# PRediction of Opioid-induced respiratory Depression In patients monitored by capnoGraphY

Published: 12-04-2017
Last updated: 14-04-2024

The purpose of this study is to improve the prediction of RD episode in patients undergoing opioid therapy in the hospital ward (also known as the General Care Floor) to guide clinicians and nursing staff in selecting the at-risk patients who could...

| | |
|---|---|
| **Ethical review** | Approved WMO |
| **Status** | Recruitment stopped |
| **Health condition type** | Respiratory disorders NEC |
| **Study type** | Interventional |

## Summary

### ID

NL-OMON42863

**Source**
ToetsingOnline

**Brief title**
Prodigy

### Condition

- Respiratory disorders NEC

**Synonym**
opoid induced RD, respiratory depression

**Research involving**
Human

### Sponsors and support

**Primary sponsor:** Medtronic B.V.
**Source(s) of monetary or material Support:** Medtronic BV

## Intervention

**Keyword:** Capnography, respiratory depression

## Outcome measures

### Primary outcome

The primary endpoint used to derive the score will be the occurrence of RD episodes resulting by C20p device memory data combined with clinical data and validated by an independent Clinical Endpoint Committee (CEC) during the study course. A RD episode is defined by whichever event is reached first during the monitoring phase:

* RR * 8 breaths for * 3 minutes.

Or

* SpO2 * 85% for * 3 minutes.

Or

* EtCO2 * 60 mmHg for * 3 minutes.

Or

* Apnea episode lasting > 30 seconds

Or

* Any invasive intervention taken from clinical staff to prevent a potential or to treat a respiratory Opioid-Related Adverse Events (ORADE).

### Secondary outcome

1 RD risk patients versus no-risk patients will be compared in terms of:

* Incidence of both invasive and non-invasive staff interventions (e.g. physical stimulation of the patient, naloxone administration, positive pressure ventilation and assistance from a respiratory therapist or a physician, etc.).

* Hospital length of stay, 30 days readmission rate and primary diagnosis upon readmission.

* Patient mortality at 30 days.

2 The sub-group of non-surgical patients will be described in terms of specific baseline characteristics, RD occurrence, respiratory ORADE occurrence, etc.

3 Staff satisfaction and patients* satisfaction on the use of capnographic monitoring will be assessed by NRS 1-10 at the end of the monitoring period. Appropriateness of alarms will be measured by calculating sensitivity and specificity based on received operator*s reaction.

4 Respiratory ORADE will be correlated with ASA value as reported in the related reports.

5 IPI value*s variations will be correlated with the occurrence of RD and respiratory ORADE.

6 Abnormal readings/waveform patterns in the first 2.5 hours from monitoring start will be correlated with RD and ORADE occurrence.

7 EtCO2 variations will be correlated with the occurrence of sepsis.

8 Cost associated to invasive staff interventions will be estimate retrospectively using standard cost data from different countries.

# Study description

**Background summary**

Opioid analgesia is the primary pharmacologic intervention for managing pain in hospitalized patients. Opioid therapy is indeed the gold standard for treatment of post-surgical pain in hospital ward but also the majority of non-surgical patients admitted in hospital are exposed to opioids. They can be administered

orally, by Patient Controlled Analgesia (PCA), by epidural or intrathecal infusions, by intravenous or intramuscular analgesia. In recent years there have been increasing concerns over unmonitored mortality and morbidity in patients during opioid therapy for acute pain. Up to 80% of patients who received opioid analgesics experience Opioid-Related Adverse Drug Events (ORADEs). In post-surgical patients, ORADEs have been showed to significantly increase patient*s hospital length of stay and related costs. Improper patients* monitoring has been reported by the Joint Commission as one of the main causes of ORADEs.

One of the major opioid side effects includes respiratory depression (RD), which causes alveolar hypoventilation and hypoxemia. The reported incidence of RD in post-surgical patients varied from 0.3% to 3.4% only considering intervention rate (i.e. naxolone infusion), while it is reported up to 21% and 41% when including also prolonged oxygen desaturation and bradypnea episodes, respectively. If detected early, most cases of opioid-related RD can be treated with naloxone; however, severe cases can be fatal.

Respiratory Compromise is a state in which there is a high likelihood of decompensation into respiratory depression, respiratory failure or death, but in which specific interventions (enhanced monitoring and/or therapies) might prevent or mitigate decompensation10. Detection of a patient*s Respiratory Compromise status before progression can help avert unwarranted outcomes and the possible need for critical care. Despite this, there are no universally accepted guidelines to direct effective and safe assessment and monitoring practices for patients receiving in-hospital opioid analgesia1. Current standard of care for respiratory monitoring of hospital ward patients receiving opioid therapy is intermittent documentation of oxygen saturation ($SpO_2$) value (e.g. performed at 4 to 6 hours intervals). Some centers perform continuous $SpO_2$ monitoring to patients considered at risk to develop RD, but the decision is usually left to physician discretion. Respiratory rate (RR) is often determined by clinician assessment though manual respiration counts9. Typically, only some high-risk patients are monitored by capnography, a technology that assesses real-time ventilation by continuous measuring of $SpO_2$, RR and the concentration of exhaled end tidal carbon dioxide ($etCO_2$).

Pulse oximetry alone can lead to inaccurate assessment of patients* condition, especially when supplemental oxygen is needed: the Anesthesia Patient Safety Foundation recommended the use of continuous electronic monitoring of oxygenation and ventilation for all patients undergoing opioid therapy in the postoperative period and capnography monitoring when supplemental oxygen is needed. Even at low respiratory rate, $SpO_2$ could be maintained for a certain period, thus delaying the RD detection. Many patients who breathe inadequately at rest or during sleep may present normal or near-normal oxygen saturation after they are awakened.

Growing evidence supports the use of capnography for earlier and more reliable warnings of RD in postoperative patients in the general ward, compared with pulse oximetry. It has been demonstrated that RD detected by capnography by bradypnea is significantly higher than RD detected by oxygen desaturation in post-surgical patients using PCA6, while there are no data in literature

related to capnography monitoring in non-surgical patients.

### Study objective

The purpose of this study is to improve the prediction of RD episode in patients undergoing opioid therapy in the hospital ward (also known as the General Care Floor) to guide clinicians and nursing staff in selecting the at-risk patients who could more benefit from capnographic monitoring by:
- Deriving a score risk assessment tool in a derivation cohort;
- Evaluating the prognostic value of the score for the prediction of RD in an internal validation cohort.

### Study design

PRODIGY is a prospective, multi-center, post-market interventional, international cohort study. The study will include consecutively enrolled patients

### Intervention

NVT

### Study burden and risks

Patients will be monitored during at least 24 hours by capnography and pulse oxyon sensors. this is a common method

## Contacts

**Public**
Paul Schelfhout

Endepolsdomein 5
Maastricht 6229 GW
NL
**Scientific**
Paul Schelfhout

Endepolsdomein 5
Maastricht 6229 GW
NL

# Trial sites

## Listed location countries

Netherlands

# Eligibility criteria

**Age**
Adults (18-64 years)
Elderly (65 years and older)

## Inclusion criteria

1. Patients admitted to a hospital ward with an ongoing opioid therapy (for both post-surgical and non-surgical pain) by PCA, by epidural or intrathecal infusions or by intravenous analgesia, started in OR, ER, PACU or ICU less than 4 hours before transition to ward;
OR
Patients starting opioid therapy in the ward for both post-surgical and non-surgical pain therapy, by PCA, by epidural or intrathecal infusions or by intravenous analgesia.
2. Patients with age *18 year old
3. Subject is able and willing to give informed consent.

## Exclusion criteria

1. Post-surgical patients with American Society of Anesthesiologists physical status (ASA PS) IV or higher.
2. Non-surgical patients not suitable for all range of therapies according to their life expectancy.
3. Ventilated or intubated patients.
4. Bariatric patients (BMI >50).
5. Unconsciousness patients that have undergone emergency surgical procedures.
6. Patients with alcohol or drug abuse history.
7. Subject is employed by Medtronic or by the department of any of the investigators or is a close relative of any of the investigators.
8. Subject is unwilling or unable to comply fully with study procedures (including non-toleration of capnography cannula) due to any disease condition (including neurological or psychological impairment) which can raise doubt about compliance and influencing the study outcome.
9. Legal incapacity or evidence that a subject cannot understand the purpose and risks of the study.

10. Subject is participating in another potentially confounding drug or device clinical study

# Study design

## Design

**Study type:** Interventional

| | |
|---|---|
| Masking: | Open (masking not used) |
| Control: | Uncontrolled |
| Primary purpose: | Diagnostic |

## Recruitment

NL

| | |
|---|---|
| Recruitment status: | Recruitment stopped |
| Start date (anticipated): | 02-05-2017 |
| Enrollment: | 330 |
| Type: | Actual |

## Medical products/devices used

| | |
|---|---|
| Generic name: | Capnography |
| Registration: | Yes - CE intended use |

# Ethics review

Approved WMO

| | |
|---|---|
| Date: | 12-04-2017 |
| Application type: | First submission |
| Review commission: | METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht) |

# Study registrations

## Followed up by the following (possibly more current) registration

No registrations found.

## Other (possibly less up-to-date) registrations in this register

No registrations found.

## In other registers

| Register | ID |
|---|---|
| Other | clintrials.gov |
| CCMO | NL58496.068.16 |