microscopic hematuria, which previously had been considered benign, does incur a risk for detrimental outcomes.

Sarafidis also raises the issue of population-based dipstick screening. Our study was not designed to evaluate the cost-effectiveness or utility of such screening programs. Nevertheless, in the United States, about 10.8% of adults younger than 65 years have early-stage chronic kidney disease, and chronic kidney disease has been associated with disability even before the onset of ESRD, thus rendering undetected chronic kidney disease a public health concern. This, together with the fact that screening programs detect proteinuria in addition to hematuria, should be taken into account when considering the need for population-based screening. Even without population-based screening programs, urinary dipstick tests are commonly performed in young adults in different settings; the results of our study suggest that in such cases, the incidental finding of microscopic hematuria has diagnostic, follow-up, and management implications that should be further studied.

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RESEARCH LETTER

Reporting of Effect Direction and Size in Abstracts of Systematic Reviews

To the Editor: Clinicians commonly misinterpret systematic review abstracts: a recent study showed many arrived at incorrect conclusions, and only 62% correctly identified the direction of the main effect.

Interpreting numerical results requires statistical knowledge that many clinicians lack. To ensure correct interpretation, abstracts should give the direction and size of effects both in words and numerically. Because systematic reviews are important and widely used summaries of primary research, we decided to examine a sample of systematic review abstracts to assess the nature and extent of any deficiencies in reporting.

Methods. The systematic reviews selected were all new reviews of interventions published in issue 4, 2009, of the Cochrane Library and from a search (based on Moher et al) of the National Library of Medicine’s 119 Core Clinical Journals (Abridged Index Medicus) during 2009. Reviews were eligible if they included 1 or more meta-analyses comparing interventions. Eligibility was broad, as there is no widely agreed definition of a systematic review. We used a definition by Moher et al: “... the authors’ stated objective was to summarize evidence from multiple studies, and the article described explicit methods, regardless of the details provided.”

One author (E.M.B.) screened all titles and abstracts with a second author (S.H.) independently checking citations classified as possible systematic reviews based on full-text review. All Cochrane reviews and a random sample of eligible non-Cochrane reviews were selected for data extraction.

From abstracts, 2 authors (E.M.B., P.P.G.) independently extracted the description in words of the direction and size of effect, statistical significance, numerical estimates of effect size (relative and absolute), P value, and confidence interval.

Results. We included 64 Cochrane and 125 of 275 non-Cochrane systematic reviews (FIGURE); 7 of the non-

Figure. Flow Diagram of Selection of Systematic Reviews and Primary Results of Analysis

- 1365 Potential reviews selected from NLM Core Clinical Journals in 2009
- 659 Excluded after titles and abstracts screened
- 706 Full-text articles screened
- 431 Excluded
  - 159 Comparative prognosis and diagnosis reviews
  - 151 Narrative reviews or editorials
  - 80 Noncomparative systematic reviews
  - 21 Methodology
  - 13 Other research
  - 7 No abstract
- 275 Comparative systematic reviews of interventions
- 125 Reviews randomly selected
- 7 Excluded (no meta-analysis)
- 118 Reviews with meta-analyses
  - 64 New Cochrane reviews from issue 4, 2009
- 162 Reports of systematic reviews with abstracts
  - 105 Direction of effect obvious from wording of abstract
  - 77 Direction of effect not obvious from wording of abstract
  - 34 Direction of effect could be determined from numerical or other information
  - 43 Direction of effect could not be determined

NLM indicates National Library of Medicine.

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Cochrane reviews did not include a meta-analysis, leaving 182 abstracts.

Of 182 abstracts, 77 (42%) did not describe the direction of intervention effect in words (Figure), and only 22 (12%) described the size in words. In 34 (19%), the direction of effect could only be determined by interpreting numerical results.

In 43 (24%) of the abstracts, we could not reliably determine the direction of effect (Figure). Sometimes a risk or odds ratio was stated, and if it was less than 1, the direction might be assumed to favor the intervention (for example, “The pooled relative risk was 0.62 [95% CI, 0.45 to 0.86]...”). However, we classified these instances as ambiguous.

Although all included reviews contained a meta-analysis, 45 (25%) gave no numerical effect measure and 44 (24%) gave no measure of uncertainty (Table).

Besides Cochrane reviews less frequently providing P values (6% vs 28%), reporting of effects in Cochrane and non-Cochrane reviews were similar.

Comment. For 42% of abstracts of systematic reviews, the direction of the main effect either could not be determined or needed to be inferred. Statistical uncertainty was also poorly reported. 24% of abstracts reported neither a confidence interval nor a P value.

Because many readers can only, or will only, read a systematic review’s abstract, clear presentation of the main results is vital. Although guidance exists for clinical trial abstracts, guidance for reporting systematic review abstracts does not, other than general guidelines in the PRISMA statement and the Cochrane Handbook for Systematic Reviews of Interventions. Guidelines for writing abstracts are needed and should include not only which items are presented, but how.

Although abstracts should present estimates of effect and confidence intervals, interpretation of the results should not require statistical knowledge. Given the high level of innumeracy among journal readers, the main results should be presented in both words and numbers. Although replication in a wider sample of journals is desirable, the apparent poor quality of systematic review abstracts deserves attention from authors, reviewers, and journal editors.

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Author Contributions: Ms Beller had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Beller, Glasziou, Hopewell, Altman.

Acquisition of data: Beller, Glasziou, Hopewell.

Analysis and interpretation of data: Beller, Glasziou, Hopewell, Altman.

Drafting of the manuscript: Beller.

Critical revision of the manuscript for important intellectual content: Beller, Glasziou, Hopewell, Altman.

Statistical analysis: Beller, Glasziou, Hopewell.

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Table. Reporting of Effect Size in Numerical Format and Measures of Statistical Uncertainty (N = 182)

<table>
<thead>
<tr>
<th>Effect size in numerical format</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not given or calculable</td>
<td>45 (25)</td>
</tr>
<tr>
<td>Absolute only</td>
<td>28 (15)</td>
</tr>
<tr>
<td>Relative only</td>
<td>87 (48)</td>
</tr>
<tr>
<td>Both only with calculation</td>
<td>14 (8)</td>
</tr>
<tr>
<td>Both stated</td>
<td>8 (4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistical uncertainty, confidence interval and P value</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neither given</td>
<td>44 (24)</td>
</tr>
<tr>
<td>P value only</td>
<td>12 (7)</td>
</tr>
<tr>
<td>Confidence interval only</td>
<td>101 (55)</td>
</tr>
<tr>
<td>Both given</td>
<td>25 (14)</td>
</tr>
</tbody>
</table>