Review title and timescale

1. Review title
   Give the working title of the review. This must be in English. Ideally it should state succinctly the interventions or exposures being reviewed and the associated health or social problem being addressed in the review. *Surgical risks for patients with metabolic syndrome: a systematic review and meta-analysis*

2. Original language title
   For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

3. Anticipated or actual start date
   Give the date when the systematic review commenced, or is expected to commence.
   05/12/2016

4. Anticipated completion date
   Give the date by which the review is expected to be completed.
   28/04/2017

5. Stage of review at time of this submission
   Indicate the stage of progress of the review by ticking the relevant boxes. Reviews that have progressed beyond the point of completing data extraction at the time of initial registration are not eligible for inclusion in PROSPERO. This field should be updated when any amendments are made to a published record.

   The review has not yet started

<table>
<thead>
<tr>
<th>Review stage</th>
<th>Started</th>
<th>Completed</th>
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<tbody>
<tr>
<td>Preliminary searches</td>
<td>No</td>
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<td>Piloting of the study selection process</td>
<td>No</td>
<td>No</td>
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<td>Formal screening of search results against eligibility criteria</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Data extraction</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Risk of bias (quality) assessment</td>
<td>No</td>
<td>No</td>
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<td>Data analysis</td>
<td>No</td>
<td>No</td>
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   Provide any other relevant information about the stage of the review here,

   *This protocol is part of a higher degree research project which will inform the development of risk-based clinical guidelines for syndrome patients with metabolic syndrome*

Review team details

6. Named contact
   The named contact acts as the guarantor for the accuracy of the information presented in the register record.
   Dr Ralph

7. Named contact email
   Enter the electronic mail address of the named contact.
   nicholas.ralph@usq.edu.au

8. Named contact address
   Enter the full postal address for the named contact.
   W520, University of Southern Queensland, West Street, Toowoomba, Australia, 4350

9. Named contact phone number
   Enter the telephone number for the named contact, including international dialing code.
   +61403844305

10. Organisational affiliation of the review
    Full title of the organisational affiliations for this review, and website address if available. This field may be completed
Review team members and their organisational affiliations
Give the title, first name and last name of all members of the team working directly on the review. Give the organisational affiliations of each member of the review team.

<table>
<thead>
<tr>
<th>Title</th>
<th>First name</th>
<th>Last name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr</td>
<td>Philip</td>
<td>Norris</td>
<td>Institute of Resilient Regions, University of Southern Queensland</td>
</tr>
<tr>
<td>Dr</td>
<td>Nicholas</td>
<td>Ralph</td>
<td>Institute of Resilient Regions, University of Southern Queensland</td>
</tr>
<tr>
<td>Dr</td>
<td>Clint</td>
<td>Moloney</td>
<td>Institute of Resilient Regions, University of Southern Queensland</td>
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Funding sources/sponsors
Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Any unique identification numbers assigned to the review by the individuals or bodies listed should be included.
None declared

Conflicts of interest
List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.
Are there any actual or potential conflicts of interest?
None known

Collaborators
Give the name, affiliation and role of any individuals or organisations who are working on the review but who are not listed as review team members.

<table>
<thead>
<tr>
<th>Title</th>
<th>First name</th>
<th>Last name</th>
<th>Organisation details</th>
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<tbody>
<tr>
<td>Dr</td>
<td>Rachel</td>
<td>King</td>
<td>University of Southern Queensland</td>
</tr>
</tbody>
</table>

Review methods

Review question(s)
State the question(s) to be addressed / review objectives. Please complete a separate box for each question.
Do adult surgical patients with metabolic syndrome have higher postoperative complication rates than adult patients without metabolic syndrome?

Searches
Give details of the sources to be searched, and any restrictions (e.g. language or publication period). The full search strategy is not required, but may be supplied as a link or attachment.
We will search the following electronic bibliographic databases: MEDLINE, EMBASE, The Cochrane Library (Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Methodology Register); and Science Direct. The search strategy will include only terms relating to or describing the intervention.

URL to search strategy
If you have one, give the link to your search strategy here. Alternatively you can e-mail this to PROSPERO and we will store and link to it.

I give permission for this file to be made publicly available
No
18 Condition or domain being studied
Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.
Surgical outcomes in patients with metabolic syndrome

19 Participants/population
Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.
Inclusion: Adults with metabolic syndrome undergoing surgery (as diagnosed using NCEP ATPIII, JIS or Harmonized Definition of Metabolic Syndrome). Exclusion: Adolescents and children (under 18 years of age); minor surgical procedures; surgical patients without metabolic syndrome; surgical patients diagnosed using other definitions of metabolic syndrome

20 Intervention(s), exposure(s)
Give full and clear descriptions of the nature of the interventions or the exposures to be reviewed
Inclusion: Patients with metabolic syndrome undergoing moderate or major surgical procedures of all types Exclusion: Minor surgery including lesion removal; cataract surgery; day procedures; endoscopic procedures.

21 Comparator(s)/control
Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group).
Surgical patients undergoing moderate or major surgery who are not diagnosed with metabolic syndrome

22 Types of study to be included
Give details of the study designs to be included in the review. If there are no restrictions on the types of study design eligible for inclusion, this should be stated.
We will include observational studies which investigate and will supplement these with observational studies (including cohort and case–control studies) for the assessment of harms.

23 Context
Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.
Patients undergoing surgery in an operating theatre will be included in the review. All countries will be considered.
Inclusion Criteria: • Adult patients (18 years or >) • Undergoing surgery • Diagnosed with metabolic syndrome as per authors definition Exclusion Criteria: • Non-adult patients • Caesarean section or minor surgical procedures • Trauma or non-elective procedures • Minor procedures (e.g. lesion removal; cystoscopy; endoscopy)

24 Primary outcome(s)
Give the most important outcomes.
The primary outcomes will be point prevalence of complication rates and other related outcomes at key intervals in the surgical experience. Period prevalence data will also be recorded for outcomes such as readmission, as well as short and long-term mortality and morbidity. Cumulative incidence and incidence rates across the categories of intraoperative mortality and morbidity and postoperative morbidity, mortality, length of stay and readmission will be reported. Mortality and Postoperative complications; Quality of life.
Give information on timing and effect measures, as appropriate.
We will review primary outcome data relevant to key clinical timelines such as: (1) observation of postoperative outcomes among surgical patients with metabolic syndrome up to 30 days; (2) Three-month outcomes; (3) Twelve month outcomes.

25 Secondary outcomes
List any additional outcomes that will be addressed. If there are no secondary outcomes enter None.
Length of stay; Readmission; Quality of Life
Give information on timing and effect measures, as appropriate.
We will review secondary outcome data relevant to key clinical timelines including: (1) observation of postoperative outcomes among surgical patients with metabolic syndrome up to 30 days; (2) Three-month outcomes; (3) Twelve month outcomes.

26 Data extraction (selection and coding)
Give the procedure for selecting studies for the review and extracting data, including the number of researchers involved and how discrepancies will be resolved. List the data to be extracted.

Independent screening of titles and abstracts against inclusion and exclusion criteria will be performed by two reviewers to identify studies for potential inclusion. Following the initial search for studies, full-text copies of article will be independently assessed for compliance with eligibility criteria. Any discrepancies between the two reviewers will be marked within data management software and resolved through discussion with a third reviewer. Studies which appeared to be candidates for inclusion but excluded at this stage of review will be detailed in a table entitled “Characteristics of Excluded Studies” where a justification for exclusion will be listed. The final list of studies included in the review will be verified by all three reviewers and a PRISMA flow diagram will be provided detailing the decisions that are made in the data collection process. Data will be extracted on the following and entered into Review Manager 5 to ensure the consistency of information retrieved and presented across studies: 1. Study Details: title, journal, author, year, city and country where research was conducted, type of publication, and funding source. 2. Methods: eligibility of study (as per inclusion criteria); study aim, data collection method, recruitment, randomisation and sampling methods. 3. Participant Demographics: number of participants, population demographics; metabolic syndrome diagnostic criteria applied; reported complications. 4. Outcome measures: estimates of, and data for point and period prevalence, cumulative incidence and incidence rate of postoperative complications in adult surgical patients with metabolic syndrome. 5. Limitations: selection bias, response bias, information bias, assessment tool used and limitations identified by study authors.

27 Risk of bias (quality) assessment
State whether and how risk of bias will be assessed, how the quality of individual studies will be assessed, and whether and how this will influence the planned synthesis. The risk of bias will be assessed for included studies using an instrument specifically designed for appraising the quality of studies including conducting quality appraisal of studies in systematic reviews of prevalence data (Munn, Moola, Riitano, & Lisy, 2014). Two reviewers (PN and NR) will appraise studies using the tool with the third reviewer (CM) to resolve discrepancies. The instrument can be employed for different study designs as a mechanism to appraise studies for internal and external validity relevant to assessing prevalence data. The instrument assesses representativeness, recruitment, sample size, reporting, data coverage, condition reliability, statistical analysis and confounding factors using a simple “yes”, “no”, “unclear” or “not/applicable”. Results of the assessment will be presented in table format. Publication bias and selective bias will be addressed by critiquing study findings in consideration of GRADE 5 guidelines. Plots will be produced for outcome variables in the context of sample sizes (Egger, Davey Smith, Schneider, & Minder, 1997). Where missing data is an issue, the authors will contact the original investigators to request the data. Similarly, sensitivity analyses will be performed to reflect changes in the findings with discussion addressing the outcomes where appropriate.

28 Strategy for data synthesis
Give the planned general approach to be used, for example whether the data to be used will be aggregate or at the level of individual participants, and whether a quantitative or narrative (descriptive) synthesis is planned. Where appropriate a brief outline of analytic approach should be given.

Data extracted from included studies will be presented in evidence tables. Descriptive narrative will accompany meta-analysis to summarise the prevalence of outcomes of interest for adult surgical patients with metabolic syndrome according to age, surgical type, and setting. Meta-analysis of outcome variables will be conducted where appropriate in reporting outcome estimates. The outcome variables will be grouped to identify similar patient populations and enable meta-analyses where the designs of studies are similar. Incidence and prevalence data will be presented with corresponding standard error and 95% confidence intervals using the exact binomial method and has been used in previous systematic reviews and meta-analyses (Chaabna, Mohamoud, Chemaitelly, Mumtaz, & Abu-Raddad, 2014; Craig et al., 2014; Kane, Blake, McArdle, Langley, & Sims, 2016). This method produces an exact confidence interval that is specifically informed by the binomial distribution instead of an approximation to the binomial distribution.

29 Analysis of subgroups or subsets
Give any planned exploration of subgroups or subsets within the review. ‘None planned’ is a valid response if no subgroup analyses are planned.

Subgroup analysis and sensitivity analysis will be performed to assess the heterogeneity of included studies. Meta-analysis will also be carried out if homogeneous study groups are identified. Descriptive narrative for statistical data will also be provided to highlight findings of the systematic review and meta-analysis.

Review general information

30 Type and method of review
Select the type of review and the review method from the drop down list.
31 Language
Select the language(s) in which the review is being written and will be made available, from the drop down list. Use the control key to select more than one language.

**English**

Will a summary/abstract be made available in English?
**Yes**

32 Country
Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved. Use the control key to select more than one country.

**Australia**

33 Other registration details
Give the name of any organisation where the systematic review title or protocol is registered together with any unique identification number assigned. If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here.

34 Reference and/or URL for published protocol
Give the citation for the published protocol, if there is one.
Give the link to the published protocol, if there is one. This may be to an external site or to a protocol deposited with CRD in pdf format.

I give permission for this file to be made publicly available
**Yes**

35 Dissemination plans
Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

A dissemination plan is currently in place involving: 1. Conference presentation 2. Publication of protocol and review 3. Email authors of included studies on review publication 4. Email network of hospital leaders and influential stakeholders alerting them to the findings

Do you intend to publish the review on completion?
**Yes**

36 Keywords
Give words or phrases that best describe the review. (One word per box, create a new box for each term)

**metabolic syndrome**

**surgery**

**complications**

**systematic review**

**meta-analysis**

37 Details of any existing review of the same topic by the same authors
Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

38 Current review status
Review status should be updated when the review is completed and when it is published.

**Ongoing**
39 Any additional information
Provide any further information the review team consider relevant to the registration of the review.

40 Details of final report/publication(s)
This field should be left empty until details of the completed review are available.
Give the full citation for the final report or publication of the systematic review.
Give the URL where available.