Precompetitive collaboration to advance laboratory safety
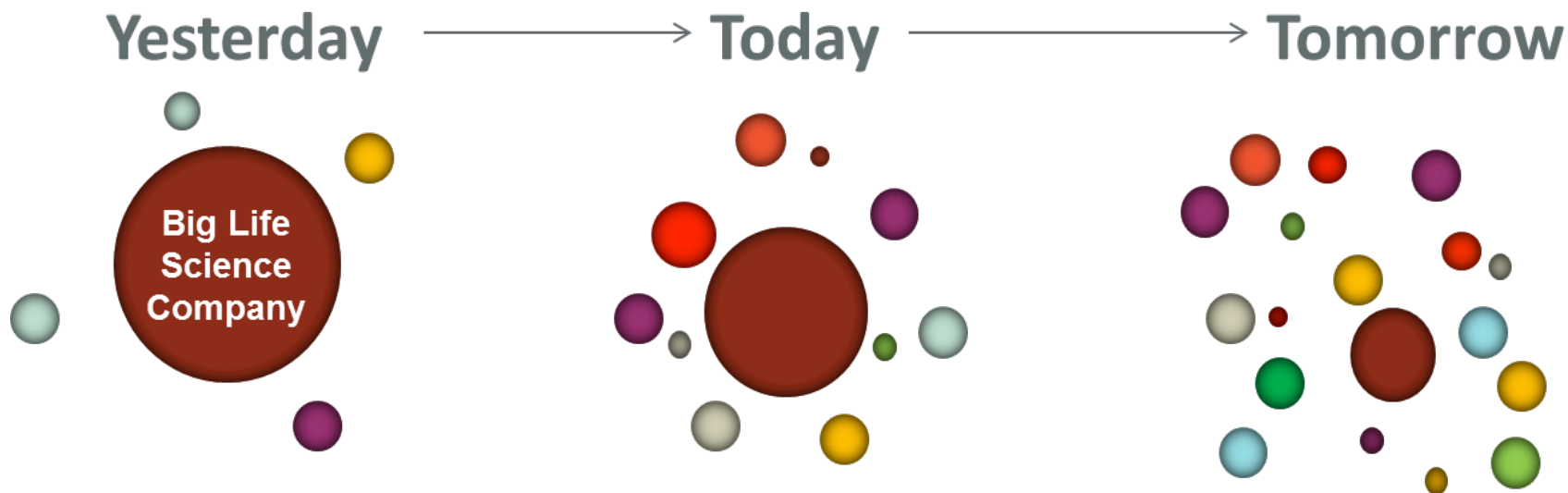
Carmen Nitsche – Executive Director Business Development North America

March 16, 2016

Pistoia Alliance

Rapidly evolving R&D ecosystem

	Yesterday	Today	Tomorrow
Innovation Model	Internal	Searching for innovation	Collaborative
IT	Internal apps & data	Change, security & trust issues	Cloud/Services
Data	Mostly internal	Inside → Outside	Distributed
Portfolio	Internally driven/owned	Partially shared	Shared

Pistoia Alliance Mission

Lowering the barriers to innovation

in life science R&D

by improving inter-operability of business

processes

through pre-competitive collaboration

Who we are and what we do

- The Pistoia Alliance is a global, not-for-profit 501 (c) (6) alliance of life science companies, vendors, publishers, and academic groups.

- We work with our members to improve the efficiency, effectiveness and success of life sciences R&D by:

    – bringing together key constituencies to identify root causes of common R&D challenges

    – developing best practices, standards, tools, specifications, technology pilots, etc. to overcome common obstacle

    – Pooling resources to solve common problems economically

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Pistoia Alliance offers a proven framework for open innovation, precompetitive collaboration

- Projects championed by members

- Multiple constituencies can engage

- IPR policy set as part of membership

- Full transparency

- Deliverables are shared with wider community

Labels: CRO, Publisher, Software vendor, Service provider, Regulatory authority, Academic group
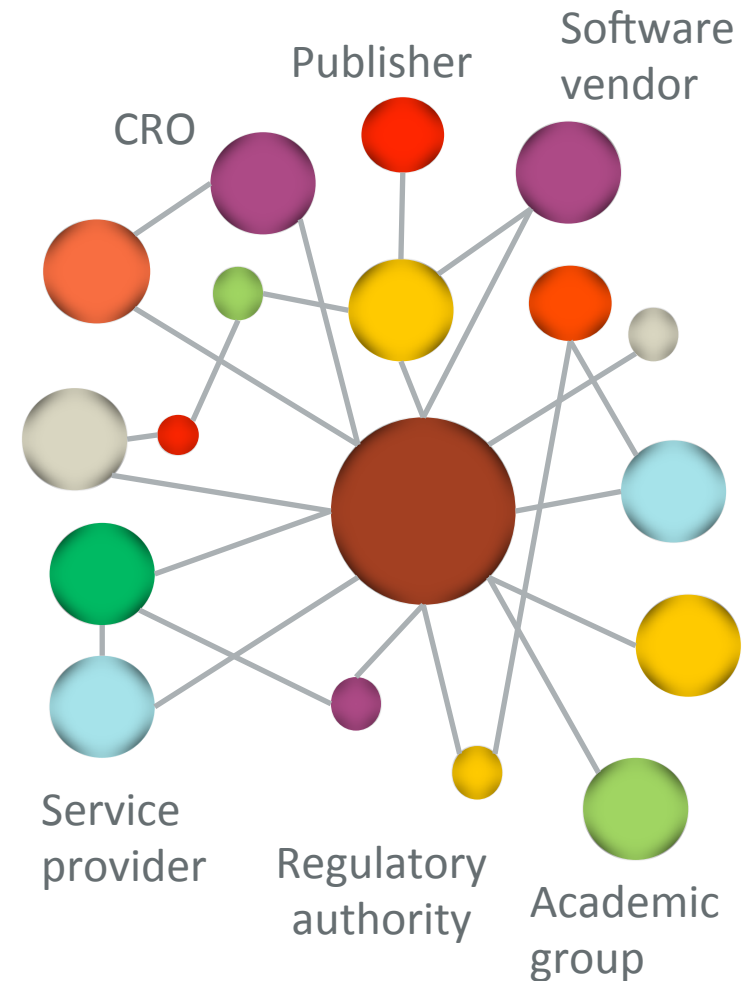
Examples of successful projects

HELM
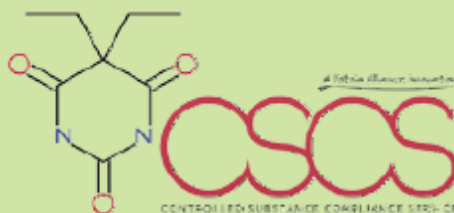*Hierarchical Editing for Large Molecules*

Rapidly becoming established as the global standard notation for large molecules.

www.openhelm.org

CSCS
Controlled Substance Compliance Service

Gaining traction across the industry as pharma companies and vendors alike seek to standardize their approach to compliance.

www.cscs-experts.org

Ontologies Mapping

The Ontologies Mapping project has been set up to create better tools or services and to establish best practices for ontology management in the Life Sciences.

www.pistoiaalliance.org/projects/ontologies-mapping

Interactive Project Portfolio Platform (IP3)

IP3 enables open innovation and collaboration

- Collection of all our project ideas
- Highlights our active and funding portfolios
- Supports discussion around ideas
- Provides updates and status reports
- Fully open to everyone
- Please contribute your ideas and comments

The project inspiration: $NaBH(F_3CCO_2)_3$

Original synthesis described in United States Patent 4,835,278

$NaBH_4$ $\xrightarrow[\text{THF}]{\text{Trifluoroacetic acid}}$
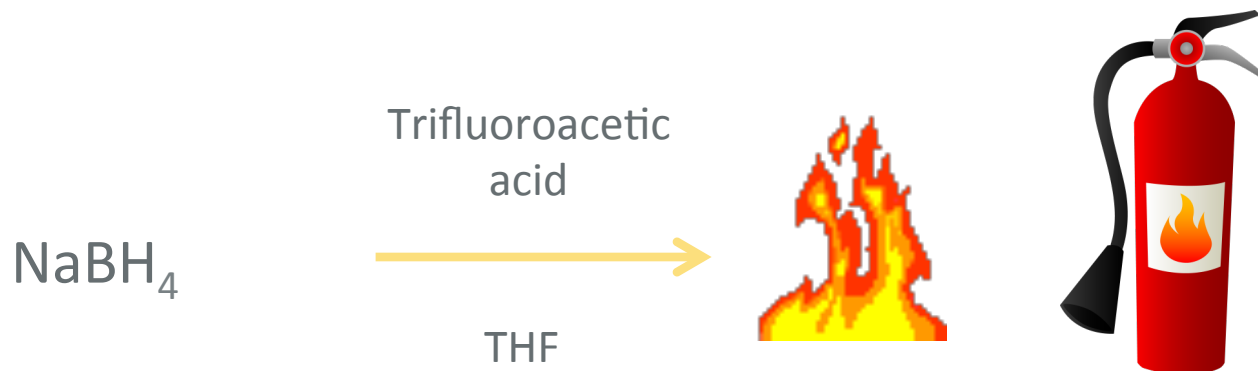
- Exothermic Reaction
- Byproduct: hydrogen gas
- Powder dissolves rapidly, reaction not controlled, will consistently catch fire
- Lesson: Must use _pelletized_ $NaBH_4$, dissolution controls reaction rate

Ensuring That Lessons Learned Are Not Forgotten, Leveraging ELN to Transform the Safety Paradigm, Mark Manfredi (BMS), ACS Fall 2016 – CHAS Division talk

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The project inspiration: NaBH(F$_3$CCO$_2$)$_3$

Original synthesis described in United States Patent 4,835,278

NaBH$_4$

Is the problem the chemist or the process???

- Exothermi...
- Byproduct: ...
- Powder disso... not controlled, will consistently ca...
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Ensuring That Lessons Learned Are Not Forgotten, Leveraging ELN to Transform the Safety Paradigm, Mark Manfredi (BMS), ACS Fall 2016 – CHAS Division talk

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The project inspiration: NaBH(F_3CCO$_2$)$_3$

Original synthesis described in United States Patent 4,835,278

-
-
-      ill

-      ntrols reaction rate

Bottom line: No one goes to work thinking:

"Today I plan to get hurt !"

Ensuring That Lessons Learned Are Not Forgotten, Leveraging ELN to Transform the Safety Paradigm, Mark Manfredi (BMS), ACS Fall 2016 – CHAS Division talk

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Safety Culture: a fundamental shift

- **Old View**
  - The complex systems are generally safe
  - Human error is the cause of accidents
  - Focus on blame and punishment
  - Remove the unreliable human element as much as possible through process and procedure

- **New View**
  - Systems are not inherently safe
  - Human error is a symptom of failure
  - Figure out why peoples' assessments at the time made sense to them
  - Design systems to support success
  - All levels must be involved to create safety

Collaborating to make things go right

- **Principles**
  - See people not as a problem to be eliminated but a resource to be tapped
  - Recognize that even when nothing bad happens, that does not mean safety prevails
  - Value trust and honesty

- **Actions**
  - Do risk assessment on process that went right.
    - Consider what could have gone wrong, and assess why not
  - Ask participants what they might suggest. They have a front row seat and probably have some good ideas
  - Promote institutional knowledge retention, even as people come and go.
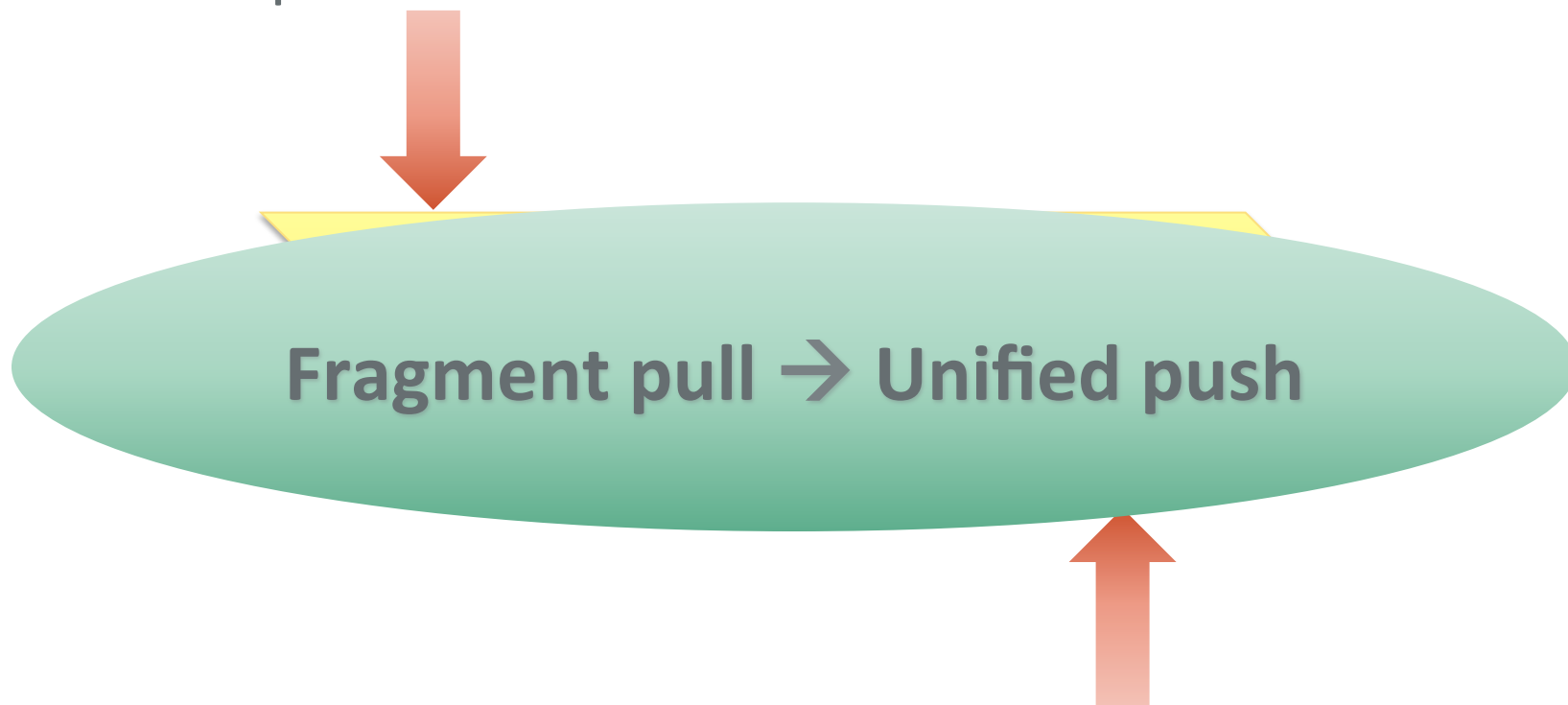
Analyzing the workflow

Point at which chemist typically pulls safety info, from disparate sources

Design The Reaction → **Procure The Materials** → **Synthesize The Product**
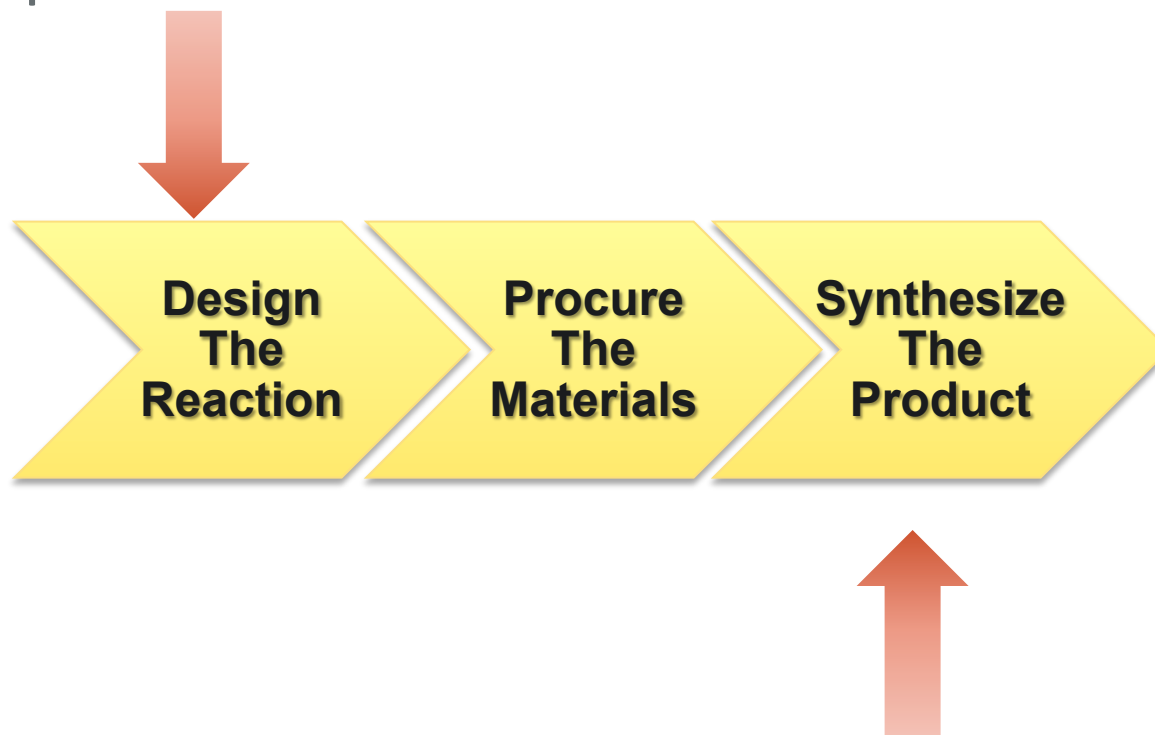
Point at which chemist really needs the info.

Analyzing the workflow

Point at which chemist typically pulls safety info, from disparate sources

Fragment pull → Unified push

Point at which chemist really needs the info.

Part one: The BMS internal solution

- **Implementation**
  - Safety committee reviews incidents and near misses and curates the ensuing rules and triggers
  - Flags delivered automatically to the e-notebook

- **Outcomes**
- Large-scale reaction notifications up 300%
- No incidents or near misses reported for any of the documented rules!
- BioIT awarded BMS Judges' Prize for this work

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  - Sa... reaction
    rev... up 300%
    nea... dents or
    cur... rted for
    rule...
  - Fla...
    aut... rules!
    not... ed BMS
    Judges' Prize for this
    work

- **Outcomes**

Elegant and successful but still a silo

Project initiation

- BMS brought the project idea for sharing reaction incident data to the Pistoia Alliance

- Project enthusiastically embraced by the membership and a CSL project steering committee and team were assembled in late 2015.

- Through the IP3 platform and personal communications, have attracted interest beyond Pistoia Alliance

- ACS is generously contributing the C&ENews Safety Letters content for use in the CSL project

CSL goal and value proposition

- The Pistoia Alliance *Chemical Safety Library* project will capture and share previously inaccessible reaction incident information.

- Making this data available to the chemical community at large will allowing companies to learn and avoid reaction incidents experienced by the wider community, enhancing overall laboratory safety.

CSL deliverables

- Determine current safety data sources and practices at participant companies

- Review existing BMS format for incident data reporting

- Outline CSL requirements for reaction incident information gathering and curation

- Build web-based submission system for gathering data

- Make the resulting information available to all
  - Internal implementations and trigger thresholds to be determined and carried out by the data users

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CSL: project participation

- **Participants**
  - AstraZeneca
  - Bayer
  - Bristol-Myers Squibb
  - GSK
  - Elsevier
  - Merck Co.
  - Merck Group
  - PerkinElmer
  - Pfizer

- **Interest Group**
  - Will launch by April
  - Open to all interested parties
  - Will be provided regular project updates
  - Will be asked to test incident data entry system

Collaborative efforts – an other example

- Laboratory Chemical Safety Summaries (LCSS)
  - https://pubchem.ncbi.nlm.nih.gov/lcss/
  - based on format described by NRC
  - Available when a GHS classification is available in PubChem compound record
  - Collaboration between PubChem and ACS-CHAS, ACS-CINF and the ACS-CCS
  - Content available electronically (bulk and one-off)

Useful links and references: New View

- Excellent Bioraft-hosted March 2, 2016 webinar on the New View entitled "The New View: Tools for Engineering a Stronger Lab Safety Culture" was presented by David A. Christenson, CEO and Consultant, Organizing for Resilience (david@o4r.co) and Ron Gantt , Vice President & Principal Consultant, Safety Compliance Management (rgantt@scm-safety.com).
    - Copy of slides of the presentation: http://www.bioraft.com/sites/default/files/New%20View%20-%20Tools%20for%20Engineering%20a%20Stronger%20Lab%20Safety%20Culture.pdf
    - Bioraft blog post with link to recording: http://www.bioraft.com/blog/recorded-webinar-new-view-tools-engineering-stronger-lab-safety-culture

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Useful links and references: Pistoia Alliance

- www.pistoaalliance.org: Pistoia Alliance website

- http://ip3.pistoiaalliance.org: The interactive Project portfolio Platform (IP3)

- https://main.qmarkets.org/live/pistoia/node/1365 Chemical Safety Library project IP3 record

Acknowledgements

- Bristol-Myers Squibb
  - Ramesh Durvasula (project sponsor)
  - Dana Vanderwall (project champion)
  - Mark Manfredi (project lead)

- Pistoia Alliance
  - Gabrielle Whittick

- CSL project team, w special thanks to David Tschaen (Merck Co), sub-team lead

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If you want to go fast,
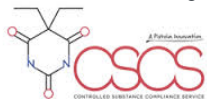
go alone.

If you want to go far,

go together.

- African Proverb -

Pistoia Alliance

info@pistoiaalliance.org   @pistoiaalliance   www.pistoiaalliance.org

Recent Pistoia Alliance successes

- Controlled Substance Compliance Services (CSCS)
  - Big pharma and compound vendors alike benefit from standardised commercial tools to interpret regulations
  - www.cscs-experts.org
  - Phase 2: expanded to China and working on South America; set up expert community

- Hierarchical Editing Language for Macromolecule (HELM)
  - Exchangeable and consistent notation allows for easier sharing and representation of complex molecules, such as antibodies
  - Code for toolkit and editor on GitHub (details at www.openhelm.org)
  - Supporters/adopters incl.
    - *Biovia, ACD Labs, Arxspan, Biomax, BMS, ChemAxon, eMolecules, GSK, Lundbeck, Merck, NextMove, Novartis, Pfizer, Roche, and Scilligence*
  - EMBL/EBI added HELM to latest release of ChEMBLE
  - HELM phase 2 addressing incompletely defined substances; Roche antibody editor contributed back to community

- Other projects
  - Sequence Services – establishing secure, cloud-based implementations of gene sequence analysis
  - Sequence Squeeze - developed a number of new, faster, better compression algorithms for NGS data
  - tranSMART - established an independent foundation to maintain and support the code, community and continuity of this popular translational research tool

BEST PRACTICES AWARDS WINNER Bio IT World 2014