CLARIFYING THE DIAMONDS

Valerie Mulholland
PRST/GMP Services

"Delivering Value and Resilience using QRM"

OLLSCOIL TEICNEOLAÍOCHTA BHAILE ÁTHA CLIATH
DUBLIN
TECHNOLOGICAL UNIVERSITY DUBLIN

Pharmaceutical
REGULATORY SCIENCE
Team

PDA HONOR AWARDS 2021
PDA CHAPTER OF THE YEAR
PDA Ireland Chapter
AWARDED TO:
PDA Ireland Chapter

Pharmaceutical REGULATORY SCIENCE Team

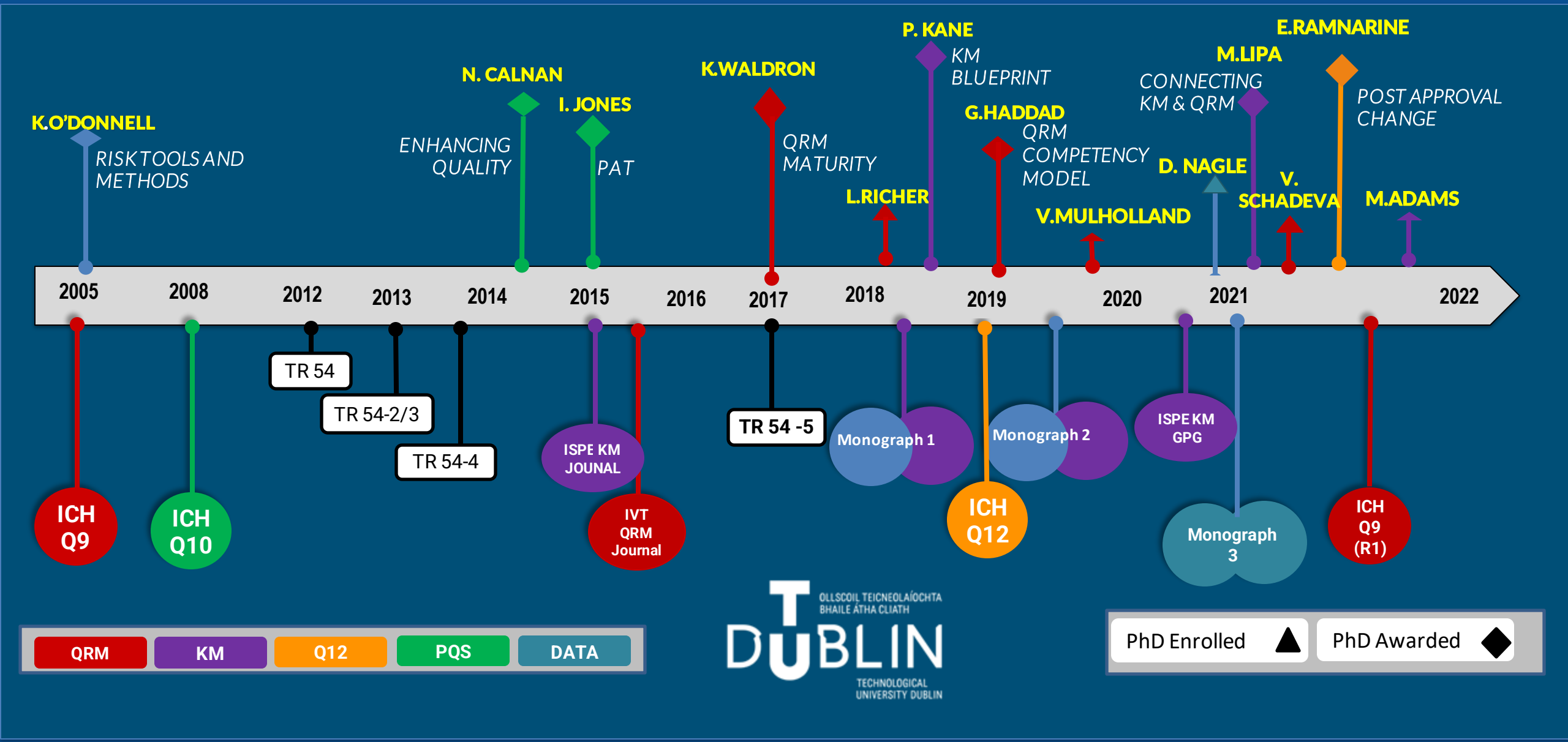
PRST was **founded in Dublin in 2005** in response to the drive for a paradigm shift in quality from the international regulatory community.

PRST **actively engages with global industry and regulators** to address the challenges and opportunities of implementing

***Science And Risk* Based Decision Making** and manufacturing approaches.

Our research emphasis is on the development of **patient-focused strategies** to enable those involved in the manufacture of commercial drug products meet the evolving international regulatory expectations ensuring the ***availability*** of ***high-quality*** medicinal products.

PRST JOURNEY 2005 - 2022



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DUBLIN TECHNOLOGICAL UNIVERSITY DUBLIN
OLLSCOIL TEICNEOLAÍOCHTA BHAILE ÁTHA CLIATH

HPRA
An tÚdarás Rialála Táirgí Sláinte
Health Products Regulatory Authority

Genentech
A Member of the Roche Group

genzyme

ultragenyx

VALSOURCE
Innovative Solutions. Sustainable Results.

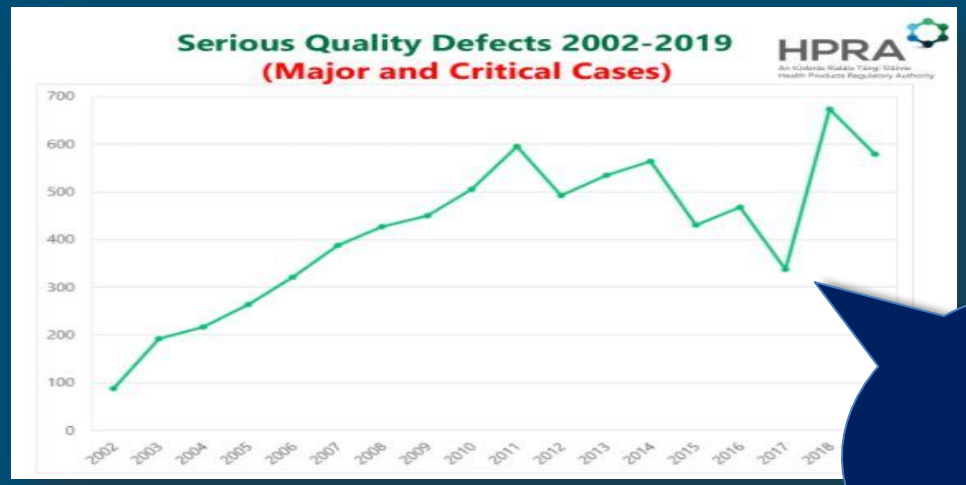
gmp services

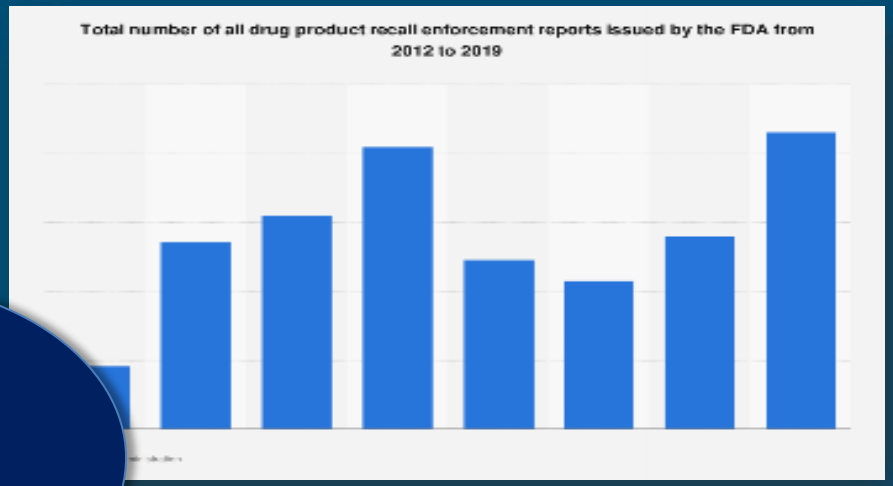
Innopharma education

University of St.Gallen

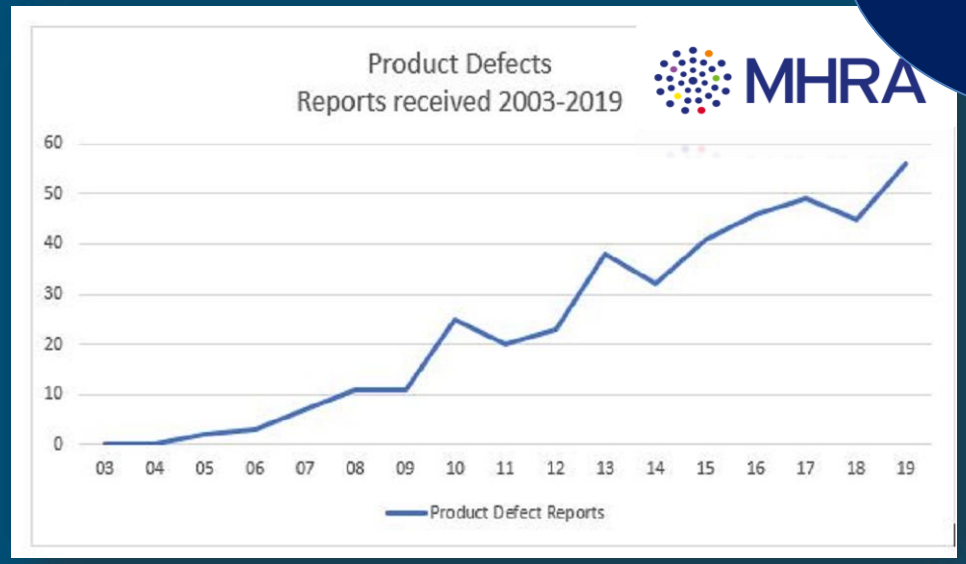
PMTC

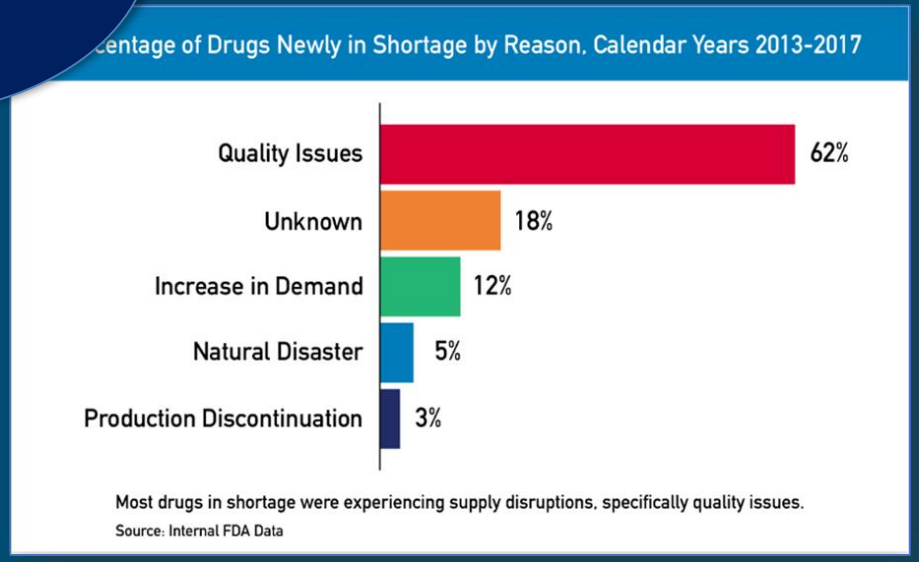
Delivering Value and Resilience using Quality Risk Management





Is QRM effective?





RISK BASED DECISION MAKING

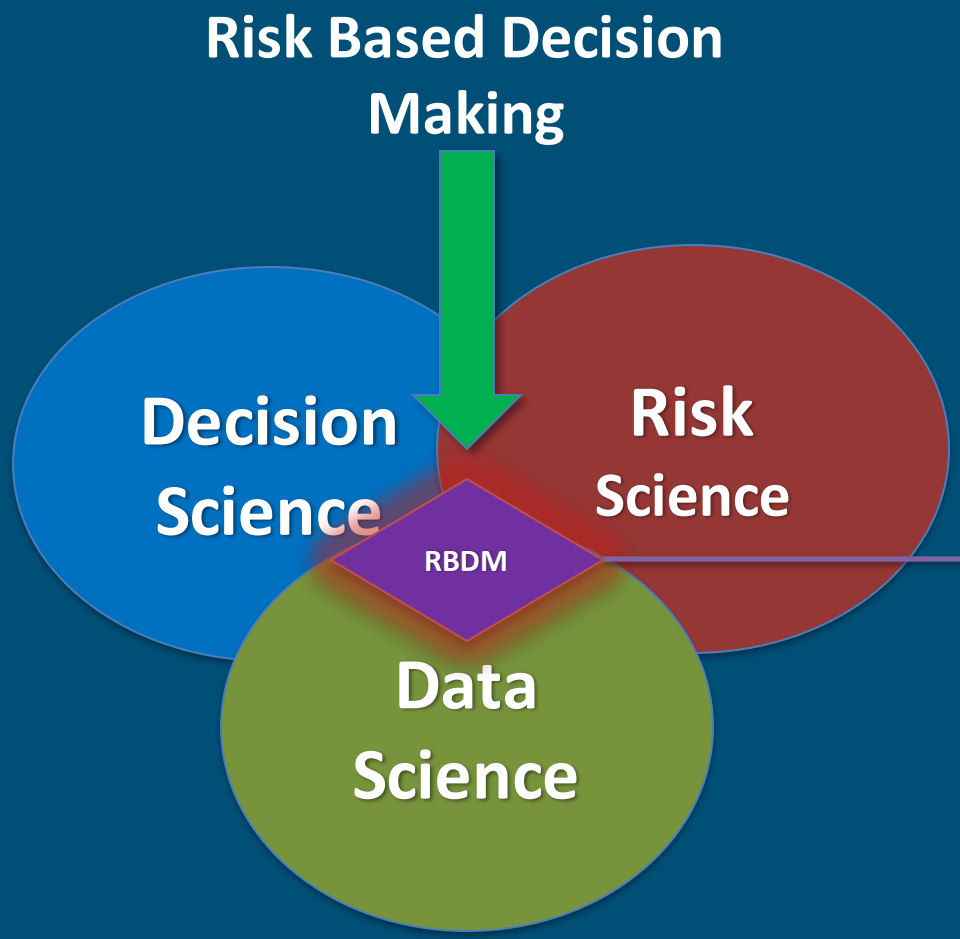
The Problem Statement

Q9 (R1): Concept Paper Nov 2020

'While there are references in ICH Q9 to decision-making, there is a ***lack of clarity on what good risk-based decision making actually means,*** *how QRM may improve decision-making, or how risk-based decisions might be achieved.*

There is a breadth of peer-reviewed research in this area, *but the level of visibility (and uptake) of that research within the pharmaceutical industry may be improved. It would also be useful to address the expected benefits of investing in risk-based decision-making activities.*

Areas of Research....



WHAT
is RBDM?

WHERE
does RBDM happen?

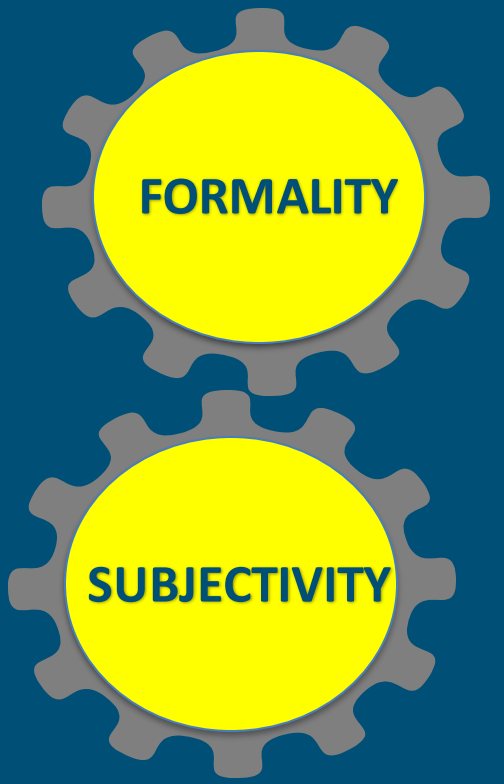
HOW
Best practice?

WHAT
is RBDM?

ICH
harmonisation for better health

ICH Q9 (R1)

Risk-Based Decision Making:
An approach or process that considers
knowledge about risks
relevant to *the decision* and
whether risks are at an acceptable level.

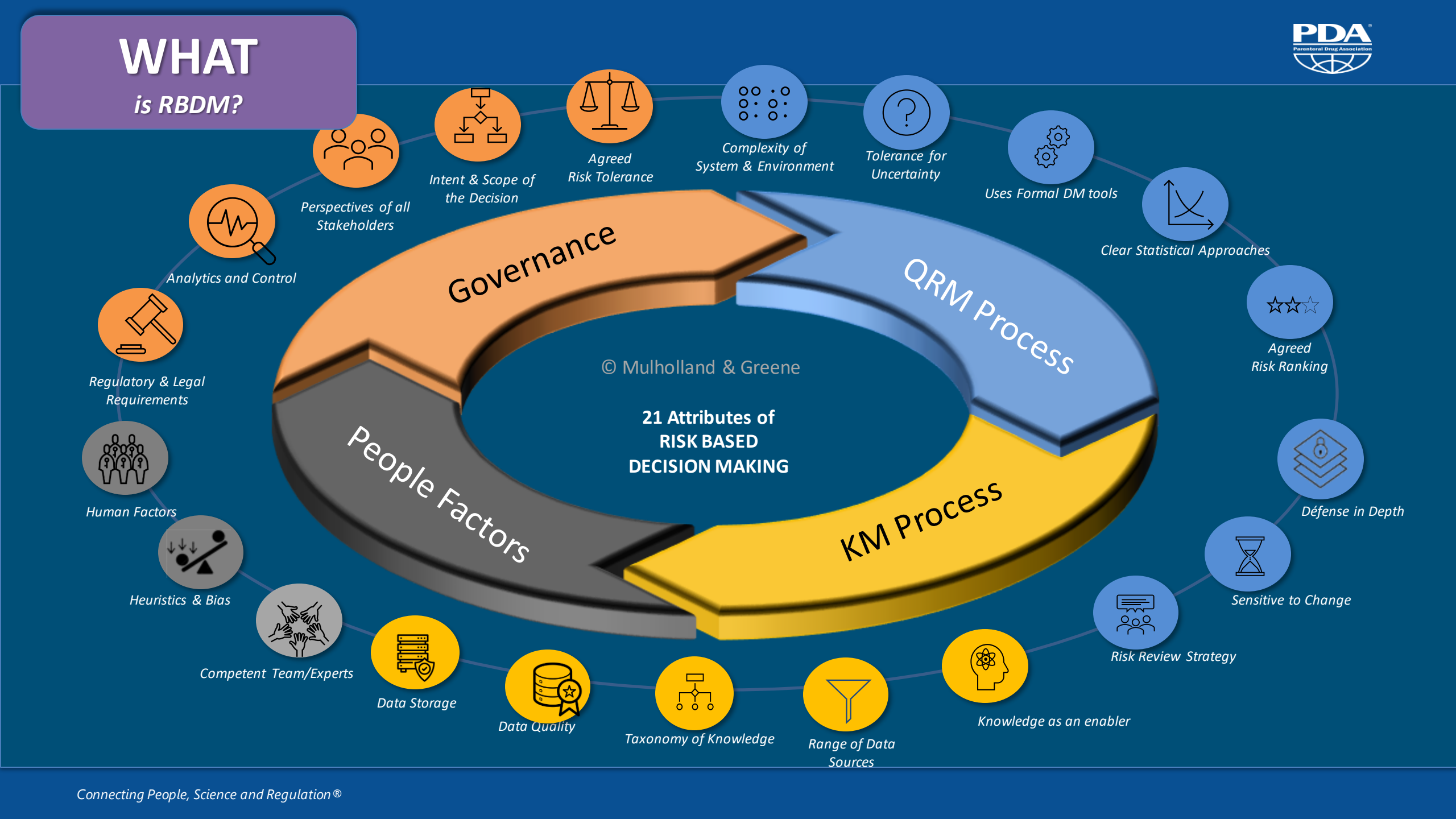


WHAT

is RBDM?

No universal definition

WHAT
is RBDM?


Governance
QRM Process
KM Process
People Factors
© Mulholland & Greene
21 Attributes of
RISK BASED
DECISION MAKING
Perspectives of all Stakeholders
Intent & Scope of the Decision
Agreed Risk Tolerance
Complexity of System & Environment
Tolerance for Uncertainty
Uses Formal DM tools
Clear Statistical Approaches
Agreed Risk Ranking
Défense in Depth
Sensitive to Change
Risk Review Strategy
Knowledge as an enabler
Range of Data Sources
Taxonomy of Knowledge
Data Quality
Data Storage
Competent Team/Experts
Heuristics & Bias
Human Factors
Regulatory & Legal Requirements
Analytics and Control

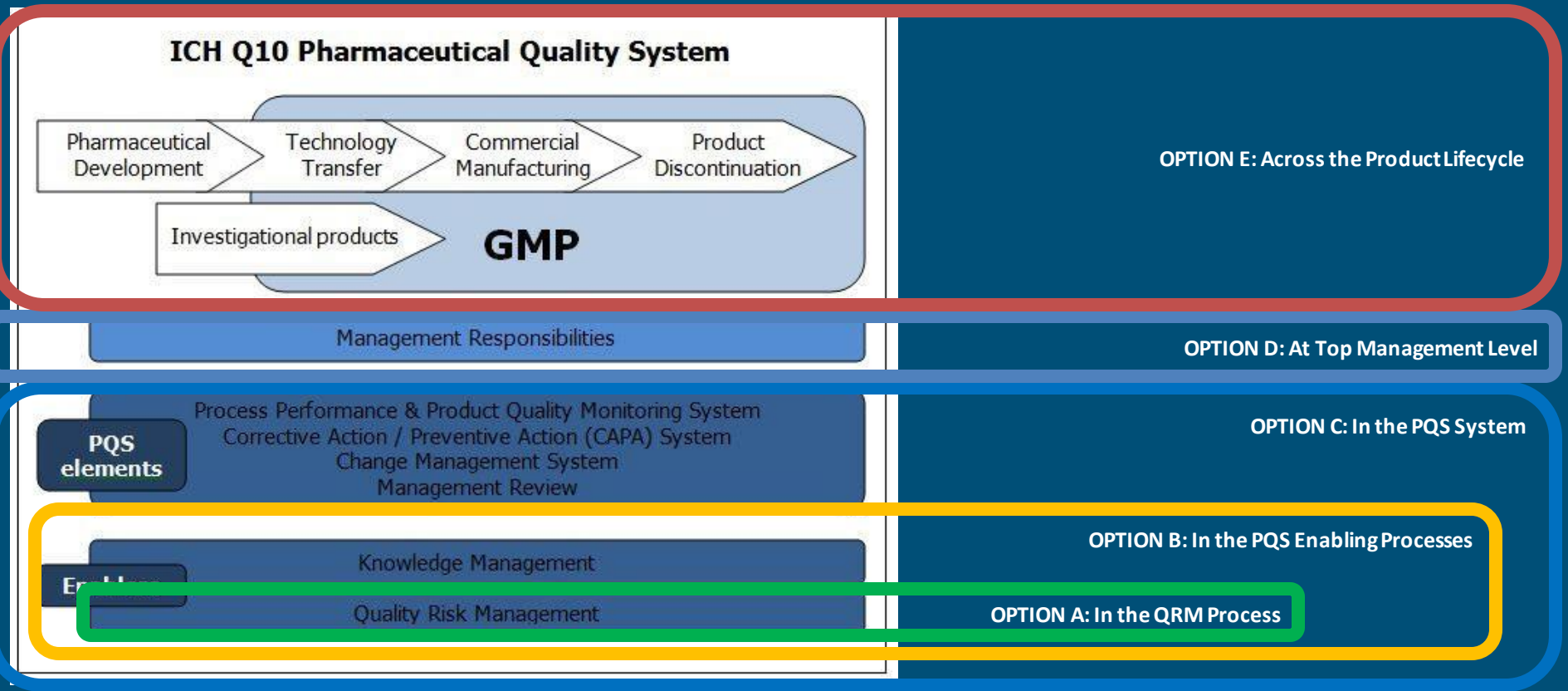
WHERE

does RBDM happen?

In a Pharmaceutical Manufacturing Operation,

where are Risk Based Decisions made?

Perhaps more then one option applies?



Decision Science

Risk Science

Risk Science distinguishes between decisions *about* risk analysis (technical) and decisions that *use* risk analysis (deliberation)

WHERE

does RBDM happen?

In a Pharmaceutical Manufacturing Operation,

where are Risk Based Decisions made?

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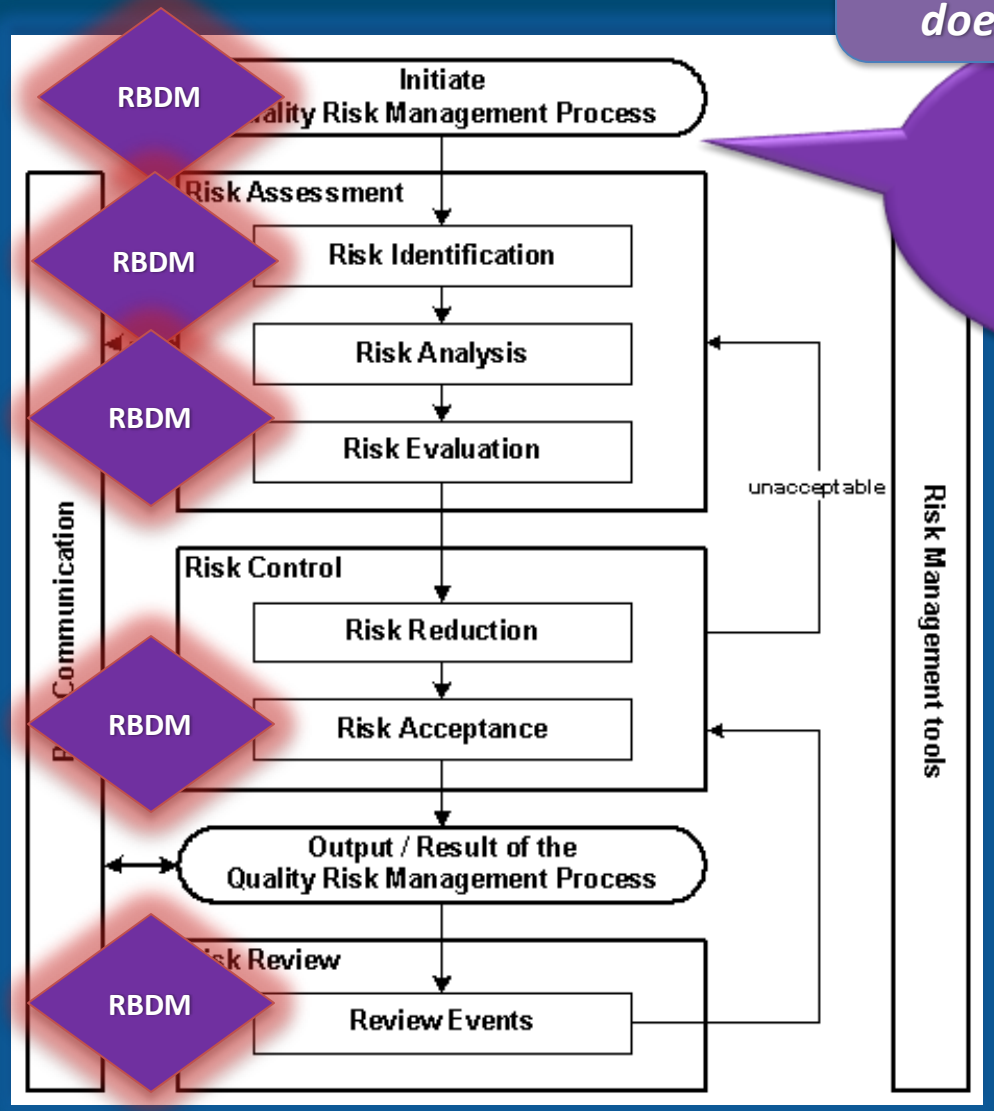
Decision Science

Risk Science

Risk Science distinguishes between decisions *about* risk analysis (technical) and decisions that *use* risk analysis (deliberation)

WHERE

does RBDM happen?



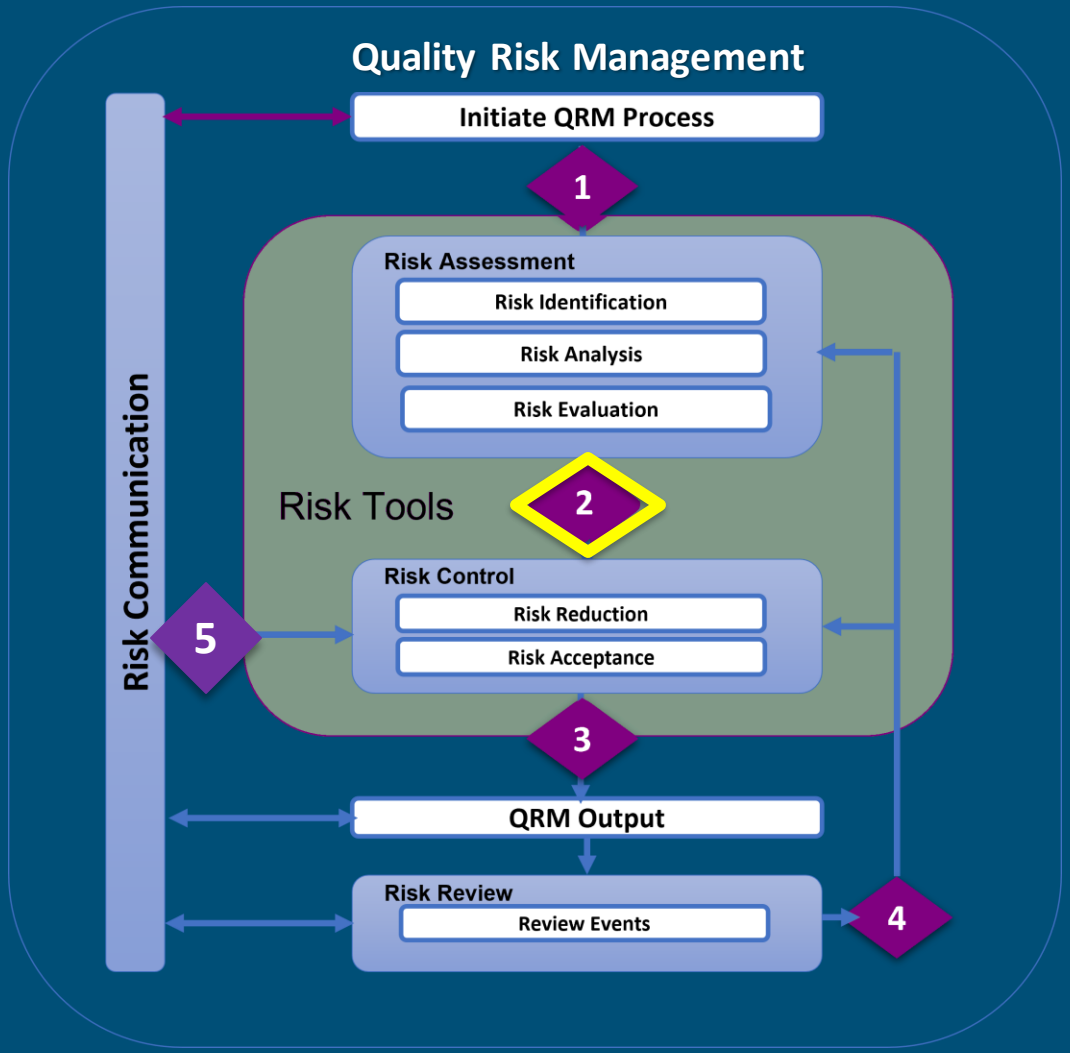
Where are the Decisions?

ICH Q9:

Decision nodes are not shown in the diagram above because decisions can occur at any point in the process

HOW

Best practice?



These may be *different* decision types needing *different* *COMPETENCIES*!

HOW

Best practice?

Data Science

Diagnostic Analytics

Answers Why?

DESCRIPTIVE ***Analytics***

*Help **Understanding***
Describes what HAS happened

PREDICTIVE ***Analytics***

*Help **Anticipation***
- describe what COULD happen

PRESCRIPTIVE Analytics

*Help **Response***
- describe what SHOULD happen

- - - - **UNCERTAINTY** + + + +

BASIC ANALYTICS

ADVANCED ANALYTICS

MACHINE LEARNING **DEEP LEARNING** **AI**

HOW

Best practice?

Diagnostic
Analytics
Answers Why?

DESCRIPTIVE
Analytics

*Help **Understanding***
Describes what
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Analytics

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- describe what
COULD happen

Data Science

Decision Science

PRESCRIPTIVE
Analytics

*Help **Response***
- describe what
SHOULD happen

2 types of reasoning

Uses truthful facts
to arrive at a certain conclusion

DEDUCTIVE

Uses a sample of data
to infer a likely conclusion

INDUCTIVE

HOW

Best practice?

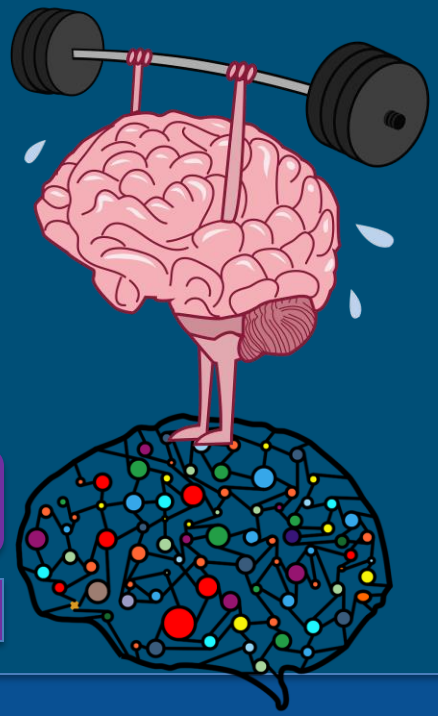
Diagnostic
Analytics
Answers Why?

DESCRIPTIVE
Analytics

*Help **Understanding***
Describes what
HAS happened

Uses truthful facts
to arrive at a certain conclusion

DEDUCTIVE



Data Science

Decision Science

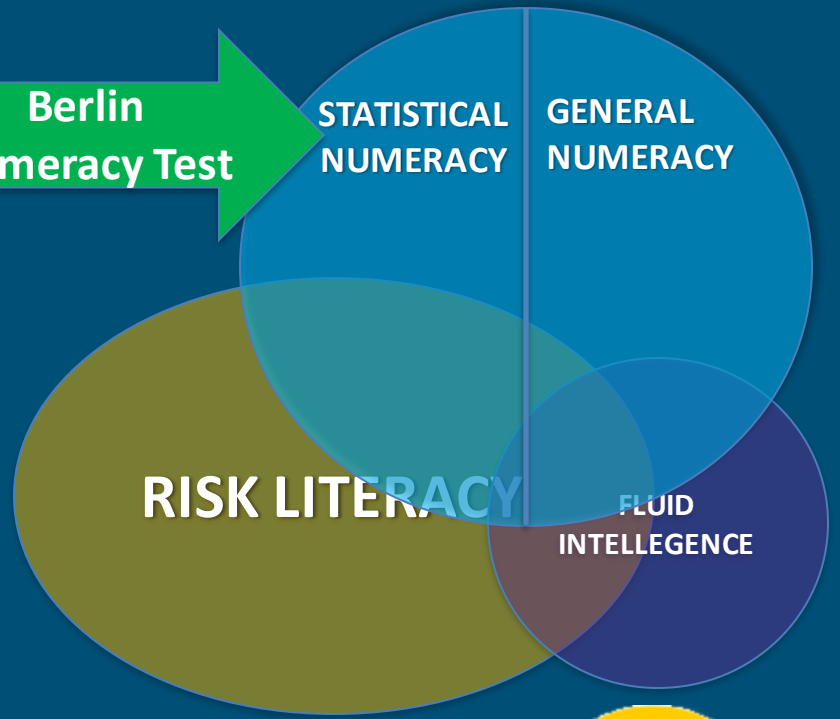
KNOWLEDGE
Crystallised Intelligence

PROBLEM SOLVI
Fluid Intelligence

HOW

Best practice?

Berlin Numeracy Test



Data Science

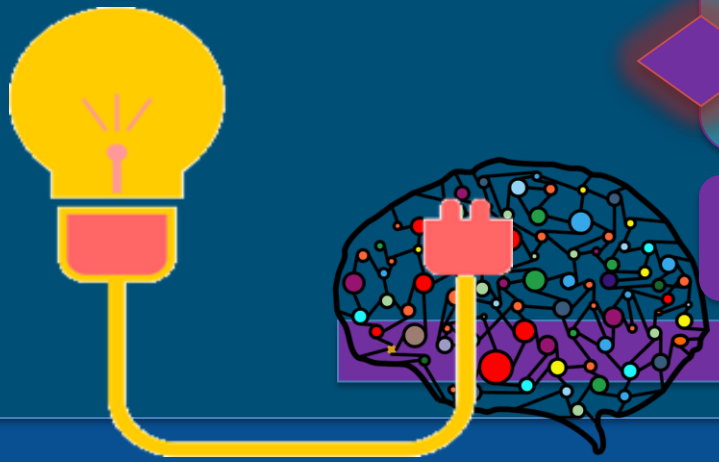
Decision Science

PREDICTIVE *Analytics*

*Help **Anticipation** - describe what COULD happen*

PRESCRIPTIVE Analytics

*Help **Response** - describe what SHOULD happen*



Conclusions that are *probable* rather than certain

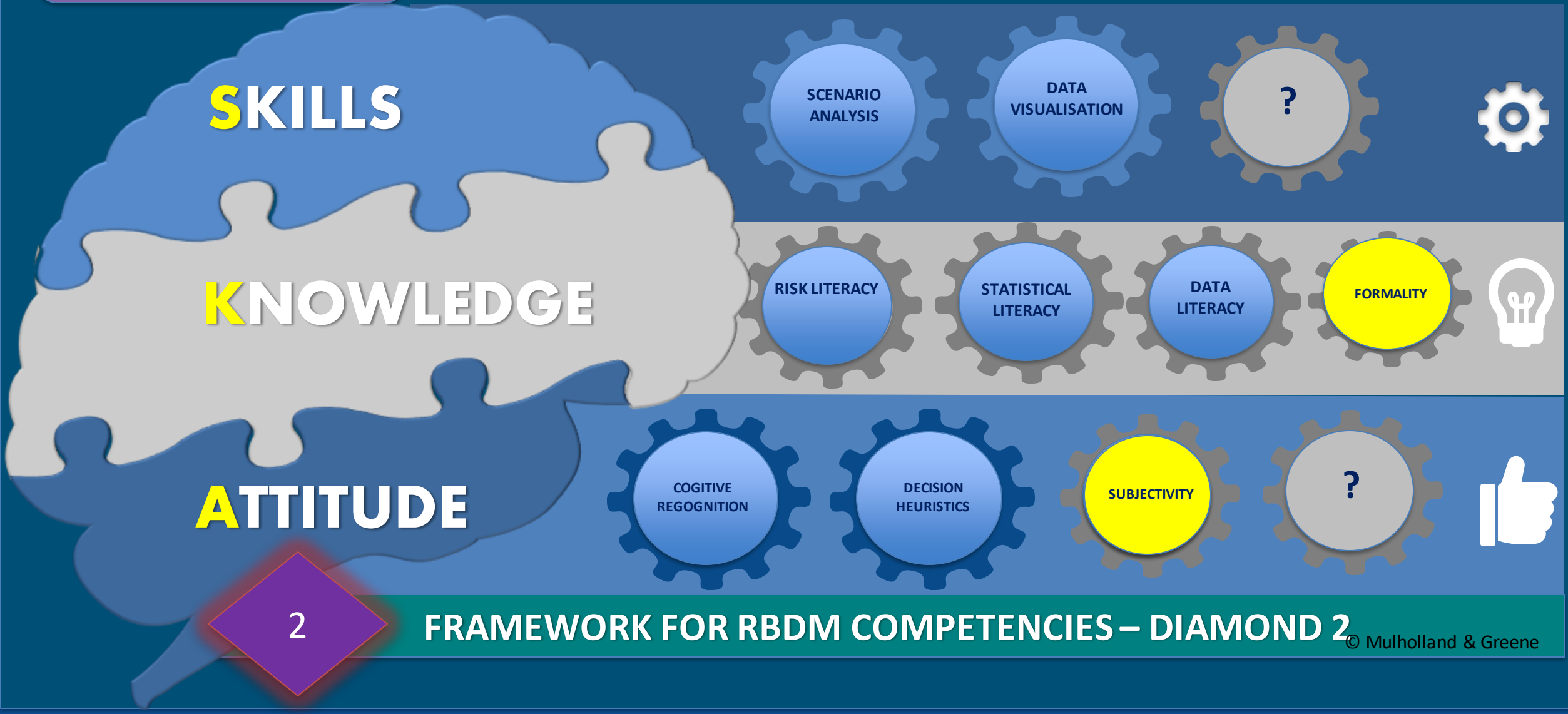
Uses a sample of data to infer a likely conclusion

INDUCTIVE

Cokely, E. T., Ghazal, S., Galesic, M., Garcia-Retamero, R., & Schulz, E. (2013). How to measure risk comprehension in educated samples. In R. Garcia-Retamero & M. Galesic (Eds.), *Transparent communication of risks about health: Overcoming cultural differences* (pp. 29–52). Springer.

HOW

Best practice?



FRAMEWORK FOR RBDM COMPETENCIES – DIAMOND 2

HOW

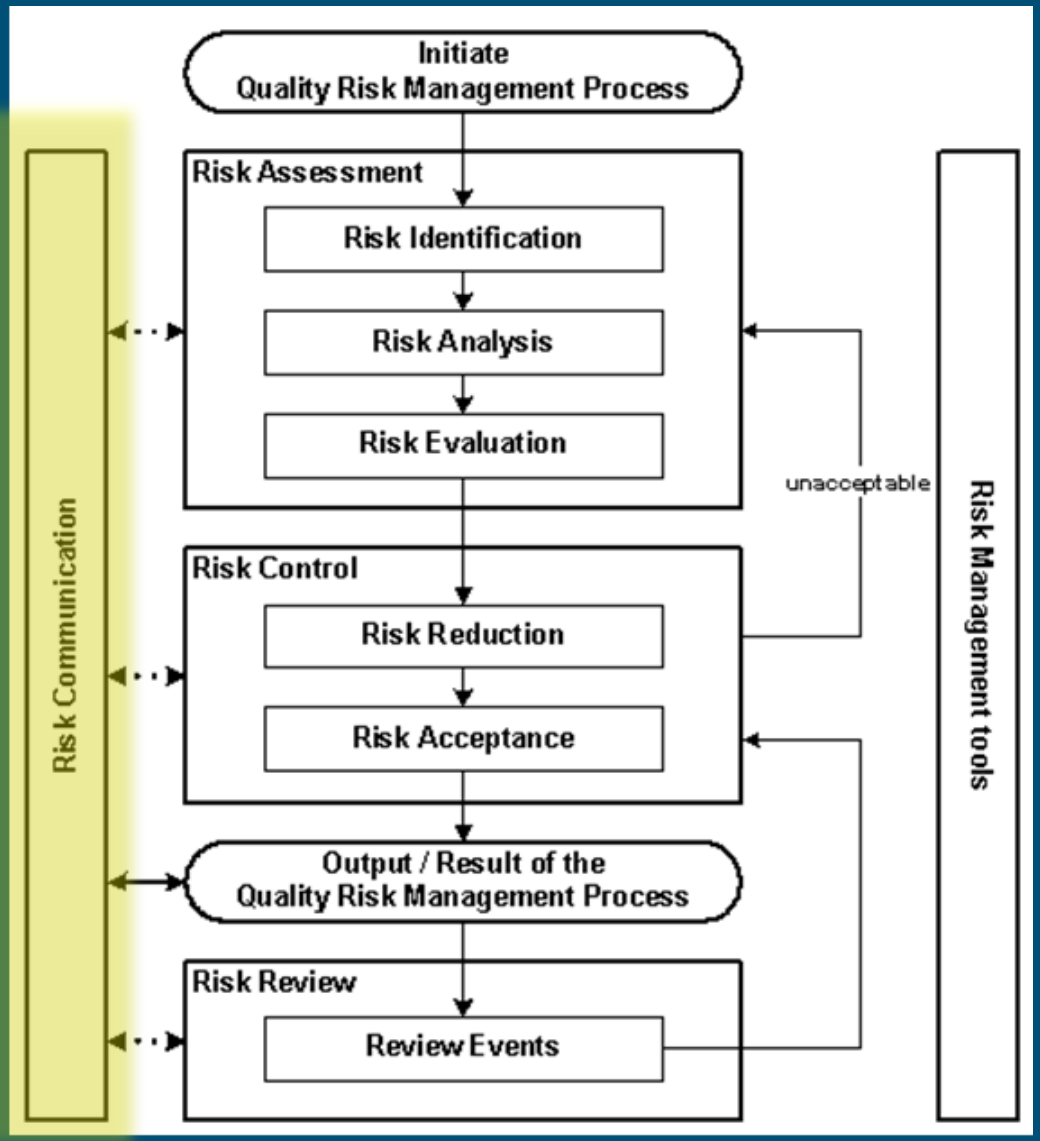
Best practice?

These may be *different* decision types needing *different* *COMPETENCIES*!

HOW

Best practice?

DATA ANALYST / SCIENTIST

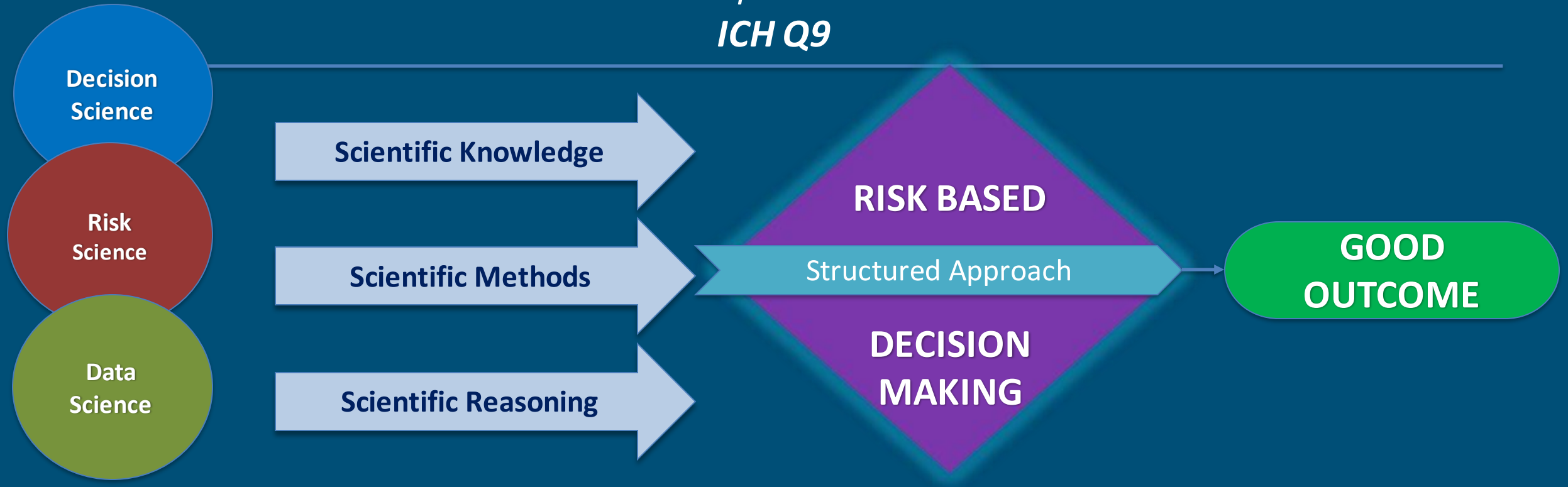


DECISION MAKER

Delivering Value and Resilience using Quality Risk Management

'Quality risk management should include systematic processes designed to coordinate, facilitate and improve ***science-based*** *decision making with respect to risk.'*

ICH Q9



Please use the QR Code to access a short survey, when you submit you can follow the link to the Berlin Numeracy Test. Good Luck!

This study is part of an overall PhD Research Project being undertaken by the Technological University Dublin to improve the understanding of the role of Quality Risk Management (QRM) to decision-making within the Pharmaceutical Quality System. This research will explore, in general terms the tools used, and the level of formality applied to decision-making within QRM and those informed by QRM.

This study will be informed by inputs from within the biopharmaceutical industry and from other high-risk industries, as applicable.

In line with best practice research methods, each participant taking part will be informed of the intent of the survey. The survey results will be retained and secured by the researcher ONLY on TU Dublin secure systems, as per GDPR requirements.

It is planned that the results of this phase of the study will be published in a peer reviewed journal and/or the doctoral thesis as research progresses. The information you contribute will be anonymized.

If you have any questions about this study or the overall research project, please contact me. Thank you for your participation

THANK YOU FOR LISTENING.

Pharmaceutical
REGULATORY SCIENCE
Team

For more information,
See our website
www.prst.ie

ACKNOWLEDGMENTS: Prof Anne Greene & PRST Colleagues
Dr Kevin O'Donnell
PDA & QRM IG