector.

8. Sources of Information and Solutions

- U.S. Food and Drug Administration (FDA)
www.fda.gov/cdrh/yr2000/year2000.html
- U.S. Department of Veterans Affairs
www.va.gov
- U.S. Federal Government Gateway for Y2K Information Directories
www.itpolicy.gsa.gov/mks/yr2000/y2khome.htm
- Health Canada
www.hc-sc.gc.ca/hpb/
- Emergency Care Research Institute (ECRI)
www.ecri.org
- British Standards Institution
www.bsi.org.uk/disc/year2000.html
- Pan American Health Organization (PAHO/WHO)
www.paho.org/spanish/hsp/hsphse.htm
- World Health Organization (WHO)
www.who.org
- Healthcare's Year 2000 Information Clearinghouse
www.rx2000.org/
- Computerworld
www.computerworld.com/news/year_2000/index.html
- Federal Y2K
www.y2k.policyworks.gov/
- Will It Work
www.willitwork.com/