AMERICAN COLLEGE OF EMERGENCY PHYSICIANS
SCIENTIFIC ASSEMBLY
1999

The Millennium Bug: R U REDE 4 Y2K?

Because of an effort to save memory space decades ago, we may be inconvenienced well into the next century. This lecture will explore the history of the Y2K problem and some of its consequences for the emergency department. This course will help the student prepare for this looming potential disaster, many of whose effects have already been felt.

- Anticipate the "domino effect" on computer systems that are allegedly Y2K corrected.
- Recognize sources for computer errors that will continue well into the next century.
- Learn why billing companies have been reluctant to sign Y2K guarantees with HCFA.
- Formulate strategies for coping, at home and work, with non--Y2K-compliant computers and software.

TU-95
Tuesday, October 12, 1999
3:00 PM - 3:55 PM
Room # N242
Las Vegas Convention Center

FACULTY

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Y2k *The Millennium Bug: R U REDE 4 Y2k?*

"I don't try to describe the future. I try to prevent it."
Ray Bradbury

Todd B. Taylor, MD, FACEP

Y2k *The Survey*

- CNN/*USA*Today/Gallup
  - 21 % major problems
  - 65 % minor problems
- Associated Press
  - 1/3 plan to stock up on food, water, supplies
  - 1/4 plan ready cash

Y2k *Top 10 Most Feared*

1. Oil and gas shortages
2. Defense weapon failures
3. Air traffic control system breakdowns
4. Utility grid blackouts and brownouts
5. Manufacturing and production shutdowns
6. Supply base and service interruptions
7. Water and sewer system breakdowns
8. Public health and safety-device failures
9. Embedded chip failures
10. Citizen panic

Harrison W. Fox, Staff Member House
Subcommittee on Government Management, Information, & Technology

Y2k — *Not Y2k, but what they do!*

- ❖ **Millennial Thievery**
  - Credit card scams
  - Stash of cash
- ❖ **Doomsday Enthusiasts**
- ❖ **"Run On's"**
- ❖ **"Part-ae"**
- ❖ **Military Panic**

Y2k — *Millennium Blues*

Anxiety and suicides multiply around the holiday season. Thanksgiving to Christmas depression multiplies.

The bigger the build up the more the let down.

The sheer magnitude of the millennial event will make this year's holiday blues worse.

Tony Blankley
Washington Times

Y2k — *The New Millennium*

The year 2000 is operating like a powerful magnet on humanity, amplifying emotions, accelerating change, heightening awareness, and compelling us to reexamine ourselves, our values and our institutions.

J. Naisbitt & P. Aburdebe
Megatrends 2000: Ten New Directions for the 1900s
New York: William Morrow, 1990: 11

Y2k — *Computer Industry Complicity*

"I believe Y2k will be the single biggest business crisis many of us will face in our lifetimes.

I've been confident that American business, indeed global business, would address this problem early, aggressively, effectively.

I was wrong. They didn't. *We* didn't."

Jim Seymour - PC Magazine
Feb 10, 1998; Page 93-94

Y2k — *What's in a name?*

- "The Year 2000 Bug"
- "The Millennium Challenge"
  (the IBM politically correct version)
- "Computer Armageddon"
- Y2-k-OS
- "Special Y2k" - The breakfast cereal
- The Ultimate "Revenge of the Nerds - "kY2"

Y2k — *"New" Millenniums*

Y0k = Christian Persecution

Y1k = The Dark Ages

Y2k = DATA OVERFLOW PROGRAM HALT

Doomsday Y2k

The difference was in the first century you had to believe in religion to think the end of the world was coming.

With Y2k, we have global nuclear war, environmental concerns, terrorism, & economic catastrophe that have replaced religion as the predominant "end of the world" scenario.

Tony Blankley
Washington Times

The New Millennium?

January 1, 2000

or

January 1, 2001

L. Loevinger
The significance of the millennium
Skeptical Inquirer 1997; 21: 31-36

The Y2k Pyramid

1995: Credit card expiration dates of "00"
– Credit card companies updated
– Servicing banks had not yet been Y2k updated

1998: Scheduling programs that plan events in the future began to fail

2000: Most systems will not really hit the wall until year "00"

2001: Problems may last well into the next century

Y2k — *When will real trouble start?*

December 31 1995?
December 31, 1998?
September 9, 1999?
October 1, 1999?
(1st day of government fiscal year)
December 31, 1999?
February 28, 2000?
April 1, 2001? (Win 95, 95, & NT - DST glitch)
December 31, 2001?
January 1, 2002? (Burroughs Unisys A Series fails)
January 1, 2020? (1920 "pivot-year" fails)
December 23, 2023 (Mayan Calendar - "End of the World")

Y2k — *When will it end?*

- 2000?
- 2001?
- 2003? (tax returns covering the 2001-2002 time period)
- Lawsuits may drag on for 10 years or more

Y2k — *How did this happen?*

- "Two digit dating": A Bill Gates' Plot?
- Saved precious memory space for low density silicon memory chips
  - Used only the last two digits of the year in date functions
  - "1998" = "98" saving 16 bits of memory
  - Programs used 1000's of dates = many kilobytes.
  - Even the original IBM PC had only 64k of memory
- Perpetuated throughout the computer revolution in the 80's.

Y2k *Just the Facts*

- ❖ **70% of software written before 1997 will fail or return incorrect results.**
- ❖ **98% of pre-1997 PCs & 73% of 1997-1998 PCs will fail to correctly recognize 01/01/2000.**

Y2k *The Software "Fix"*

- ❖ **Not as easy as it seems**
- ❖ **Social Security Administration**
  - – Working on Y2k for more than 8 years
  - – Corrected 30 million lines of code
  - – Further debugging revealed another 30 million lines not previously recognized
- ❖ **The original programmers dead or retired**
- ❖ **15 % of vendors no longer in business**
- ❖ **Finding the code is the greatest challenge**

Y2k *The Hardware "Fix"*

- ❖ **Real Time Clock (RTC)**
- ❖ **Not as easy as it seems**
- ❖ **Money!**
  - – Social Security Administration alone: $35 billion
  - – OMB: Estimates $8.34 billion for all US government
  - – World-wide estimates: $3.6 trillion
  - – Many hospital spend half their capital budgets on Y2k
- ❖ **Many legacy systems are hardwired Y2k incompatible**
- ❖ **Finding equipment the greatest challenge**

Y2k — The "Fix"

❖ "Most vendors have done a pretty good job of fixing Y2k issues. In medicine "pretty good" is scary!"

❖ "What if you had to inspect & fix every rivet on the Golden Gate Bridge and if you miss one the whole bridge will fall?"

❖ "Our security system is still running CPM."

**Rick McGonegal, Program Manager
RCG Information Technology**

Y2k — The Cascade Effect

❖ Example: Social Security Administration
  – Corrected Y2k?
  – Relies on at least 8 other government agencies for computer information that may not be Y2k ready

❖ Example: Third World Countries
  – Most do not have the resources
  – World markets rely on data from these sources
  – 34 nations handling 1 million airline passengers traveling to/from the US have yet to report on Y2k readiness

US Transportation Dept - Sept. 30, 1999

Y2k — The Problem

❖ One second after midnight January 1, 2000, the date in all computer systems not corrected may become January 1, 1900

❖ Any date dependent equipment (routine maintenance scheduling) may fail:
  – Cardiac Defibrillators
  – Elevators
  – Power generators
  – Phone systems

❖ December 31, 1999 is a Friday

Y2k — *So what you say?*

❖ **Inaccurate Dates**
  – Someone born in 1899 would be calculated as 1 year old
  – Everyone else is a "negative age"

❖ **Billing information systems**
  – Is your billing company updated?
  – Are the carriers they deal with including HCFA and Medicaid carriers updated?
  – How long can you wait for claims payment?
  – Will insurance policies suddenly "expire"?
  – Will bank deposits go astray and checks bounce?

Y2k — *Billing*

HCFA asked its claims processors to sign contract amendments to include a Y2k guarantee.

As of July 1998 no carrier has signed it.

"Year 2000: You're Liable"
American Medical News
July 6, 1998; Page 25

Y2k — *February 29, 2000*

❖ **Year 2000 also a leap year**
  – Most century marks (including 1900) are not leap years
  – The rule of thumb: Years divisible by 100 are *not* leap years, except years also divisible by 400

❖ **After February 28, 2000, dates will not only be off by a 100 years, but an additional day**

❖ **Even Microsoft couldn't get it right**
  – Surfaced in Windows NT 4.0
  – Corrected in Service Pack 4

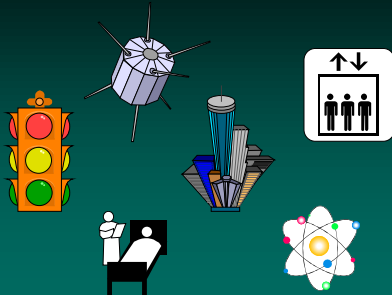**Y2k** — *Jan 1, 2000 End the Problem?*

- ❖ **Legacy files & Data**
  - – **May not be enough to correct software and hardware**
- ❖ **We will continue to accommodate for computer data errors well into the next century**

Y2k — *Jan 1, 2000 & Beyond*

"- - if you are using VBA and OLE, you can make the [Y2k] problems happen real fast. If you are using VBA, OLE, *and* relational databases, you can make them happen really fast in *three dimensions*."

Karl Feilder, CEO
Greenwich Mean Time, Inc.
PC Today - July 1998

Y2k — *"Hidden" Computers*

Y2k — *Will it effect us personally?*

- Will your VCR work? (1972)
- Will your microwave will blow up?
- Will the stock market will crash?
- Will airplanes will fall from the sky?
- Will your family be OK?

The world-wide Y2k cascade effect will cause at least transient inconveniences

Y2k — *Doomsdayers*

- What's the difference between a Y2k analyst and a terrorist?
- New York is #1 millennium destination. Who's #2?
- "Around 10% of US businesses will fail as a result of Y2k

(Karl Feilder Greenwich Mean Time)

Y2k — *Stockpiling*

"I think there will be some stockpiling and some inventory building and some hoarding" of consumer products and raw materials. That leads to almost a miniature economic cycle in the last two quarters of 1999 and very slow growth in the first quarter of the year 2000.

I'm expecting a human response to all the Y2k mania - that may add a ½% to GDP."

David Blitzer, Chief Economist
Standard & Poor's

Y2k — *Y2-Lawyers*

A "potentially monstrous" wave of litigation is expected to be instigated by people who suffer from business and government failures related to the year 2000 changeover. Projections of liability costs go as high as $1 trillion.

Robert A. Rankin
Knight Ridder Newspapers

Y2k — *Y2-Lawyers*

- Most professional liability insurance excludes claims arising from situations like Y2k.
- Y2k liability legislation?
- Total US liability costs $15-35 billion
  - Asbestos = $40 billion

Y2k — *The Government You Say?*

We need every state and local government, every business large and small, to work with us to make sure that this Y2k computer bug will be remembered as the last headache of the 20th century - not the first crisis of the 21st.

President William Jefferson Clinton
State of the Union Address
January 19, 1999

Y2k *Governmental Complicity*

The Federal government, as a protector of US citizens and arbiter of all standards, lost a great opportunity in the 1990's to prevent the impending Y2k calamity.

"We're operating under different laws. The computer industry operates on Internet time, which is three times as fast as clock time. The government works three times slower than clock time. That's a nine fold difference. - - Patience is not one of our virtues."

Andy Grove, CEO of Intel Corp.
PC Magazine - August 1997

Y2k *Telecommunications*

❖ About 95 percent of telephone systems are expected to be ready.

❖ No reliable data exist on readiness to test data networks, cellular or satellite communications systems, or 1,400 regional carriers.

Council of Economic Advisers 1998 Annual Report

Y2k *Utilities*

❖ Only about 50 percent of electric utilities had repaired Y2k systems as of December [1998].

❖ "Of greatest concern are about 1,000 small, rural electric utilities."

❖ Local and regional blackouts are "likely," but a "prolonged, nationwide blackout" is not.

Council of Economic Advisers 1998 Annual Report

Y2k Aviation

- ❖ The nation's 670 domestic airports started Y2k compliance too late.
- ❖ The FAA has "made great strides" but "it still has a way to go.
- ❖ "Planes will not fall out of the sky, but flight rationing to some areas & countries is possible."
- ❖ Aviation problems will be "much worse" abroad.
- ❖ Busiest, priciest, riskiest travel weekend in history.

Council of Economic Advisers 1998 Annual Report

Y2k Aviation - At Risk Airports

Afghanistan	Haiti	Philippines
Bahrain	Indonesia	Romania
Cambodia	Kenya	Russia
Chad	Laos	Somalia
China	Lithuania	Sudan
Costa Rica	Morocco	Uruguay
Ecuador	Mozambique	Vietnam
El Salvador	Nepal	Zaire
Ethiopia	Nigeria	Zimbabwe
Fiji	Pakistan	

GartnerGroup, Stamford, Conn.

Y2k Finance

- ❖ Banks & automated tellers are expected to function and to have enough cash.
- ❖ The Federal Reserve intends to expand available currency by one-third, to about $200 billion, to cover withdrawals "and has other contingency arrangements available if needed."

Alan Greenspan
Federal Reserve Chairman

Y2k Government

- ❖ **Federal agencies vary widely in preparedness**
- ❖ **Dept. of Defense**
  - – Among the least prepared
  - – An overall grade of C+
  - – Only 72 percent of its "mission-critical systems" are ready
- ❖ **Dept. of Transportation**
  - – Only 53 percent ready

Council of Economic Advisers 1998 Annual Report

Y2k State Governments

- ❖ **State & local governments vary widely in preparations**
- ❖ **Their "greatest concern is the ability of local communities to provide 911 emergency services."**

Council of Economic Advisers 1998 Annual Report

Y2k Local Governments

- ❖ **Only 1 of the nations 21 largest cities was fully Y2k as of July 99.**
- ❖ **The rest claim they will be by 1/1/00.**
- ❖ **Most "say" they have fixed transportation, communications, water, and emergency services.**

Government Accounting Office - July 1999

Y2k *Healthcare*

- ❖ **64 % of hospitals no plans to test Y2k fixes.**
- ❖ **90 % of doctors' offices unaware of exposure.**
- ❖ **Federal payment systems for Medicare & other health-insurance programs are behind schedule.**
- ❖ **"The health care industry is one of the worst-prepared for Y2k & carries a significant potential for harm.**

Council of Economic Advisers 1998 Annual Report

Y2k *31 Medicaid Programs at Risk*

- ❖ **High Risk**
  - – AK, AL, MA, NH, NM, NC, ND, VT
- ❖ **Medium Risk**
  - – AZ, CO, CT, DE, GA, HI, IN, LA, KY, MS, ,TX, NJ, NY, OH, OK, OR, NV, RI, SC, TN, TX, WV, WY

HCFA
Sept 17, 1999
Y2K Report

Y2k *Healthcare*

"The Senate's most alarming conclusion is that it is healthcare, not electricity and not the finance industry, but healthcare that's most vulnerable to year 2000 computer glitches.

The report warns that computer failure could even cause the shut down of an operating room."

CBS Evening News
February 24, 1999

Y2k *The Good*

- Forced to upgrade
- Forced to rethink IS strategies
- Cleared out the deadwood
- Unleashed a technology boom

Y2k *The Millennium Baby*

- Y2k Pregnant by April
- Increase OB services required year end.

Y2k *Will it effect us in the ED?*

- Media frenzy
- Cardiac defibrillators
- Critical computer infrastructures
- The biggest weekend party of the millennium
- We work in a 24/7 service industry
- Doomsday rituals & really stupid people
- Terrorism
- Staff shortages

Y2k *ED Y2k Preparedness*

- ❖ Scheduled "external" disaster
- ❖ Backup systems
  - – Phone/Radio
  - – Utilities
  - – Supplies
- ❖ Staffing

Y2k *Like Planning a Wedding*

It's a one-time event associated with great anxiety.

By the time you get good at it, it's over.

It's usually followed by a honeymoon.

Y2k *Contingency Plans*

- ❖ **Think "Natural" Disaster**
  - – **Nonperishable food & water**
  - – **Think warm (no power - no gas - no heating oil)**
  - – **Gas your car**
  - – **Personal medical needs**
  - – **Finances (copies, cash, etc.)**

- ❖ **Think "Business" Disaster**
  - – **Cash flow**
  - – **Lost Data**

Y2k — *Suggested Reading*

- *PC Magazine*: Sept 23, 1997; pages 229-231
- *PC Magazine*: October 6, 1998; pages 100-159
- *PC Magazine*: April 6, 1999; pages 100-126
- *PC World*: Jan 1998; pages 78-80
- *PC World*: Jan 1999; pages 91-100
- *PC World*: Sept 1999; pages 165-172
- *PC Today:* July 1998; pages 76-78
- *Byte Magazine:* July 1998; pages 52-62

Y2k — *Internet Information & Utilities*

- www.righttime.com
- www.sbhs.com/y2k/index.htm
- www.rigel.co.nz
- www.mitre.org/research/y2k
- www.itaa.org
- www.year2000.com
- www.or-computers.com/support/appnotes/bios/year2000.html
- www.ama-assn.org/not-mo/y2k/index.htm
  - The Year 2000 Problem: "Guidelines for Protecting Your Patients and Practice"
- www.fda.gov/bbs/topics/answers/ans00972.html
- www.rx2000.com (healthcare site)

Y2k — *What's this?*

- the 70's
- the 80's
- the 90's
- the . . . . . .
  - the hundreds?
  - the oh-oh's?
  - the aughts
  - the naughts or
    the double naughts
  - the preteens
  - the zero's
  - the zips