

# RISK MANAGEMENT APPLIED TO CYBERSECURITY AND PRIVACY WITH ISO27001, ISO27701 AND ISO 27005

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- ISO/IEC 27001:2022 Information Security, Cybersecurity and Privacy Protection Information Security Management Systems – Requirements
- ISO/IEC 27701:2019 Security Techniques Extension to ISO/IEC 27001 and ISO/IEC 27002 for privacy information management – Requirements and guidelines
- ISO 27005:2022 Information Security, Cybersecurity and Privacy Protection Guidance on managing Information security risks



## **WHAT IS RISK**



· Depends on environment

 Not controlled by the organization

### Threat

Anything that has the potential to cause harm to information systems / assets

· Can be controlled by the organization

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

## RISK

#### Dimensions

- Technical
- Procedural
- Managerial

### **Properties**

- Likelihood
  - Probability
- Frequency · Impact to organization
  - Potential Costs
  - Tolerance to risk

## **Cybersecurity and Privacy Risks**

#### Loss of

- · Confidentiality
- Integrity
- Availability

## Impact

- · Operations Assets
- Individuals
- · Other Organizations
- Users/clients

## Compliance Risk

- Rules
- Policies Laws
- Governance
- Practices

## WHAT IS RISK – THREAT ANALYSIS



#### **Threat** · Depends on environment · Not controlled by the Anything that has the potential to cause harm to information systems / assets organization Social Engineering Cyber threats **Unauthorized Access** Starts with asset Inventory -· Guessing Passwords Malware threats are on assets Available computers Ransomware Phishing Viruses Business Email Threat Analysis through · Exploit unpatched · Trojan horse threat catalogue/studies, Compromise (BEC) · Logic Bombs expert opinions worms · Org. historical records

· Can be controlled by the organization

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source



- Loss of
- Confidentiality
- · Integrity
- Availability

## Operations

- Assets
- Individuals
- · Other Organizations

Impact

Users/clients

## Compliance Risk

- Rules
- Policies
- Laws
- Governance
- Practices

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or networks

systems or

applications

## WHAT IS RISK – VULNERABILITY ANALYSIS



. Denende en en disemment		Threat		
<ul> <li>Depends on environment</li> <li>Not controlled by the organization</li> </ul>	Anything that has the potent	tial to cause harm to information	systems / assets	
Cyber threats		Social Engineering	Unauthorized Access	
Starts with asset Inventory – threats are on assets  Threat Analysis through  threat catalogue/studies,  expert opinions  Org. historical records	Malware     Ransomware     Viruses     Trojan horse     Logic Bombs     worms	Phishing     Business Email     Compromise (BEC)	Guessing Passwords     Available computers or networks     Exploit unpatched systems or applications	

•	Can be controlled by the	
	organization	

Vulnerability Analysis through expert opinions

- Org. historical records
- Available Info on assets
- · Software flaws
- · out-of-date Antivirus
- · No patching
- No backups
- · Lack of awareness

implementation that could be exploited or triggered by a threat source

Vulnerability

Weakness in an information system, system security procedures, internal controls, or

- · Lack of adequate training (IT professionals, Executives, HR)
- · No email protection
- · Default settings on a device, system, or application causing unintended consequences
- Software flaws / not updated/patched

#### RISK Dimensions **Properties** Likelihood Probability Technical Frequency Procedural · Impact to organization Managerial Potential Costs Tolerance to risk

## **Cybersecurity and Privacy Risks**

· Confidentiality

Loss of

- · Integrity
- Availability

## Impact

- Operations Assets
- Individuals
- · Other Organizations
- Users/clients

## Compliance Risk

- Rules
- Policies
- Laws
- Governance
- Practices

## WHAT IS RISK – RISK EVALUATION



## RISK CRITERIA/TOLERANCE

Determined by business

leaders	·	
	Likelihood	Descriptor
	1	Rare
	2	Unlikely
	3	Possible
	4	Likely
	5	Almost Certain

	Consequence Scor				
Factors	1	2	3	4	5
Safety					
Service/Facility					
Compliance					
Complaint					
erformance Rating					
Image					
Key Objectives					
delivery					
Claims					

Environment

Budget

## Threat Anything that has the potential to cause harm to information systems / assets

## Starts with asset Inventory -

threats are on assets Threat Analysis through

· Depends on environment

· Not controlled by the

organization

- threat catalogue/studies,
- expert opinions
- Org. historical records

· Can be controlled by the

organization

## Malware

Ransomware

Cyber threats

- Viruses
- · Trojan horse
- · Logic Bombs
- worms

- Phishing
- Business Email

Social Engineering

- Compromise (BEC)
- · Available computers or networks Exploit unpatched systems or
- applications

Unauthorized Access

· Guessing Passwords

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

Vulnerability Analysis through expert opinions

- Org. historical records
- Available Info on assets
- Software flaws
- · out-of-date Antivirus
- No patching
- No backups

- · Lack of awareness · Lack of adequate
- training (IT professionals. Executives, HR)
- · No email protection
- · Default settings on a device, system, or application causing unintended consequences

Software flaws / not updated/patched

## Impact

· Confidentiality

Loss of

Technical

· Managerial

Procedural

**Dimensions** 

- Integrity
- Availability

## · Operations

**Properties** 

Probability

Frequency

· Impact to organization

Potential Costs

Tolerance to risk

Likelihood

- Assets
- Individuals
- · Other Organizations
- Users/clients

## Compliance Risk

Cybersecurity and Privacy Risks

**RISK** 

- Rules
- Policies
- Laws
- Governance
- Practices

Contracts							
	Consequence Score						
Likelihood	1	2	3	4	5		
5							
4							
3							
2							
1							

Risk not justified in any circumstances

Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk Assure risk remains at this level

## WHAT IS RISK – CONTROLLING THE RISK

Malware

Viruses

worms

Ransomware

· Troian horse

· Logic Bombs

Cyber threats



## RISK CRITERIA/TOLERANCE Determined by business

ders		
	Likelihood	Descriptor
	1	Rare
	2	Unlikely
	3	Possible
	4	Likely
	5	Almost Certain

	<b>Consequence Score</b>				
Factors	1	2	3	4	5
Safety					
Service/Facility					
Compliance					
Complaint					
Performance Rating					
Image					
Key Objectives					
delivery					
Claims					
Environment					
Budget					

Contracts

	Consequence Score					
Likelihood	1	2	3	4	5	
5						
4						
3						
2						
1						

## **RISK**

#### **Dimensions Properties**

- Likelihood Probability
- Technical Frequency Procedural
- · Impact to organization · Managerial Potential Costs

Cybersecurity and Privacy Risks

Tolerance to risk

Confidentiality

Loss of

- Integrity
- Availability

## Impact

- · Operations Assets
- Individuals
- · Other Organizations
- Users/clients

## Compliance Risk

- Rules
- Policies
- Laws
- Governance
- Practices

· Can be controlled by the

Vulnerability Analysis through

Org. historical records

Available Info on assets

expert opinions

Needs resources

· Needs governance Needs approval

· Needs monitoring

organization

· Depends on environment

Starts with asset Inventory -

threat catalogue/studies,

Org. historical records

· Not controlled by the

threats are on assets

Threat Analysis through

expert opinions

organization

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source · Lack of awareness

**Threat** 

Social Engineering

Compromise (BEC)

Anything that has the potential to cause harm to information systems / assets

Phishing

Business Email

· Software flaws

· out-of-date Antivirus

No patching

No backups

· Lack of adequate training (IT

Executives, HR)

professionals.

· No email protection

Unauthorized Access

· Guessing Passwords

Exploit unpatched

· Default settings on a

unintended

consequences

device, system, or

application causing

Software flaws / not

updated/patched

· Available computers

or networks

systems or

applications

Controls

A measure that modifies threat exposure - controls the vulnerability

Risk not justified in any circumstances

Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk

Assure risk remains at this level

## WHAT IS RISK – CONTROLLING THE RISK



## RISK CRITERIA/TOLERANCE

leaders Likelihood Descriptor 1 Rare Unlikely 3 Possible Likely Almost Certain

Contracts

## Determined by business

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Factors	1	2	3	4	5
Safety					
Service/Facility					
Compliance					
Complaint					
Performance Rating					
Image					
Key Objectives					
delivery					
Claims					
Environment					
Budget					

	Consequence Score						
Likelihood	1	2	3	4	5		
5							
4							
3							
2							
1							

Threat

Anything that has the potential to cause harm to information systems / assets

Phishing

Business Email

Compromise (BEC)

- Malware
- Ransomware
- Viruses
- · Troian horse
- · Logic Bombs
- worms

- Social Engineering Cyber threats
  - - · Guessing Passwords

Unauthorized Access

- · Available computers or networks
- Exploit unpatched systems or applications

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

Vulnerability Analysis through expert opinions

· Can be controlled by the

organization

· Depends on environment

Starts with asset Inventory -

threat catalogue/studies,

Org. historical records

· Not controlled by the

threats are on assets

Threat Analysis through

expert opinions

organization

- Org. historical records

Needs resources

· Needs governance Needs approval

· Needs monitoring

Available Info on assets

Controls selected by experts.

technologies best practices

ex.: ISO 27001, ISO 27701

following standards and

- Software flaws · out-of-date Antivirus
- No patching
- No backups
- · Lack of awareness · Lack of adequate training (IT professionals.
- Executives, HR)
- application causing
- · No email protection
- unintended consequences
- updated/patched

· Default settings on a

device, system, or

Software flaws / not

### Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
- Frequent Antivirus Update
- Auto Patching mechanisms
- Backup servers
- · Awareness training
- · Proper training programs
- Spam protection / attachment removal. etc...
- · Change default settings to a secure one
- · Frequent software patches/updates

#### · Operations Assets

 Confidentiality Integrity

Loss of

Technical

Managerial

Procedural

Dimensions

- Availability

## Individuals

Other Organizations

Impact

**Properties** 

Probability

Frequency

Impact to organization

Potential Costs

Tolerance to risk

Likelihood

Users/clients

## Compliance Risk

Cybersecurity and Privacy Risks

**RISK** 

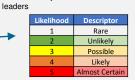
- Rules
- Policies
- Laws
- Governance
- Practices

Risk not justified in any circumstances Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk Assure risk remains at this level



## RISK CRITERIA/TOLERANCE Determined by business



	Consequence Score					
Factors	1	2	3	4	5	
Safety						
Service/Facility						
Compliance						
Complaint						
Performance Rating						
Image						
Key Objectives						
delivery						
Claims						
Environment						

		Consequence Score						
Likelihood	1	2	3	4	5			
5								
4								
3								
2								
1								

Budget

Contracts

## Threat

Anything that has the potential to cause harm to information systems / assets

Social Engineering

- Malware
- Ransomware

Cyber threats

- Viruses
- · Troian horse
- Logic Bombs
- worms
- Business Email Compromise (BEC)
- Phishing

· Guessing Passwords · Available computers

Unauthorized Access

- or networks
- Exploit unpatched systems or applications

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

#### Vulnerability Analysis through expert opinions

· Can be controlled by the

organization

· Depends on environment

Starts with asset Inventory -

threat catalogue/studies,

Org. historical records

· Not controlled by the

threats are on assets

Threat Analysis through

expert opinions

organization

- Org. historical records
- Available Info on assets

Controls selected by experts.

technologies best practices

ex.: ISO 27001, ISO 27701

following standards and

Needs resources

· Needs governance Needs approval

· Needs monitoring

- Software flaws · out-of-date Antivirus
- No patching
- No backups

- · Lack of awareness · Lack of adequate
- training (IT professionals.
- Executives, HR)
- · No email protection
- · Default settings on a device, system, or application causing unintended consequences
- Software flaws / not
- updated/patched

### Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
- Frequent Antivirus Update
- Auto Patching mechanisms
- Backup servers
- · Awareness training · Proper training
- programs Spam protection /
- attachment removal. etc...
- · Change default settings to a secure one
- · Frequent software patches/updates

## Impact

**RISK** 

Cybersecurity and Privacy Risks

Confidentiality

Technical

Managerial

Procedural

- Integrity
- Availability

Loss of

Dimensions

#### · Operations Assets

Likelihood

- Individuals
- Other Organizations

**Properties** 

Probability

Frequency

Impact to organization

Potential Costs

Tolerance to risk

Users/clients

## Compliance Risk

- Rules
- Policies
- Laws
- Governance
- Practices

Risk not justified in any circumstances Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk Assure risk remains at this level

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Cyber threats

**Ransomware** 

Malware

worms

Viruses

· Troian horse

Logic Bombs



RISK CRITERIA/TOLERANCE

Determined by business

Likelihood

1

3

Descriptor

Rare

Unlikely

Possible

Likely

Almost Certain

**Consequence Score** 

1 2 3

leaders

Factors

Safety Service/Facility

Compliance

Complaint

Performance Rating

Image

**Key Objectives** 

delivery

Claims

Environment

Budget

Contracts

## · Depends on environment

· Not controlled by the organization

Starts with asset Inventory threats are on assets

Threat Analysis through

- threat catalogue/studies,
- expert opinions
- Org. historical records
- · Can be controlled by the organization
- Vulnerability Analysis through
- expert opinions
- Org. historical records

Needs resources

· Needs governance Needs approval

Needs monitoring

Available Info on assets

Controls selected by experts.

technologies best practices

ex.: ISO 27001, ISO 27701

following standards and

- Software flaws · out-of-date Antivirus
- No patching
- No backups
- implementation that could be exploited or triggered by a threat source · Lack of awareness
  - training (IT
    - Executives, HR)
    - · No email protection
- Weakness in an information system, system security procedures, internal controls, or

Vulnerability

Threat

Social Engineering

Compromise (BEC)

Anything that has the potential to cause harm to information systems / assets

Phishing

Business Email

- · Lack of adequate professionals.

- · Default settings on a device, system, or application causing unintended consequences

Unauthorized Access

· Guessing Passwords

· Available computers

Exploit unpatched

or networks

systems or

applications

Software flaws / not updated/patched

#### Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
- · Frequent Antivirus Update
- Auto Patching mechanisms
- Backup servers
- · Awareness training · Proper training
- programs
- Spam protection / attachment removal. etc...
- · Change default settings to a secure one
- · Frequent software patches/updates

## **RISK**

## **Properties**

- Technical
- Procedural
- Managerial

### Likelihood

- Probability
- Frequency
- Impact to organization Potential Costs
- Tolerance to risk

## Cybersecurity and Privacy Risks

### Loss of

**Dimensions** 

- Confidentiality
- Integrity
- Availability

## · Operations

- Individuals
- Users/clients

## Compliance Risk

- Policies
- Governance

## Impact

- Assets
- Other Organizations

- Rules
- Laws
- Practices

Consequence Score Likelihood 1 2 3 4 5 3 2 1

Risk not justified in any circumstances

Tolerable if risk reduction is impracticable Tolerable. Cost to reduce does not compensate risk

Assure risk remains at this level



## RISK CRITERIA/TOLERANCE Determined by business

leaders Likelihood Descriptor 1 Rare Unlikely 3 Possible Likely Almost Certain

	Consequence Score				core
Factors	1	2	3	4	5
Safety					
Service/Facility					
Compliance					
Complaint					
Performance Rating					
Image					
Key Objectives					
delivery					
Claims					

Environment

Budget

Contracts

	Consequence Score				
Likelihood	1	2	3	4	5
5					
4					
3					
2					
1					

## Threat

Social Engineering

Compromise (BEC)

Anything that has the potential to cause harm to information systems / assets

- Malware
- Ransomware

Cyber threats

- Viruses
- · Troian horse
- Logic Bombs
- worms

- Phishing Business Email
- · Guessing Passwords · Available computers
  - or networks

Unauthorized Access

Exploit unpatched systems or applications

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

#### Vulnerability Analysis through expert opinions

Needs resources

· Needs governance Needs approval

· Needs monitoring

Controls selected by experts.

technologies best practices

ex.: ISO 27001, ISO 27701

following standards and

· Can be controlled by the

organization

· Depends on environment

Starts with asset Inventory -

threat catalogue/studies,

Org. historical records

· Not controlled by the

threats are on assets

Threat Analysis through

expert opinions

organization

- Org. historical records
  - Available Info on assets
- Software flaws · out-of-date Antivirus
- No patching
- - No backups

- · Lack of awareness · Lack of adequate
- training (IT professionals.
- Executives, HR) · No email protection
- unintended consequences
  - Software flaws / not updated/patched

· Default settings on a

device, system, or

application causing

## Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
- Frequent Antivirus Update
- Auto Patching mechanisms
- Backup servers
- · Awareness training · Proper training
- programs
- Spam protection / attachment removal. etc...
- · Change default settings to a secure one
- · Frequent software patches/updates

## Impact

Cybersecurity and Privacy Risks

**RISK** 

Confidentiality

Loss of

Technical

Managerial

Procedural

Dimensions

- Integrity
- Availability

## Individuals

#### Other Organizations Users/clients

· Operations

Assets

**Properties** 

Probability

Frequency

Impact to organization

Potential Costs

Tolerance to risk

Likelihood

## Compliance Risk

- Rules
- Policies
- Laws
- Governance
- Practices

Risk not justified in any circumstances Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk Assure risk remains at this level



### RISK CRITERIA/TOLERANCE

**RISK** 

Cybersecurity and Privacy Risks

Compliance Risk

**Properties** 

Probability

Frequency

Impact to organization

Potential Costs

Impact

**Other Organizations** 

Operations

Individuals

Users/clients

Assets

Tolerance to risk

Likelihood

**Dimensions** 

Loss of

Confidentiality

Availability

Integrity

Rules

Laws

**Policies** 

Governance **Practices** 

Technical

Managerial

Procedural

Likelihood Descriptor 1 Rare Unlikely 3 Possible Likely Almost Certain

1 2 3 Factors Safety Compliance

Determined by business leaders

**Consequence Score** Service/Facility Complaint Performance Rating Image **Key Objectives** delivery Claims

Environment

Budget

Contracts

	Consequence Score				
Likelihood	1	2	3	4	5
5					
4					
3					
2					
1					

Threat

Anything that has the potential to cause harm to information systems / assets Social Engineering Unauthorized Access

## Malware

- Ransomware

Cyber threats

- Viruses · Troian horse
- Logic Bombs
- worms

- Phishing Business Email Compromise (BEC)
- · Guessing Passwords · Available computers
- or networks Exploit unpatched systems or
- applications

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

#### Vulnerability Analysis through expert opinions

· Can be controlled by the

organization

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Starts with asset Inventory -

threat catalogue/studies,

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threats are on assets

Threat Analysis through

expert opinions

organization

- Org. historical records

Needs resources

· Needs governance Needs approval

Needs monitoring

Available Info on assets

Controls selected by experts.

technologies best practices

ex.: ISO 27001, ISO 27701

following standards and

- Software flaws
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  - · No email protection
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### Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
- · Frequent Antivirus Update
- Auto Patching mechanisms
- Backup servers
- · Awareness training · Proper training
- programs Spam protection /
- attachment removal. etc...
- · Change default settings to a secure one
- · Frequent software patches/updates

Risk not justified in any circumstances Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk Assure risk remains at this level





Likelihood Descriptor 1 Rare Unlikely 3 Possible Likely Almost Certain

1 2 3 Factors Safety Service/Facility Compliance Complaint

Image

**Key Objectives** 

delivery

Claims

Environment

Budget

Consequence Score Likelihood 1 2 3 4 5 3 2

**Consequence Score** Performance Rating

> Contracts 1

## **RISK**

#### **Dimensions Properties**

- Technical
- Procedural
- Managerial
- Probability Frequency Impact to organization

Likelihood

Potential Costs

Impact

Tolerance to risk

## Cybersecurity and Privacy Risks

## Loss of

- Confidentiality
- Integrity
- Availability

#### Operations Assets

- Individuals
- **Other Organizations**
- Users/clients

## Compliance Risk

- Rules
- **Policies**
- Laws
- Governance
- **Practices**

## Starts with asset Inventory -Threat Analysis through

threat catalogue/studies,

· Depends on environment

· Not controlled by the

organization

expert opinions

threats are on assets

Org. historical records

· Can be controlled by the

organization

## Vulnerability

Threat

Social Engineering

Compromise (BEC)

Anything that has the potential to cause harm to information systems / assets

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Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

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 Software flaws · out-of-date Antivirus

Cyber threats

**Ransomware** 

Malware

worms

Viruses

· Troian horse

Logic Bombs

- No patching
- No backups
- · Lack of awareness · Lack of adequate
- training (IT professionals.
- Executives, HR)

- · No email protection

- device, system, or application causing unintended consequences Software flaws / not

· Default settings on a

Unauthorized Access

· Guessing Passwords

· Available computers

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### Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
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Tolerable. Cost to reduce does not compensate risk Assure risk remains at this level

## WHAT IS RISK – CONSIDER RANSOMWARE ATTACK ON HOSPITAL WITH RISK CONTROL



Likelihood

1

3

Factors

Patient Safety Service/Facility

Compliance

Complaint

Performance Rating

Image

**Key Objectives** 

delivery

Claims

Environment

Budget

Contracts

Descriptor

Rare

Unlikely

Possible

Likely

Almost Certain

Consequence Score

1 2 3

#### RISK CRITERIA/TOLERANCE Threat · Depends on environment **RISK** Determined by business · Not controlled by the Anything that has the potential to cause harm to information systems / assets leaders

organization

Starts with asset Inventory threats are on assets

Threat Analysis through

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Vulnerability Analysis through expert opinions

- Org. historical records

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following standards and

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Cyber threats

**Ransomware** 

Malware

worms

Viruses

· Troian horse

Logic Bombs

- No patching
- No backups
- Weakness in an information system, system security procedures, internal controls, or · Lack of awareness

implementation that could be exploited or triggered by a threat source

Vulnerability

Social Engineering

Compromise (BEC)

Phishing

Business Email

- · Lack of adequate training (IT professionals. Executives, HR)
- · No email protection
- · Default settings on a device, system, or application causing unintended

Unauthorized Access

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Exploit unpatched

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### Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
- · Frequent Antivirus Update
- Auto Patching mechanisms
- Backup servers
- · Awareness training · Proper training
- programs
- Spam protection / attachment removal. etc...
- · Change default settings to a secure one
- · Frequent software patches/updates

Probability

Technical

**Dimensions** 

- Procedural
- Managerial

- Likelihood
  - Frequency
- Impact to organization

**Properties** 

- Potential Costs
- Tolerance to risk

## Cybersecurity and Privacy Risks

- Confidentiality
- Integrity

Loss of

Availability

## Assets

- Individuals

## Compliance Risk

- Laws
- Governance

### Impact

- Operations
- **Other Organizations**
- Users/clients

- Rules
- **Policies**
- **Practices**

Consequence Score Likelihood 1 2 3 4 5 3 2 1

Risk not justified in any circumstances Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk

Assure risk remains at this level

## WHAT IS RISK – CONSIDER RANSOMWARE ATTACK ON HOSPITAL WITH RISK CONTROL



RISK CRITERIA/TOLERANCE

Determined by business

Likelihood

1

3

Descriptor

Rare

Unlikely

Possible

Likely

Almost Certain

Consequence Score

1 2 3

leaders

Factors

Patient Safety Service/Facility

Compliance

Complaint

Image

Key Objectives

delivery

Claims

Environment

Budget

Contracts

Performance Rating

#### · Depends on environment · Not controlled by the Anything that has the potential to cause harm to information systems / assets organization Cyber threats Starts with asset Inventory - Malware threats are on assets **Ransomware**

- Threat Analysis through
- threat catalogue/studies,
- expert opinions
- Org. historical records

· Can be controlled by the

organization

#### · Troian horse Logic Bombs

Viruses

worms

## Social Engineering

Business Email

Compromise (BEC)

Phishing

Threat

- - · Guessing Passwords

Unauthorized Access

- · Available computers or networks
- Exploit unpatched systems or applications

## Vulnerability

Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source

#### Vulnerability Analysis through expert opinions

- Org. historical records

Needs resources

· Needs governance Needs approval

Needs monitoring

Available Info on assets

Controls selected by experts.

technologies best practices

ex.: ISO 27001, ISO 27701

following standards and

- Software flaws
- · out-of-date Antivirus
- No patching
- No backups
- · Lack of awareness · Lack of adequate training (IT
- professionals. Executives, HR)
  - · No email protection
- · Default settings on a device, system, or application causing unintended consequences
- Software flaws / not updated/patched

### Controls

A measure that modifies threat exposure – controls the vulnerability

- · Frequent software updates
- · Frequent Antivirus Update
- Auto Patching
- mechanisms Backup servers
- · Awareness training · Proper training
- programs Spam protection / attachment removal.

etc...

- · Change default settings to a secure one
- · Frequent software patches/updates

### **RISK** Dimensions **Properties** Likelihood

- Technical
- Procedural
- Managerial

- Probability Frequency
- Impact to organization
- Potential Costs
- Tolerance to risk

## Cybersecurity and Privacy Risks

## Loss of

- Confidentiality
- Integrity
- Availability

## Assets

- Users/clients

## Compliance Risk

- Laws
- Governance

#### Impact

- Operations
- Individuals
- Other Organizations

- Rules
- **Policies**
- Practices

Consequence Score Likelihood 1 2 3 4 5 3 2 1

Risk not justified in any circumstances Tolerable if risk reduction is impracticable

Tolerable. Cost to reduce does not compensate risk Assure risk remains at this level

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## NHS RISK REGISTER REPORT - CONSEQUENCES SCORE AND FACTORS



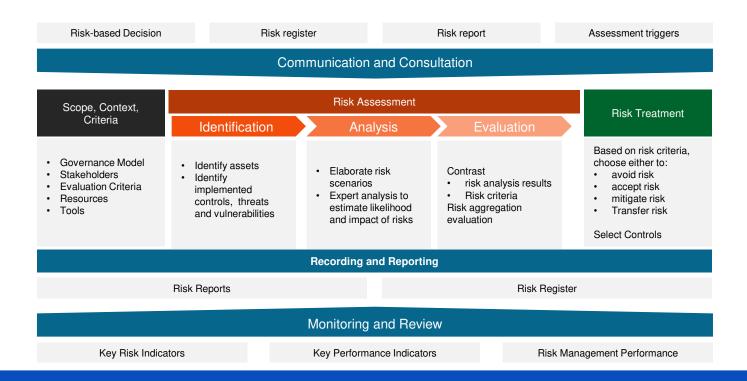
	Consequence Score				
	Negligible	Minor	Moderate	Major	Catastrophic
Factors	1	2	3	4	5
Patient Safety	Minimal injury requiring no/minimal intervention or treatment.	unresolved	Treatment or service has significantly reduced effectiveness Major patient safety implications if findings are not acted on	Major injury leading to long-term incapacity/disability	An issue which impacts on a large number of patients, increased probability of death or irreversible health effects.
Service/Facility	Peripheral element of treatment or service suboptimal	Overall treatment or service suboptimal Loss/interruption of more than 8 hours	,		An issue which impacts on a large number of patients, increased probability of death or irreversible health effects.  Permanent loss of service or facility
Compliance		single failure to meet internal standards	Repeated failure to meet statutory or contractual standards Challenging external recommendations/improvement notice	Non-compliance with national standards with significant risk to patients if unresolved Enforcement action Multiple breeches in statutory duty Improvement notices	Gross failure to meet national standards Multiple breeeches in statutory or regulatory duty Prosecution
Complaint	Informal complaint/inquiry			Multiple complaints/independent review	
Performance Rating		Reduced performance rating if unresolved		Low performance rating	
Image		Elements of public expectation not being met	Local media coverage - long-term reduction in public confidence	National media coverage with less than 3 days service well below reasonable public expectation	National media coverage with greater than 3 days service well below reasonable public expectation
Key Objectives delivery				Uncertain delivery of key objective/service due to lack of staff	
Claims		Claim less than £10.000		Claim(s) between £100.000 and £1 million	Claim(s) > £1 million
Environment		Minor impact on environment			Catastrophic impact on environment
Budget		loss of 01-0.25 per cent of budget	Loss of 0.25 - 0.5 per cent of budget	Non-compliance with national 10-25 per cent over project budget Uncertain delivery of key objective/Loss of 0.5 - 1.0 per cent of budget	Incident leading to greater than 25 per cent over project budget
Contracts					Loss of contract / payment by results



Likelihood Score	Descriptor	Frequency - How often might it/does it happen
1	Rare	- This will probably never happen/occur - Not expected to occur for years
2	Unlikely	- Do not expect it to happen/ocur but it is possible it may do so - expected to occur at least annually
3	Possible	- Might happen or recur occasionally - Expected to occur monthly
4	Likely	- Will probably happen/recur but it is not a persisting issue - Expected to occur weekly
5	Almost Certain	- Will undoubtedly happen/occur, possibly frequently - Expected to occur daily

## SIMPLIFIED PROCESS FLOW DIAGRAM OF ISO 31000 – RISK MANAGEMENT GUIDELINES







## **ISO 27005** – PROCESS FLOW DIAGRAM



Risk-hased Decision Risk register Risk report Assessment triggers Communication and Consultation **Risk Treatment Establish Context Identify Risk Risk Analysis Risk Evaluation Risk Treatment** Decision people, methods and **Asset Identification** Impact Survey Impact Evaluation **Risk Level Determination** Estimation vs resources **Risk Aggregation** Avoid Risk Criteria List of: Asset · Roles and Resp. Impact Identify RM system assets Int/Ext. Stakeholders Evaluation Lower probability or impact to zero considerations Tools Compare: Aggregate risks that Governance Model make incident occurrence more difficult Resources Based on can be combined Technology (hardware, software) · CIA: Estimated Risk Totally eliminate the impact Relevant Each scenario will be importance for Network devices together to form a risk Risk Evaluation · Org. Services: Risk Evaluation Criteria Incident ora.'s business assigned an impact value Accept Risk of higher score. People Criteria Scenarios goals and probability of Location perspectives: Based on: occurrence The organization formally accept the risk etc. Technical Stakeholders Commercial and Financial expectations operational importance Based on: Human Quantitative **Risk Evaluation Decisions**  Processes strategic of information Mitigate Risk Asset Reputation Numeric value scale to value Other Context relevant Control Identification Threat Identification restitution Other relevant reduce probability and/or impact of an adverse Identified evaluate impacts and Asset Criticality considerations Operational event to acceptable levels Should be based on: threats and persp. (e.g., probabilities consequences Implemented through controls and countermeasures health, safety) vulnerabilities Incidents history Impact Criteria controls docs implementation Usually use historical Acceptable risk levels Asset responsible Consult infosed data about incidents. Impacts Determine level of damage or costs taking into Infosec. specialists responsible Transfer Risk **Probability Analysis** which might directly relate Probabilities account indicators: Legal department Evaluate the to the objectives and Confidence levels on the performed risk · Planning and deadline · Asset Importance Threat catalogues / controls Transfer the impact of a threat, totally or concerns regarding identification and analysis Risk occurrence probability should be evaluated based on: Classification disruptions studies partially, to a third party (e.g., insurance) implementation infosec of the Affected · Reputation Damage Infosec failures (CIA) organization assets · Others (e.g., safety, · Costs for the Threats **Risk Prioritization** organization health, etc) Qualitative List of incidents (lessons learned docs.) Vulnerabilities Identification Qualitative scale Should be based on: to organization Risk Acceptance Criteria to systems indicating: to processes and Consider Evaluate configuration Evaluation Criteria Identify risk level threshold from which executive procedures Consequence · to hardware. · Severity of potential Identified Scenarios approval is needed: to management s for the applicable statistics and software and impacts (e.g., low, Identified risks routine experience Threat frequency of · Technological factors network equipment assets and medium, high) Activity factors human threats occurrence Ease of exploiting Financial factors to human resources processes environmental threats external parties Operational factors Probability of such vulnerabilities (individually to physical Social and humanitarian dependencies and in conjunction) occurrences Financial factors locations factors... Incident Scenarios Asset Inventory and affected assets Evaluation of Risk Estimation vs. Risk Criteria Minutes Risk Evaluation Criteria Controls associated to each asset Impact evaluation Consequences for · Risk aggregation evaluation risk follow-up plan Risk Impact Criteria Threats associated to each asset Asset Evaluation · Risk Level Estimation Risk Treatment Risk Evaluation decisions assets and progress reports Risk Acceptance Criteria Vulnerabilities associated to each asset · Probability Analysis respective Risk Prioritization risk associated to each asset processes

## **Recording and Reporting**

Monitoring and Review

ISO/IEC 27001:2022 INFORMATION
SECURITY, CYBERSECURITY AND PRIVACY
PROTECTION – INFORMATION SECURITY
MANAGEMENT SYSTEMS - REQUIREMENTS



• ISO/IEC 27001 specifies the requirements for establishing, implementing, maintaining and continually improving an Information Security Management System (ISMS) within an organization.



## PLAN

#### Establish the ISMS

## 4. Context and Organization

- · Define context
- How the organization meets needs/expectations of other parties
- · Define scope of the ISMS

#### 5. Leadership

- Have proper leadership and commitment
- write and approve security policies, roles and responsibilities

### 6. Planning

- defined information security objectives
- · define plans to achieve objectives
- requires addressing risks and opportunities for your organization



## ACT

## Maintain and Improve the ISMS

## 10. Improvement

- Improvements must be made taking corrective actions
- Continual improvement processes must be implemented



## Implement and Operate the ISMS

### 7. Support

- Have right resources with the right level of competence
- ensure appropriate level of security awareness and training for all users



- Plan and control the security operations necessary to implement the ISMS
- Requires information security risk assessment and risk treatment



## CHECK

#### Monitor and Review the ISMS

#### 9. Performance Evaluation

- Monitor, analyze and evaluate the ISMS
- Conduct internal audits
- · Management reviews of ISMS







## ISO 27001 ANNEX A CONTROLS (HTTPS://WWW.ISMS.ONLINE/ISO-27001/ANNEX-A/)

18.



## Policies for Information Security

- Information Security Roles and responsibilities
- Segregation of Duties
- Management Responsibilities
- Contact with Authorities
- Contact with Special Interest Groups
- Threat Intelligence
- Information Security in Project Management
- 9. Inventory of Information and Other Associated Assets
- 10. Acceptable Use of Information and Other Associated Assets
- 11. Return of Assets
- 12. Classification of Information
- Screening
- Terms and Conditions of Employment

Physical Security Perimeters

Physical Security Monitoring

Security Offices. Rooms and Facilities

Information Security Awareness, Education and training

Protecting Against Physical and Environmental Threats

- Disciplinary Process
- Responsibilities After termination or Change of Employment
- Confidentiality or Non-Disclosure Agreements

Information Security in Supplier Relationships

Addressing Information Security Within Supplier

Information Security for Use of Cloud Services

Managing Information Security in the ICT Supply Chain

Monitoring, Review and Change Management of Supplier

Information Security Incident Management planning and

Labelling of Information

Information transfer

identity Management

Authentication Information

Access Control

Access rights

Agreements

Services

- Working In Secure Areas

- Assessment and Decision on Information Security Events
- Response to Information Security Incidents
- Learning from Information Security Incidents
- Collection of Evidence
- Information Security During Disruption
- ICT Readiness for Business Continuity
- Legal, Statutory, Regulatory and Contractual Requirements
- Intellectual Property Rights
- 33. Protection of Records
- Privacy and Protection of PII 34.
- Independent review of Information Security
- Compliance with Policies, Rules and Standards for Information Security
- **Documented Operating Procedures**
- Remote Working
- Information Security Event Reporting

- Clear Desk and Clear Screen
- Equipment Siting and Protection
- Security of Assets Off-Premise
- 10. Storage Media

- 11. Supporting Utilities
- Cabling Security
- Equipment Maintenance
- Secure Disposal or Re-Use of Equipment

User Endpoint Devices

Physical Entry

- Privileged Access Rights
- Information Access Restriction
- Access to Source Code
- Secure Authentication
- Capacity Management
- Protection Against Malware
- Management of technical Vulnerabilities
- Configuration Management
- Information Deletion
- Data Masking
- Data Leakage Prevention

- Information Backup
- Redundancy of Information Processing Facilities
- 15. Logging
- 16. Monitoring Activities
- Clock Synchronization
- Use of Privileged Utility Programs
- Installation of Software on Operational Systems 19.
- Networks Security 20.
- Security of Network Devices
- Segregation of Networks Web Filtering
- Use of Cryptography

- Secure Development Life Cycle
- Application Security Requirements
- Secure System Architecture and Engineering Principles
- Secure Coding
- Secure Testing in Development and Acceptance
- Outsourced Development
- Separation of Development, Test and Production Environments
- Change Management
- Test Information
- Protection of Information Systems During Audit Testing

ISO/IEC 27701 – SECURITY TECHNIQUES – EXTENSION TO ISO/IEC 27001 AND ISO/IEC 27002 FOR PRIVACY INFORMATION MANAGEMENT – REQUIREMENTS AND GUIDELINES



- ISO 27701 extends the ISO 27001 standard for privacy information management. It specifies requirements and provides guidance for establishing, implementing, maintaining and continually improving a Privacy Information Management System (PIMS).
- It provides PIMS-related requirements and provides guidance for PII controllers and PII processors holding responsibility and accountability for PII processing.



### **PLAN**

#### **Establish the PIMS**

#### 5.2 Context and Organization

- · Organization and context
  - Role as PII controller / processor
  - · PII internal and external factors
- · Needs/expectations of other parties
  - include parties having PII interests or responsibilities (including PII principals)
- · Define scope of the ISMS
  - Include processing of PII

#### 5.3 Leadership

- Have proper leadership and commitment
- Include interpretation of PIMS
- write and approve security policies, roles and responsibilities
  - · Include interpretation of PIMS

## 5.4 Planning

- · defined information security objectives
  - include PIMS scope/interpretation
  - · include Annex A and B on SoA
- define plans to achieve objectives
- include PIMS scope/interpretation
- requires addressing risks and opportunities for your organization
  - include PIMS scope/interpretation

### DO

## Implement and Operate the PIMS

#### 5.5 Support

- Have right resources with the right level of competence
  - · include PIMS scope/interpretation
- ensure appropriate level of security awareness and training for all users
  - · include PIMS scope/interpretation

### 5.6 Operation

- Plan and control the security operations necessary to implement the ISMS
  - include PIMS scope/interpretation
- Requires information security risk assessment and risk treatment
- · include PIMS scope/interpretation

### ACT

## Maintain and Improve the PIMS

### 5.8 Improvement

- Improvements must be made taking corrective actions
  - include PIMS scope/interpretation
- Continual improvement processes must be implemented
  - include PIMS scope/interpretation



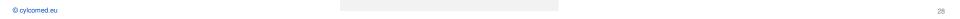
## CHECK

#### Monitor and Review the PIMS

#### 5.7 Performance Evaluation

- · Monitor, analyze and evaluate the ISMS
- include PIMS scope/interpretation
- · Conduct internal audits
- · include PIMS scope/interpretation
- Management reviews of ISMS
  - include PIMS scope/interpretation





## ISO 27701 ANNEX A CONTROLS - PII CONTROLLERS AND PROCESSORS



## PII Controller PII Processor

Conditions for collection and processing	1. Identify and document purpose 2. Identify lawful basis 3. Determine when and how consent is to be obtained 4. Obtain and record consent 5. Privacy impact assessment 6. Contractors with PII processors 7. Joint PII controller 8. Records related to processing PII	Customer agreement     Organization's purposes     Marketing and advertising use     Infringing instruction     Customer obligations     Records related to processing PII
Obligations to PII principals	Determine and fulfilling obligations to PII principals     Determine information for PII principals     Providing information to PII principals     Providing mechanism to modify or withdraw consent     Providing mechanism to object to PII processing     Access, correction and/or erasure     PII controllers' obligations to inform third parties     Providing copy of PII processed     Handling requests     Automated decision making	Obligations to PII principals
Privacy by design and privacy by default	Limit collection     Limit processing     Accuracy and quality     Pll minimization objectives     Pll de-identification and deletion at the end of processing     Temporary files     retention     Disposal     Pll transmission controls	Temporary files     Return, transfer or disposal of PII     PII transmission controls
PII sharing, transfer and disclosure	Identify basis for PII transfer between jurisdictions     Countries and international organizations to which PII can be transferred     Records of transfer of PII     Records of PII disclosure to third parties	Basis for PII transfer between jurisdictions     Countries and international organizations to which PII can be transferred     Records of PII disclosure to third parties     Notification of PII disclosure requests     Legally binding PII disclosures     Disclosure of sub-contractors used to process PII     Engagement of a subcontractor to process PII     Change of sub-contractor to process PII





## THANK YOU FOR YOUR ATTENTION







