Better Cost Estimation Through Radically Improved Risk Identification

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Relationship between risk and cost

Unknown or underestimated risks add an unknown amount of uncertainty to the project S curve
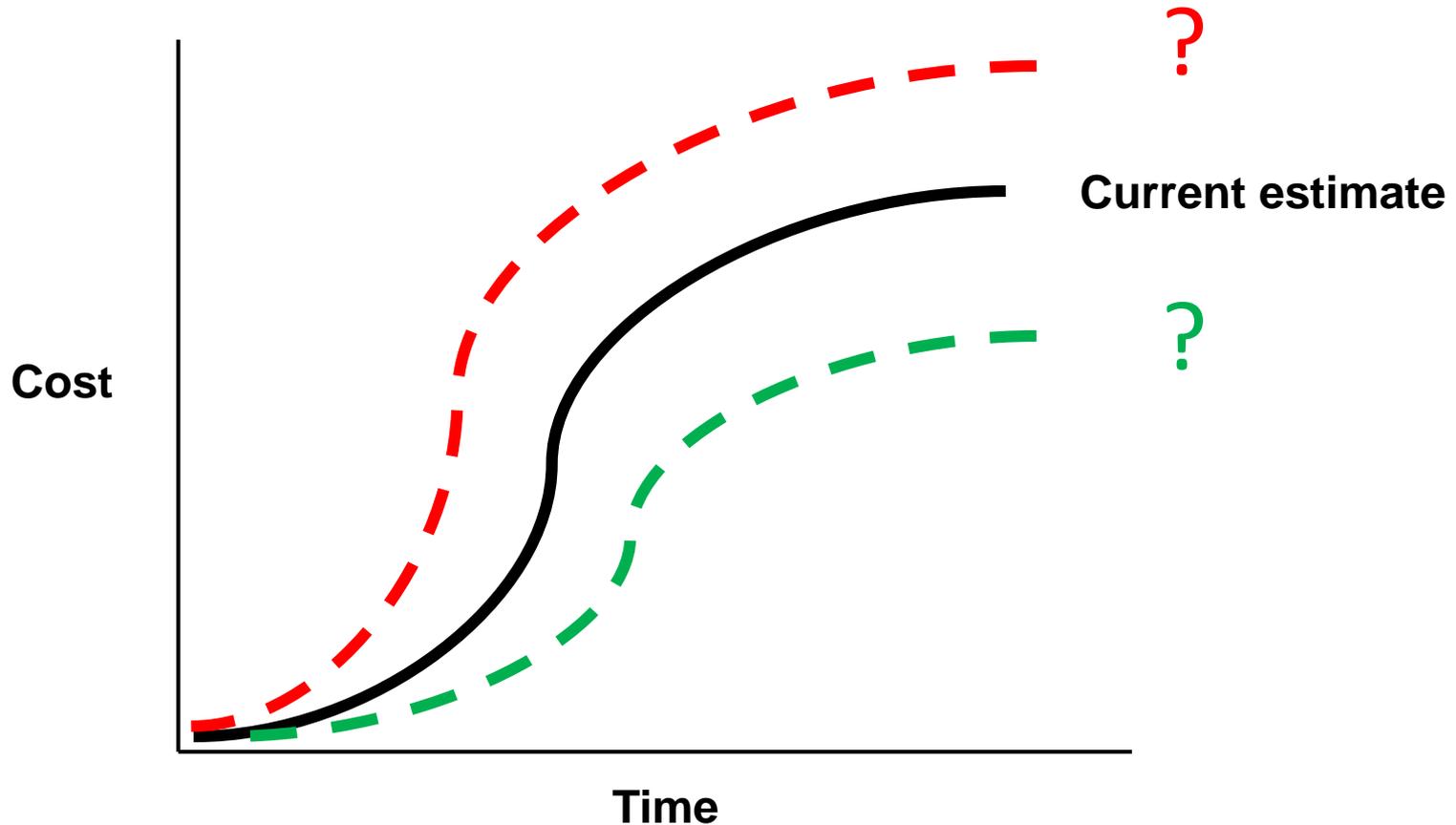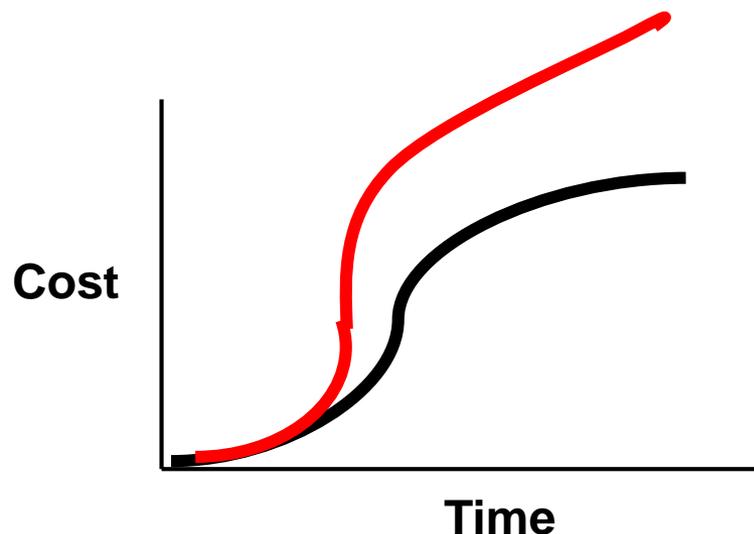
Program Overruns

Deloitte reported that the Major Defense Acquisition Program (MDAP) portfolio programs recorded a **48.3% growth in costs** and suffered an **average schedule delay of 29.5 months** in 2015. [1]

The Denver Post reported that the new **VA hospital** being built in Aurora CO, will suffer **cost overruns of $1.7 B**, originally expected to cost $604M. [2]

'Management errors in **Airbus' A400M** cargo plane program allowed huge cost overruns' [3] It was **delayed a total of four years** and has gone **6.2 billion euros (US$8.3bn) over budget** - a 30 percent overrun. [3]

1 http://blog.executivebiz.com/2016/10/deloitte-says-defense-acquisition-program-cost-overruns-hit-468b-in-2015-robin-lineberger-comments/ l New York, Oct. 24, 2016
2 http://www.denverpost.com/2016/09/21/aurora-va-officials-warned-repeatedly/ September 21, 2016
3 http://blog.seattlepi.com/aerospace/2010/01/20/audit-finds-eads-can-pay-for-a400m-cost-overruns/ January 2010

Cost vs. Time

Risk Management is painful – not a natural act for humans to perform

Source: Managing Risks: A New Framework, Robert S. Kaplan, Anette Mikes, Harvard Business Review, June 2012

Risk Management Process
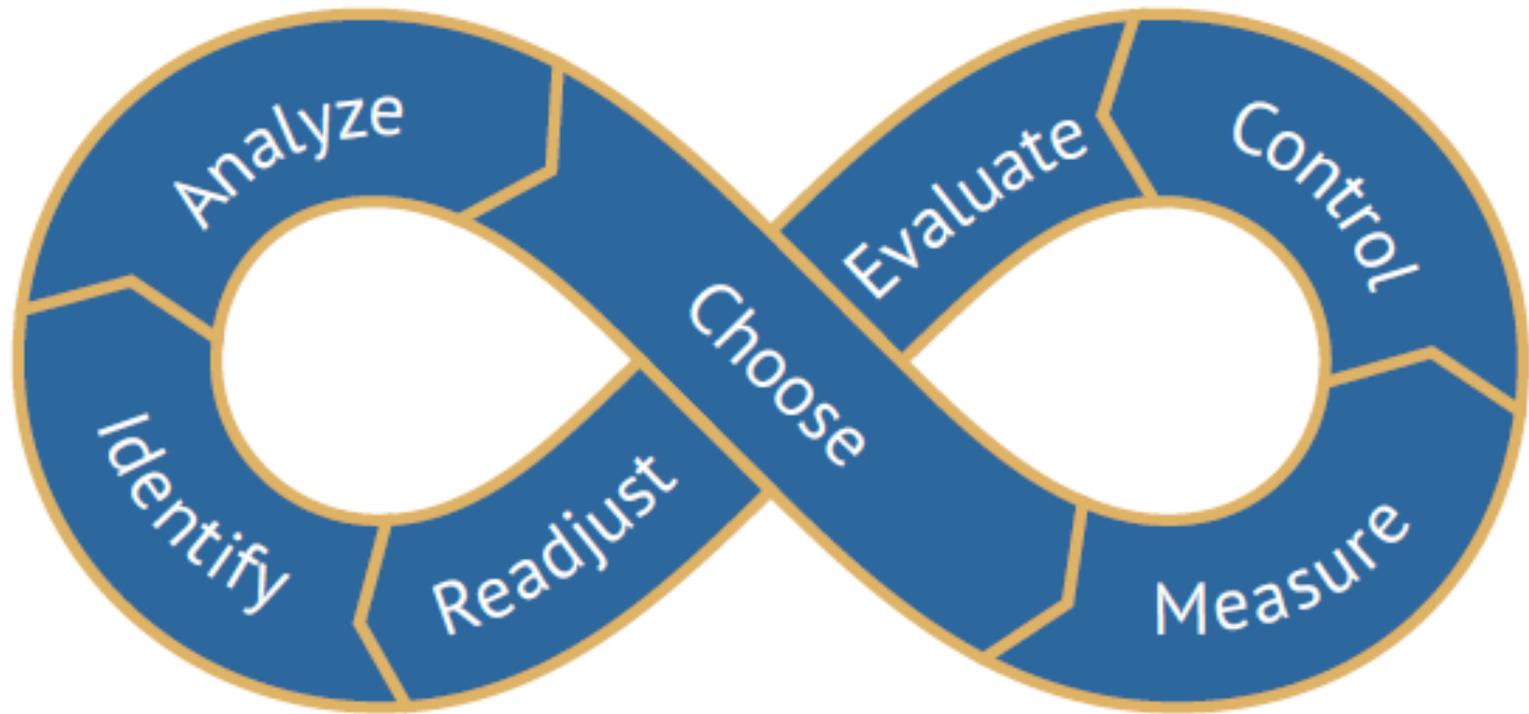
Why is RM So Problematic?

- Failure to perform risk management throughout the program

- Risk Identification is *subjective*

- Risk ID particularly critical for new products/services or modifying existing

Why is RM So Problematic?

- Organizational biases – including groupthink

- The Piecemeal Approach to Risk Management

- Denial, Fear and Embarrassment

But Risk Management (RM) is critical to cost estimation accuracy,

especially *early identification* of risks

Effectiveness Costs
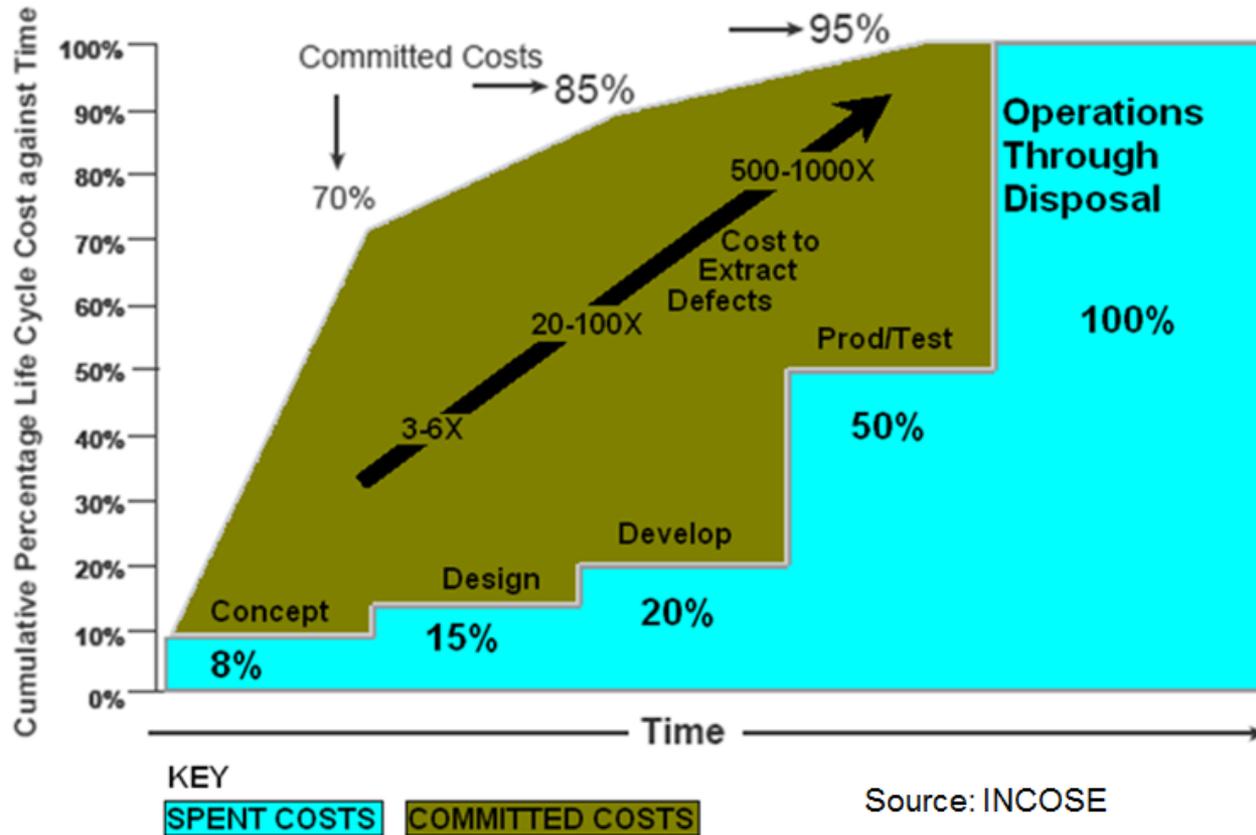
Problems found late in development cost 500-1000x to address

We've been doing it the same way for 50+ years

Common Problems of Cost Estimation

Unexpected technical difficulties
an assumption the tech problems will be minimal especially on projects that depend on tech innovation for success

Schedule Delays
Program changes, lack of schedule margin, unexpected rework

Software estimating issues
No simple relationship between lines of code, productivity, programming language used

Specification changes – the result of scope creep

External factors beyond the program's control
inflation, product shortages, new legislation

Risk Identification Analysis

- **Over 500 programs, their risks and outcomes were analyzed**

- **The same risks kept coming up, over and over**

- **Although risk specifics vary by program, the *underlying causes are the same***

- **218 common risks identified**

- **Risk weighting based on risk frequency, severity**

Risk Identification Analysis

Selected Risks in each Risk Area

Technical

Requirements Definition
•Interface Definition and Control
•Common Mode/Cascading Failures
•Quality
•Safety
•Logistics Supportability
•Technology Maturity
•Failure Analysis
•Models and Simulations
•Data Quality
•Software Module Maturity
•Software Integration Maturity
•Experience Required to Implement HW Module
•HS Methodology and Process Maturity
•Change Management Process
•Producibility
•Testing Planning
•COTS/GOTS/Reuse Experience

Organizational

Organizational Interest in Personnel Motivation
•Organizational Management Processes
•Organizational Culture
•Organizational Experience
•Organizational Business/Mission Benefit

Operational

•System Operational Problems
•Obsolescence Management Process
•Personnel Training and Experience
•Human Error
•Near Miss Consideration
•User Acceptance
•User Satisfaction
•System Availability
•System Failure Contingencies

Enterprise

Enterprise Experience
•Enterprise Reputation
•Enterprise Management Processes
•Enterprise Security Processes
•Enterprise Contingency Planning

Management

Management Experience
•Resources and Commitment
•Overall Program Staffing
•Personnel Experience
•Turnover Rate
•Personnel Morale
•Subcontractor Management
•Supplier Management

External

•Funding
•Regulatory
•Legal
•Labor Market
•Customer Experience
•Customer Interaction

Program Risk ID (PRID)
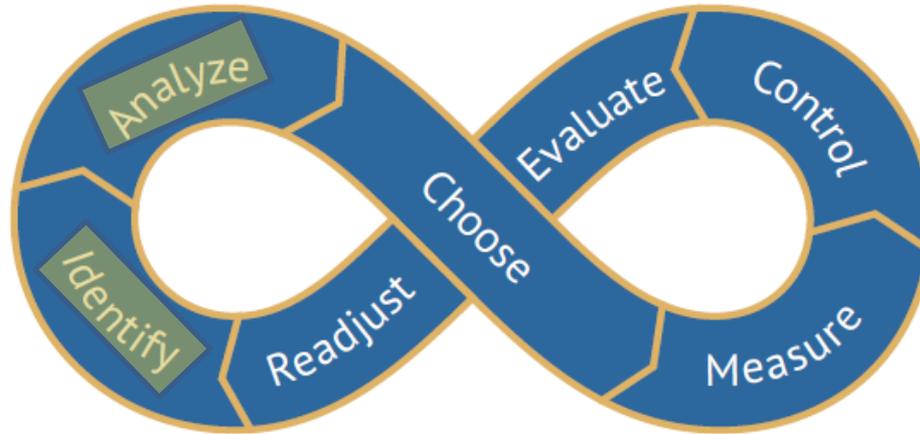
Changes the RM Paradigm

A web-based software tool

For One Program – **trending through time**

Across Many Programs - **compare risk levels across programs**

SysenexCE Problem – Project External Forces

Program Risk ID Risks

EXR1   Program Fit to Customer Organization
EXR2   Current Customer Personnel Turnover Rate
EXR3   Customer Experience
EXR4   Customer Interaction
EXR5   Destination/ and/or Use Environment

EXR6   Funding
EXR7   Regulatory
EXR8   Legal
EXR9   Litigation
EXR10 Political

EXR11 Labor Market
EXR12 Environmental
EXR13 Country Stability
EXR14 Direct or Indirect Threats

Program Risk ID Risks

TR5   Quality
TR7   Interface Definition and Control
TR15   Data Quality
TR16   Data Conversion
TR24   Software Complexity (Cyclomatic Complexity)

TR25   Software Development
TR26   Software Module Maturity
TR27   Software Integration
TR28   Software Module Reliability and Quality
TR29   Experience Required to Implement Software Module

TR30   Software Development Personnel
TR31   Software Data Requirements
TR32   Software Integration Maturity
TR50   Software Methodology and Process Maturity
TR56   Software Configuration Management

Our Ask

- Warm introductions to mid-market companies in

  - Medical device manufacturing
  - Pharma manufacturing
  - Banking
  - Cybersecurity
  - CXO, CRO, Chief Compliance Officer
  - Also those undergoing M&A – operational risk

- Investors who see value in risk management
  - cognitive, analytic RM solution development
  - $0.5M investment

Your Feedback and Recommendations are welcome

Sysenex Inc.

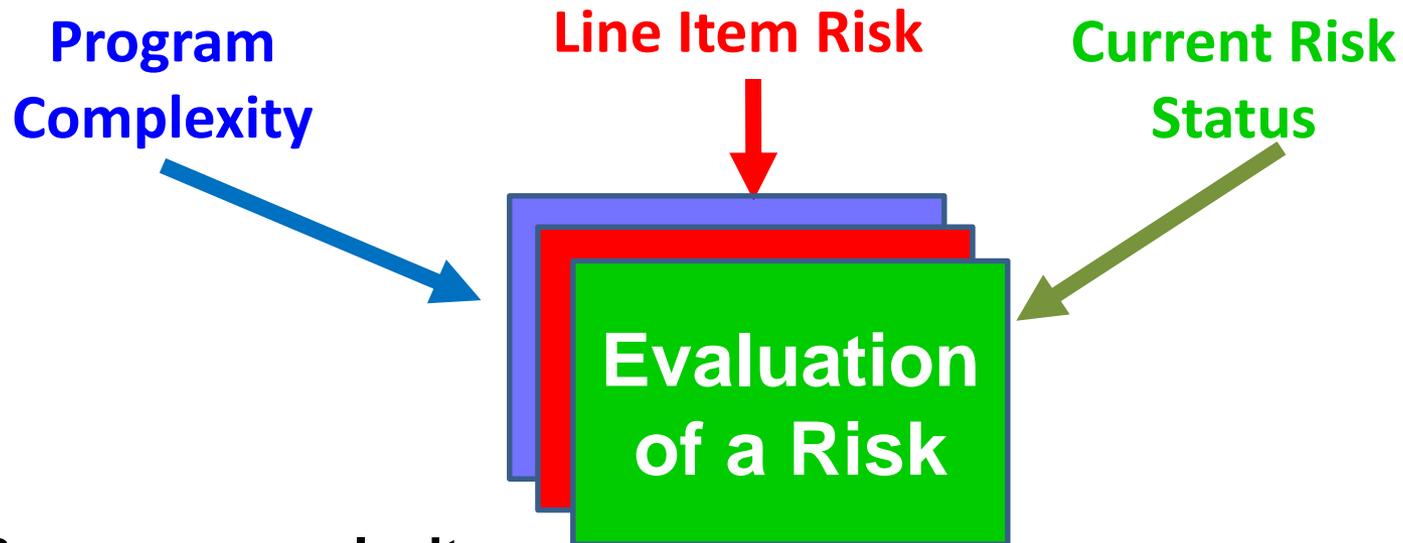# www.programriskid.com

Sysenex provides Risk Management consulting

www.Sysenex.com

BACKUP

Components of a Thorough Risk Evaluation

Program Complexity

Line Item Risk

Current Risk Status

Evaluation of a Risk

Program complexity
- Greater complexity = greater risk
- Simple, average, moderate, intermediate and high

Objective risk evaluation – two parts
- The risk line item
- Program status of the risk *at this time*

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EXR6 - Funding

Select the risk level that most accurately describes your program.

Risk Levels

○ **1.** Funding is completed for the program life cycle. There is no known threat to funding.

○ **2.** Required funding is committed for the program. Allocations are completed for next year.

○ **3.** Funding is allocated for out-years. There is some threat to continued funding at the required levels.

○ **4.** There is no funding allocated for the out-years. There is a high threat to continued funding.

○ **5.** Required funding is not committed for the program, and there is an extreme threat to present funding.

○ **N/A.** This risk is not applicable to the program

User Notes (Optional)

Enter any relevant comments to explain the choice that you selected above.

TR1 - Requirements Definition

Select the risk level that most accurately describes your program.

Risk Levels

○ **1.** System and user requirements are fully defined and formally agreed to by all stakeholders.

○ **2.** System and user requirements are partially defined; the remainder are to be defined in the short term and formally agreed to by all stakeholders.

○ **3.** System and user requirements are not defined, forcing the developer to make assumptions. Assumptions are informally agreed to by the stakeholders or users. Potential for definition of requirements in the short term exists.

○ **4.** System and user requirements are not defined, forcing the developer to make assumptions. Assumptions are informally agreed to by the stakeholders or users. There is no potential for definition of requirements for the long term.

○ **5.** System and user requirements are not defined, forcing the developer to make assumptions. There is no potential for definition of requirements for the long term.

○ **N/A.** This risk is not applicable to the program

Anatomy of a PRID Risk

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MR11 - Management Experience

Select the risk level that most accurately describes your program.

Risk Levels

○ **1.** Similar work has been successfully completed more than once, and most of the senior management experience is still available.

○ **2.** Similar work has been successfully completed more than once, and some of the senior management experience is still available.

○ **3.** Similar programs have been successfully completed once, and some of the senior management experience is still available.

○ **4.** Similar programs have been successfully completed once, but most senior management experience is no longer available.

○ **5.** No similar programs have been successfully completed under existing senior management.

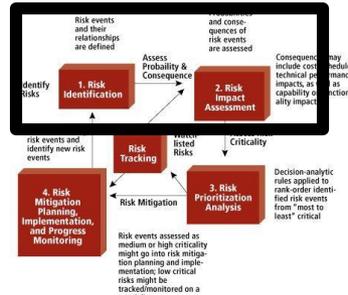○ **N/A.** This risk is not applicable to the program

How does PRID integrate with the RM Process?

1. Risk Identification

→

2. Risk Impact Assessment

Risks with levels 3-5: Which are most important?

Perform PRID Analysis

Evaluate Risks

TR5 - Quality

Select the risk level that most accurately describes your program.

Risk Levels

○ **1.** There is high concern for quality, and proven, successful processes are in use.

○ **2.** There is concern for quality, and quality processes are available and in use.

● **3. There is some concern for quality, and quality processes are available.**

○ **4.** Minimal concern for quality in program exists.

○ **5.** There is no concern for quality in program.

○ **N/A.** This risk is not applicable to the program

PRID risk levels, probability and impact

- Risk Statements help to prioritize risks, e.g.

If program funding is not allocated for the out-years, then we can't finish our program

- This information is then used to assess probability of occurrence and areas of impact

- PRID risk levels to If-Then risk statements
  - PRID risk level forms the first part of the risk statement

- Always use PRID at the beginning of the effort

- Use subsequently to evaluate mitigation efforts

- Assess when enough additional progress has been made to
  - Reassess current risk status
  - Check for new risks

- Rule of thumb
  - For programs 3 months or less in duration: once at start, then again 2/3rds along
  - For longer programs, once every 2 months or so

- Trending allows measurement of risk mitigation efforts through subsequent analyses
    - changes in risk level = changes in scores

- Portfolio Management
  - using a common standard makes common problems visible
  - which programs are in the most trouble? Enables better resource allocation

Program Risk ID

Now that you have these risks, what's next?

PRID tool reports become the input for other risk tools
- commercial, homegrown