

The FLOSS Paradigm Shift: Transforming Healthcare Through Rapid, Evidence Driven, Software Innovation

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Agenda

- A holistic health systems model
- A paradigm shift long overdue
- And now for something completely different - FLOSS
- Breaking down the benefits
- Real world evidence
- Challenges

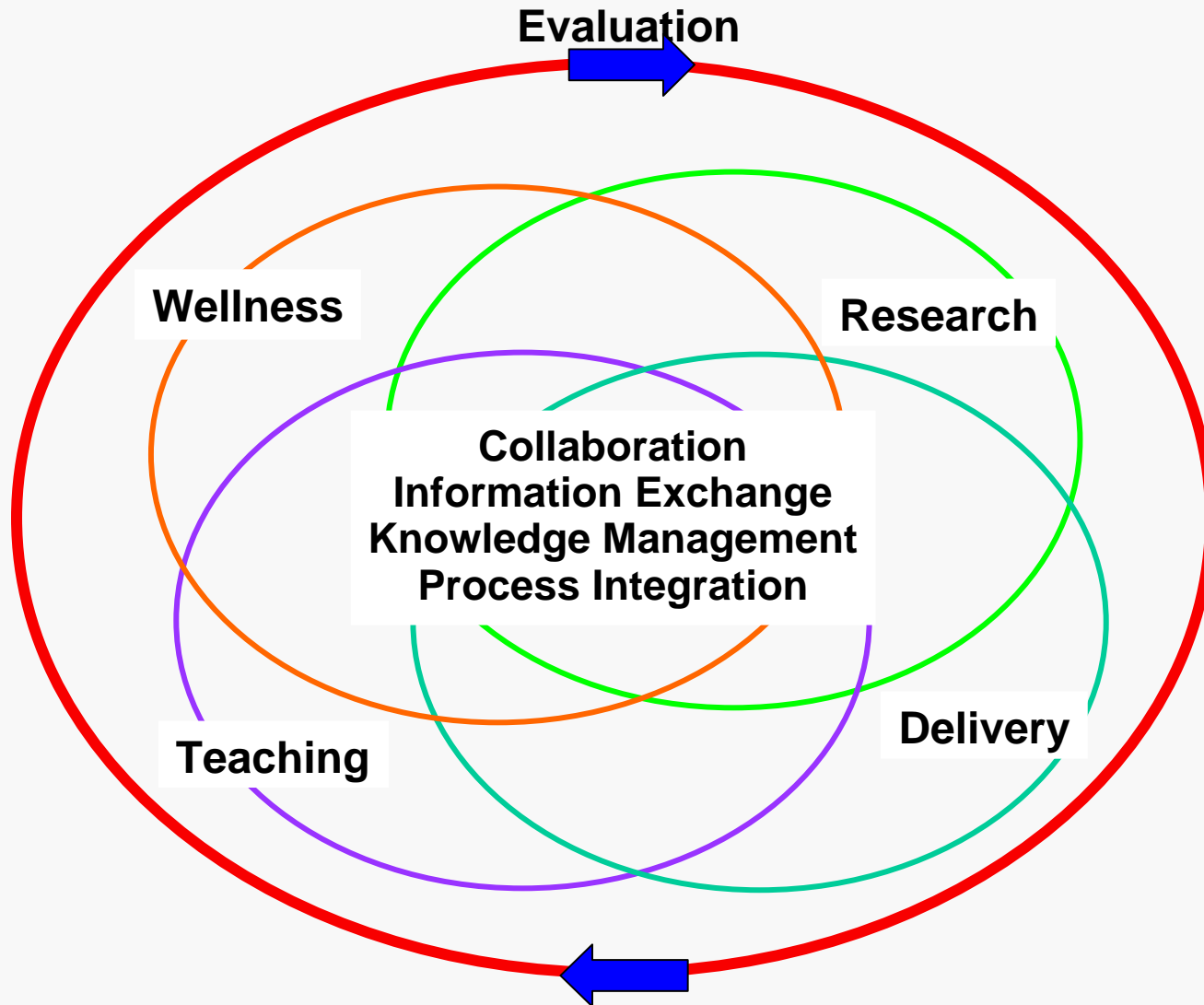


A Holistic Perspective

Health Systems are Ecosystems
They are “Complex Adaptive Systems”



Health Systems Are Patient Centred E-ecosystems



Why an Ecosystem Perspective is Relevant

Legacy, proprietary industry models, are chronically underachieving the promise of IT because they have the wrong DNA to dance effectively with evidence driven health ecosystems.

The Symptoms:

- Difficult to share medical information and integrate systems
- Difficult to measure efficacy of health policy and IT investment
- Re-invention of the wheel is a pandemic
- Price tag for integrated national health systems is too high
- System-wide evidence based feedback loops are almost impossible to create



The Evidence: Recent and Future Painful Experiences

Recently

- Canada
 - Canada Health Infoway – 1.5 Billion +
 - Ontario, Smart Systems for Health – 1 Billion
 - BC
- UK NHS Connect – 10's of Billions

The Future?

- US – ARRA estimated \$14–\$27 billion



The socio-economic opportunity cost of legacy ICT business models has reached epic proportions



"The significant problems we face cannot be solved at the same level of thinking we were at when we created them."

Albert Einstein

OR

"...and Now for Something Completely Different"

Monty Python



It Is Time for a New Paradigm

FLOSS Model Overview

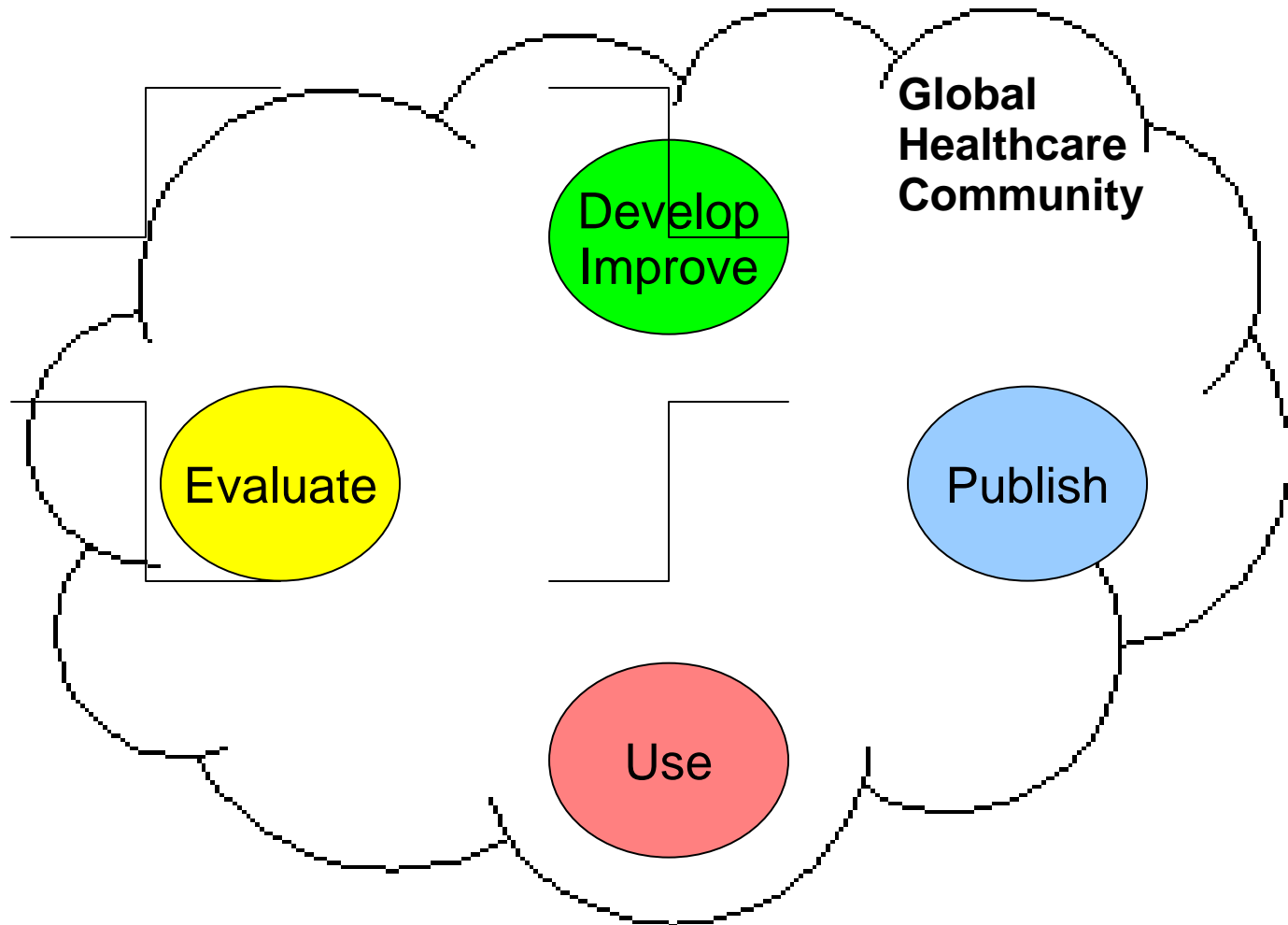
The FLOSS Freedoms

- The freedom to run the program, for any purpose
- The freedom to study how the program works, and change it to make it do what you wish
- The freedom to redistribute copies so you can help your neighbour
- The freedom to distribute copies of your modified versions to others

<http://www.gnu.org/philosophy/free-sw.htm>



FLOSS Mimics Evidence Based Medicine A Catalyst for Improving Outcomes, Quality and Cost



Breaking Down the Benefits



Component Benefits

- Operating systems: Linux
- Data bases: MySQL, GT.M
- Tools and Frameworks: Protocol development
- Standards, Terminology and Knowledge: RxNorm
- Components: Image viewers/PACS
- Total Solutions: EHR, PHRs



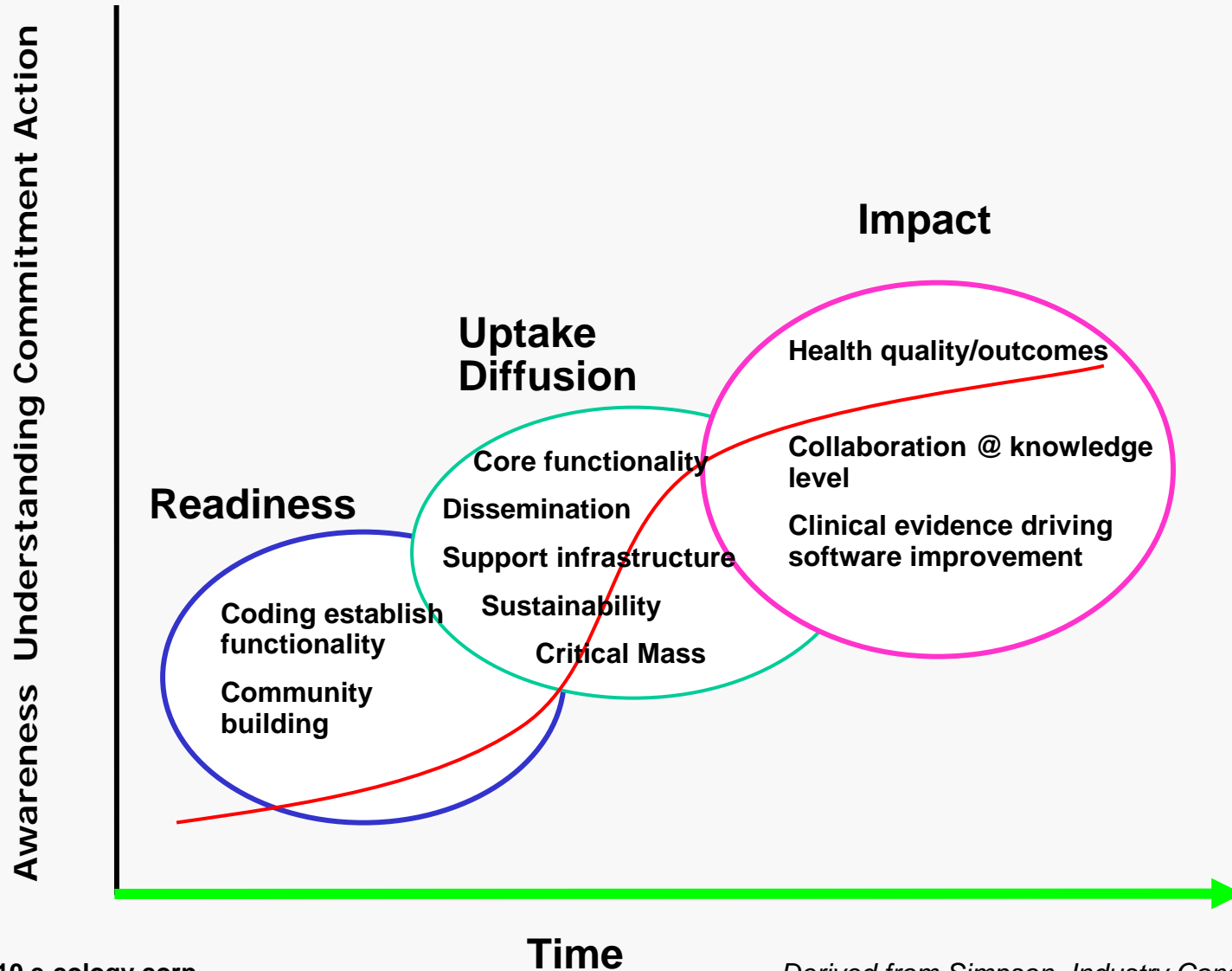
Process Benefits

A Synergistic Network of Benefits

- Acquisition and Support
 - Try before you buy
 - More competitive support pricing
- Implementation
 - A community experience
 - Leveraged investment and re-use
 - Broad dissemination
- User Acceptance
 - We like to use it AND we can make it better
- Virtuous Spiral of Quality and Cost Improvement
 - Rapid evolution and adaptation through reduced innovation friction
 - Targeted innovation – innovate where there is a real need to innovate and adapt



Where is Health FLOSS in 2010



...and the Evidence, please?



Cost Reduction

- OSCAR Primary care EHR
 - \$20 Million estimate to automate all doctors in Ontario
 - British Columbia – doctors are ignoring subsidies
- Jordan National e-Health Initiative
 - Cost of database license and support an order of magnitude less
- VistA Office EHR
 - Reuse and extension of key components, e.g. Rx Finishing, Scanning, Growth Charts



Why the US VA is a Good Benchmark

- Subject of very many peer reviewed studies – no marketing hype
- It is an evidence based e-cosystem
- It is 99% open source in clinical applications
- It resembles the rest of the world's health systems more than it does the US private sector health system



Clinical Evidence From US VA Ecosystem

- Elimination of virtually all medication error through barcode medication administration and direct physician CPOE
- Support of preventative care, immunization, cancer screening, and smoking cessation programs – VA went from 35% of eligible patients in 1996 to over 82% by 2003
- Significant improvement in chronic disease management through the use of evidence based clinical reminders
- Improvements in postoperative morbidity and mortality rates – From 1991 to 2008 the VHA has experienced declines in 30-day postoperative morbidity rates, from 17.4% to 8.8% and from 3.16% to 1.36% respectively



Clinical Evidence From US VA Ecosystem

Table 2. VA, Medicare, and Best Measured non-VA, non-Medicare Performance for 18 Comparable Performance Quality Indicators (US benchmarks are bolded)*

Clinical Indicator	VA 2003	Medicare 2003 ¹⁸	Best non-VA or Medicare
Advised tobacco cessation (VA ×3, others ×1)	75	63	68 ^{17,†}
Beta-blocker after MI	98	93	94 ^{17,†}
Breast cancer screening	84	74	75 ^{17,†}
Cervical cancer screening	90	NA	81 ^{17,†}
Cholesterol screening (all patients)	91	NA	73 ¹⁹
Cholesterol screening (post-MI)	94	80	79 ^{17,†}
LDL-C < 130 mg/dL post-MI	78	67	61 ^{17,†}
Colorectal cancer screening	67	50	49 ¹⁹
Diabetes HbA _{1c} checked past year	94	88	83 ^{17,†}
Diabetes HbA _{1c} > 9.5% (lower is better)	15	NA	34 ^{17,†}
Diabetes LDL-C measured	95	91	85 ^{17,†}
Diabetes LDL-C < 130 mg/dL	77	68	55 ^{17,†}
Diabetes eye exam	75	65	52 ^{17,†}
Diabetes kidney function	70	54	52 ^{17,†}
Hypertension: BP ≤ 140/90	68	61	58 ^{17,†}
Influenza immunization	76	74	68 ^{16,†}
Pneumococcal immunization	90	NA	63 ¹⁹
Mental health follow-up 30 days postdischarge	77	60	74 ^{17,†}

*All measures are directly comparable, except for mental health follow-up, because the VA accepts telephonic follow-up. All data are from 2002 and were published by the sources noted.

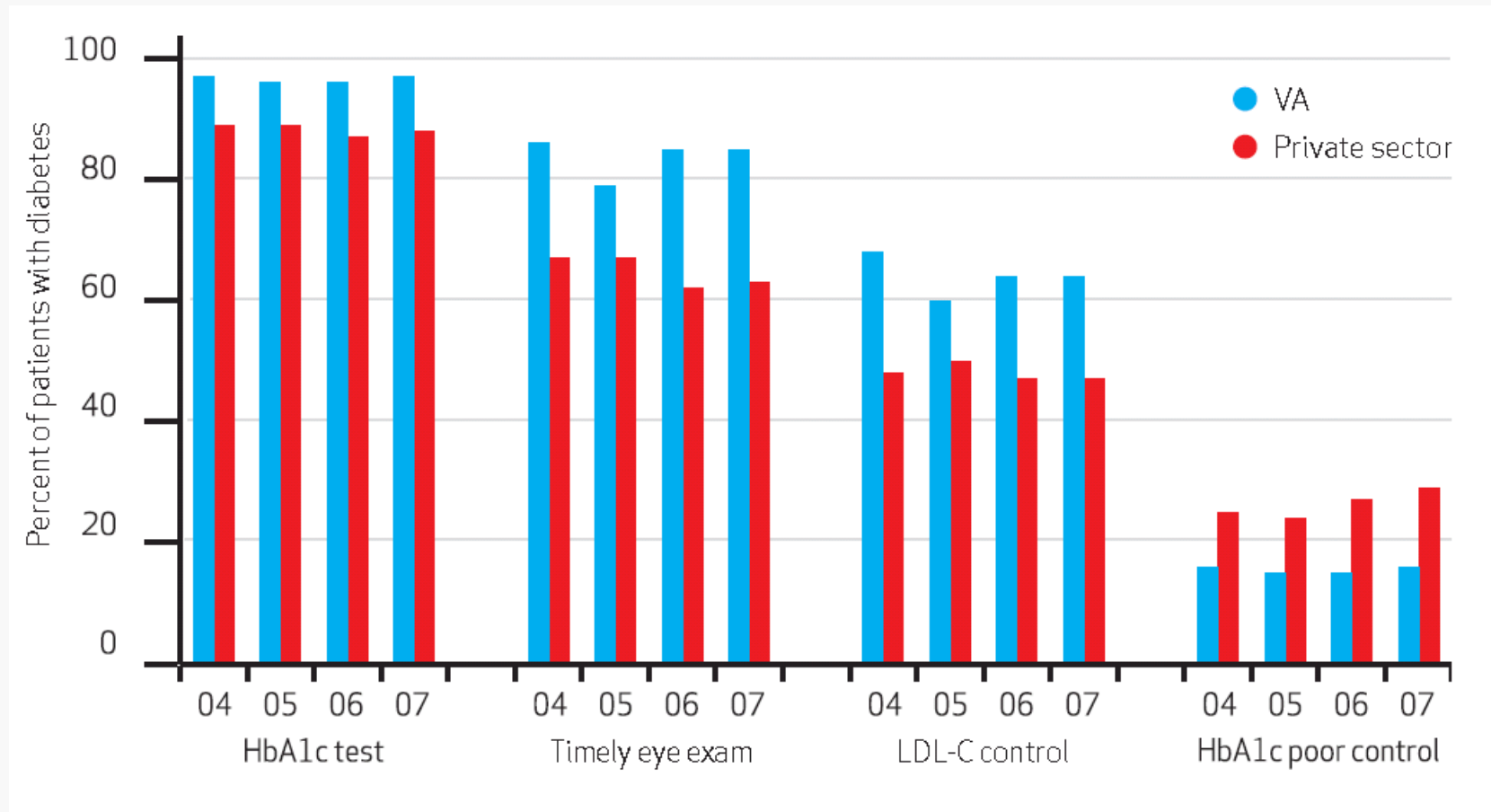
BP indicates blood pressure; HbA_{1c}, glycosylated hemoglobin; LDL-C, low-density lipoprotein cholesterol; MI, myocardial infarction; NA, data not available; VA, Department of Veterans Affairs.

[†]Patients were of all ages and were in private managed care programs.

¹⁸Rhode Island is the benchmark for influenza immunization.



Outpatient HIT Related Quality Measures For Patients With Diabetes, VA And Private Sector, 2004–2007



Source: HEALTH AFFAIRS 29, NO. 4 (2010): 629–638



Financial Evidence from US VA Ecosystem

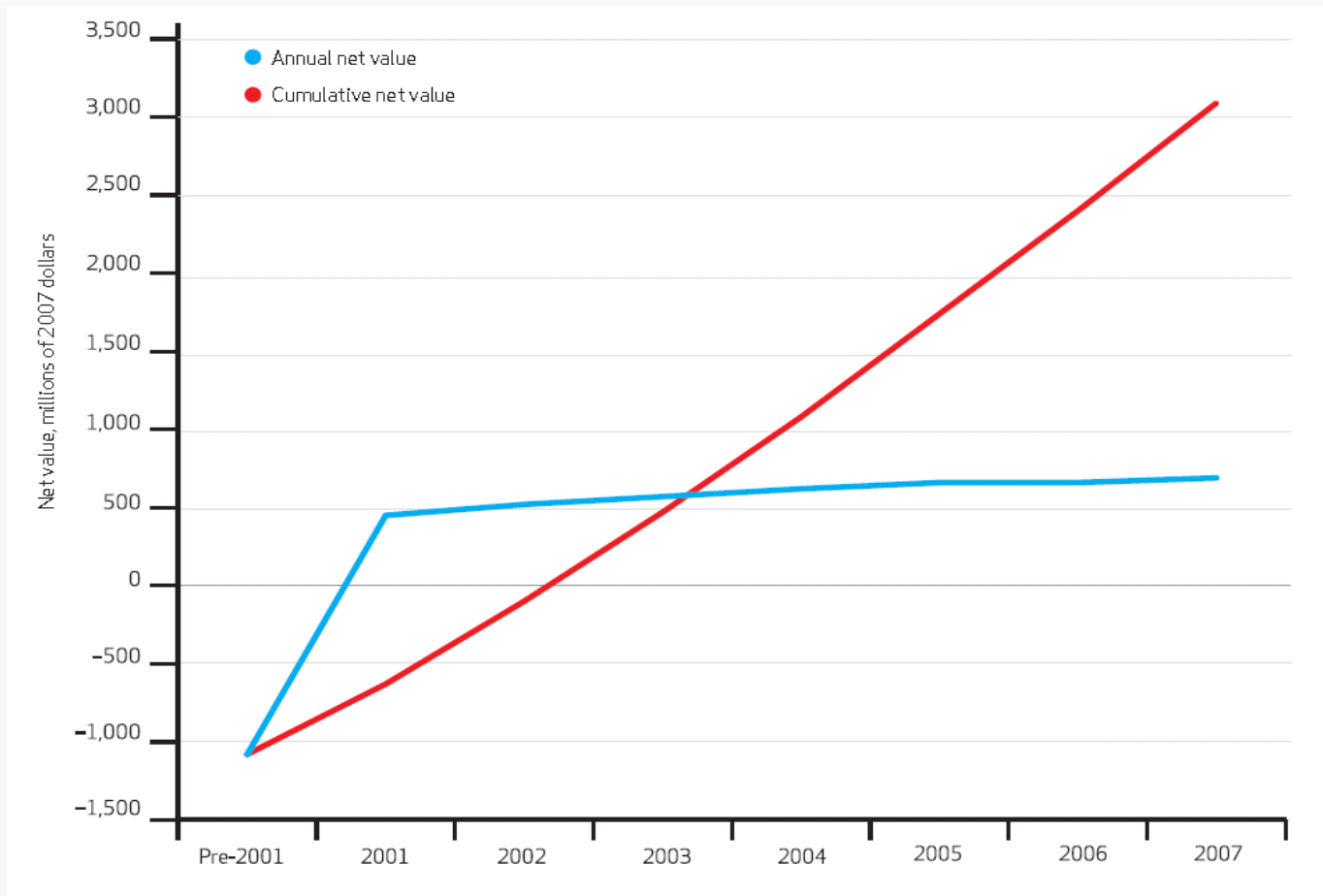
From 1996 to 2003, the **number of veterans treated** annually **increased by 75%** from 2.8 to 4.9 million.

The **budget remained flat** at \$19 billion **from 1995 to 1999**, and increased to approximately \$25 billion for fiscal year 2003, or about **32% cumulatively over 6 years**.

- Significant reduction in waste and duplication of lab tests and radiology exams
- Elimination of waste and cost of “prescription shopping”
- Significant cost reductions by reducing inpatient admissions, increasing outpatient visits through better managed care –



Net And Cumulative Potential Value Of Benefits Derived From VA (VistA) Applications



The potential value of the VA's health IT investments is estimated at \$3.09 billion in cumulative benefits **NET** of investment costs.

Source: *Health Affairs* 29, NO. 4 (2010): 629–638



Challenges

- Some governments do not know how to accept free software
- Past investments create inertia
- Overcoming the effects of co-evolution
 - Procurement processes need re-engineering
 - Capacity building in health IT
 - Mad cow disease
- NIH and Boiling the Ocean
 - Localization without forking – think global while acting local
 - Perfection is the enemy of the “good enough”... starting from scratch
- FLOSS economics have to be engineered for sustainability



In Summary FLOSS Changes Everything

Components Process and E-cosystem

“We speculate that the VA’s success in achieving relatively streamlined software development and high levels of system adoption which, in turn, was reflected in our cost-benefit projection was made possible by its structure.”

Source: Health Affairs 29, NO. 4 (2010): 629–638



Thank You!

“There's only one thing more painful than learning from experience, and that is not learning from experience.”

Author Unknown

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